The design of a distributed learning system to support a transnational learning centre network

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This paper starts by highlighting increasing levels of multi-site transnational education, increasing acknowledgement of the importance of students learning from other students; and the increasing importance of making strong quality statements about educational processes and outcomes. The paper then describes how a Distributed Learning System (DLS) could support efficient, high quality educational provision in a multi-site educational business based on discrete learning centres. The presentation will include evidence of the operation of the NextEd DLS from studies conducted in Australia and overseas, exploration of several scenarios exemplifying the way a DLS can support Quality Assurance in a multi-site transnational educational business and demonstration of the NextEd Distributed Learning System (DLS).

Keywords: Distributed Learning System, educational management, educational quality, off shore education, transnational education, learning centres

Three trends in higher education

This paper picks up on three educational trends:

- The move from single location educational provision to multi-location educational provision in the form of transnational borderless education (Cunningham et al., 2000)
- The realisation that higher education is more than the transmission of knowledge to the student and that the active dialogue between students is also vitally important Mayes (2001)
- The acceptance of the critical importance of quality assurance of all educational provision especially that of transnational education (GATE,1999)

Growth of off shore transnational educational provision

The higher education market in Australia can be divided into the following segments:

- On campus education of domestic students
- Off campus or online education of domestic students using distance educational materials
- On campus education of international students
- Off campus education of international students
- Off shore education provided in local learning centres to international students

Of these sectors the last three are growing the quickest with "Educational Services" being the third largest service exported from Australia after those of "Tourism" and "Transport". Moreover the Educational Services sector has experienced the second highest growth rate with a compound growth of 10.6% since 2000 (IDP Education Australia, 2004).

The importance of this sector is clearly evidenced by the fact that:

Australian universities have signed over 1000 agreements with offshore universities, industry associations, and private providers and it is estimated that around 36% of international students studying Australian programs are doing so in countries other than their own. (Heffernam & Poole, 2004, p. 75)

By 2025 it is estimated to be around 44% of international students at Australian universities will be studying at off shore locations (Bohm et al cited in Heffernam & Poole, 2004)

Example of a distributed educational business

The Global Alliance for Transnational Education (GATE) refers to transnational education as any "teaching or learning activity in which the students are in a different country (the host country) to that in which the institution providing the education is based (the home country)" (GATE, 1999). In addition to being transnational the vast majority of distributed learning businesses operate at multiple sites and generally in multiple countries.

There are many different transnational education businesses including (Jones, 2001):

- Branch campus - where the student is effectively studying with the university
- Franchises - where the university has licensed the local centre to use its courses under certain conditions
- Articulation - where the university agrees that courses undertaken at the local centre can be transferred into the university program when the student appliances for admission into their program
- Twinning - where the students are effectively enrolled in both programs

Before continuing it is worthwhile describing such distributed educational businesses:

- A university who awards a given program of courses
- A local partner who owns an education centre
- The student studies several years with the local partner often without being a formal student of the home institution. After completing several years that student can enrol with the university and either complete the final year with in Asia or perhaps in Australia

Hilsberg claims that the "rapid emergence of chains of distance learning centres across a wide range of educational programs" has been remarkable.

> In describing the growth of distance learning centres, Hilsberg frequently refers to India-based NIIT, a provider of online learning primarily in the IT sector…. NIIT has more than 1,900 learning centres located in more than 22 countries, but primarily in India and, to a lesser extent, China. "NIIT has 280,000 students paying $100 per 3-credit course," says Hilsberg. "They graduate 80,000 students per year from a two-year diploma program…. Companies like NIIT will become major forces in the world market for higher education over the next 30 years because they will provide reasonably good product at a low cost. (Lorenso, 2001).

The Global University Alliance provides another example of such a transnational educational system. The GUA Blended Learning Model is an enabling system to deliver high quality blended learning educational services in geographically dispersed locally owned Education Centres. These educational services are sourced from respected western universities and enable students to receive the same awards as received by the universities own students while benefiting from the flexibility and appropriateness of local educational support. (GUA, 2004)

Strengths and weakness of a distributed learning business

There are many reasons for the rapid increase in the number of educational operations based in learning centres:

- The relatively small size of the learning centres means that they can be rapidly setup
- They can offer courseware from western universities at a lower cost than directly from the university because the learning centre can use lower cost local labour
- Some students feel more comfortable studying in a local learning centre where they have some face to face and learning support rather than studying totally print based or online courses. (Ryan & Stedman, 2002)
- The huge unmet need for higher education in Asian counties and the fact that this demand is growing much faster than supply (Jones, 2001)

- Universities see partnerships with local learning centres as a cost effective way of expanding their business both in terms of building brand, entering new markets, expanding their activities and potentially increasing profits (McBurnie & Pollock, 2000)

While there are many drivers for the expansion of the local learning centre businesses there are also many limiting factors including:

- The complexity of the business and educational relationship between all partners
- Concern about the educational quality of such transnational operations

Quality assurance within transnational multi-site learning centres

While many of these off shore operations are working very well there:

> … appears to be concern across the university sector for the quality of many partnerships, for the ongoing strength of existing partnerships, and for the sustainability of offshore educational relationships as they are established and developed across nations, cultures and industries. (Heffernam & Poole, 2004, pp 77-78).

They continue by saying that the major difficulties are ones of process and difficulties ensuring that all parties clearly understand what is expected of them and how they procedurally deal with the business.

> What is clear is that traditional quality assurance systemic measures are no longer adequate for the new educational environment, with its blurred borders between informal and forum learning, online and on-campus provision, and a greater emphasis on outcomes-based assessment (Ryan & Stedman, 2002)

Thus quality, or the perception that there are quality problems or the difficulty of making clear statements demonstrating high quality, is a major issue for multi-site transnational educational providers. Heffernam and Poole (2004) suggest that the maintenance of high quality appears to be based on the strength of the relationship between key individuals and when these individuals move or the network becomes too large then the system breaks down. Moreover as the network of learning centres gets larger the time needed to intervene becomes longer and this can introduce its own difficulties.

In 2000 the UK Committee of Vice Chancellors and Principles (CVCP, 2000) made the following recommendations in relation to quality of borderless education:

> A stronger emphasis will need to be placed on internal quality management since external arrangements may become too costly and cumbersome to remain cost-effective.

> The nature of external quality assurance needs to shift from a compliance based approach towards comparative benchmarking.

The disaggregation of the value chain allowing a variety of partners (university, education center, agent, course leader, course tutor, marker, moderator etc) to provide services to the end to end educational system, means that it is too difficult for any external agency to visit all necessary points and thus there will be a need to replace external compliance based QA with internal comparative bench marking based QA.

Against these difficulties one researcher suggests that the digital nature of these systems means that it will be easier to do this comparative benchmarking:

> … for perhaps the first time in educational history the transitory outputs of the learning process will be recordable, storable, and open to judgement. These, provided they are not submerged under the waves of data-protection or commercial and professional sensitivities, will provide a powerful new source of evidence about the true educational value of the activities in question. (Mayes, 2001)

The impact of technology on educational outcomes

The remainder of this paper will examine the design and components of a DLS and the way in which such a system might support an educational business operating via partnerships in several locations

Technologies or the features of these technologies are not simple unitary forces that have the same impact on all people in all situations. Some technologies will enable certain behaviours in some people but not in others, e.g. a "tiered lecture theatre" and "a tutorial room". Each is best suited to a particular educational model but with skill and thought an educator could conduct the most learner centred educational experience in a lecture theatre or the most teacher led interaction in a tutorial room.

Description of a distributed learning system

A distributed learning system (DLS) should have the following types of components:

- A Publishing Solution to allow the cost effective publishing, distribution and reuse of courseware
- A Business Management System to facilitate student and course administration, process monetary transactions, support tracking and to provide executive reports.
- A Customer Support system allowing people to create support requests and have these resolved in a speedy and effective way
- A Learning System providing a supportive environment for teaching and learning within individual courses.

Episodes in the educational process

The remainder of this paper will examine features of a DLS in the context of the tasks that it enables through various episodes in the educational process. These educational episodes occur along one of several process sequences e.g. the student lifecycle contains the episodes of recruitment, credit transfer application, enrolment, course progression, graduation and retention. The course lifecycle contains stages of design, development, use, evaluation and redesign.

Of course, education and learning is a complex process and any attempt to compartmentalise it into a discrete stages will oversimplify the process.

Course development and redevelopment

Designing, developing and publishing the course

Historically, most Higher Education courses have been designed and developed by the same people who teach them—or at least by people within the same institution or faculty.

This has lead to the situation where each institution spends scarce resources to develop their own versions of core courses (e.g. Introductory Physics or Chemistry or Psychology) that are taught in most other similar institutions. Increasingly developmental costs are being spread over several institutions allowing the "content business" to buy the best talent in educational delivery and the best content experts to prepare courses, which are used in many different places (Ryan, 2001). In additional to the content extensive teacher's notes could also be prepared and distributed with the materials.

Underpinning the "content business" there must be flexible and standards based publishing tool allowing the publishing and reuse of the content. Standards such as SCORM (Advanced Distributed Learning, 2004) allow richly interlinked and interactive multimedia content to be shared among many institutions and thus share development costs. This publishing tool should also allow multiple people from multiple places to collaborate on the content.

Mayes (2001) contrasts three types of courseware:

> *Primary Courseware* is material intended mainly to present subject matter. It would typically be authored by subject matter experts but is usually designed and programmed by courseware specialists… *Secondary Courseware* describes the environment and set of tools by which the learner performs learning tasks, and the tasks (and task materials) themselves…. *Tertiary Courseware* is material, which has been produced by previous learners, in the course of discussion or in the assessment of their learning tasks. It may consist of dialogues between learners and tutors, or peer discussions, or outputs from

assessment…. The defining characteristic is the 're-use' of the learning experiences of other students. (Mayes, 2001), p 468-9)

He continues by arguing that higher education are using more "tertiary courseware" and this is especially important in a system that emphasises the "distributed" nature of learning. A DLS must not only present the content to the learner but also actively help the learner to use and integrate this information into their lives.

For example a student could:

- Create his or her own private annotated pathway through the course by weaving together their writing and materials from the course or even from discussions they have participated in
- Submit this as a piece of work in the course
- Publish this for use by others in the current offering of the course or future offerings of the course. This publishing could be certified by the teacher or be self publishing

Perhaps a student who has performed well in a course could receive discounts in future courses by being available to assist future students.

Course delivery

This section addresses processes, which would occur when a course is delivered in one or more centres.

Buying and fulfilment

A DLS should allow the centre and the student to "buy" the services, which they need in a scalable and cost effective way which does not overly burden the university. For example, some centres may decide that a course should be supported by a print version or a CD version of the course content. Of course, if something can't be "published" in the print version of the course e.g. an interactive online learning object, this must be clearly declared to the student and the student provided with a link allowing them to use these resources when online.

Blending centrally and locally provided services

A DLS must actively support educational activities which are provided centrally and those that are provided locally. A Blended Learning approach allows the integration of centrally and locally provided educational approaches as well as the use of a blend of different educational media. The Blended Learning approach has been captured by terms such as "clicks and mortar" or "high tech - high touch" to signify the importance of the both the online as well as physical environments and the importance of ensuring that they are blended together.

A DLS will allow the local learning centre to make, publish and implement certain decisions related to the delivery of courses in the local centre e.g. local pricing, local timing of course events, local support of students.

Table 1 shows a course study planner with items provided by the central university (week, topic and assessment), items provided by each local centre (local events) and items provided dynamically by the system (percentages).

Of course, the local centre must be given strict guidelines telling them what items can be modified for local use and what items can't be. One way of ensuring that these modifications happen in a clear and open way is to ensure that modifications are published in the DLS in a way clearly shows who created the modification and who the modification applies to e.g. students from a particular site.

User support and communication

One of the most labour intensive tasks within a multi-site educational business is to ensure that all users receive good quality support. This can be done by staffing a large central support centre to provide all support to remote students but this is neither a scalable or truly distributed system.

Table 1: Course study planner

Study planner

Week	Local dated and local events (provided by the local centre	Topic (% of students who have started) (% of students who have completed)	Assessment tasks (% started) (% completed)
1	Introductory seminar Monday July 15 6-9pm	Introduction (30%) (20%)	Creating your student profile (20%) (15%)
etc			

Details of local support

Name of local tutor:	
Location of classes:	
Times of meetings:	

Another approach is to model user support on a tiered Customer Support System allowing the synergistic blending of local and centralised support. Such a system also explicitly put the customer and their needs at the centre of the communication process. The basic customer support cycle is as follows:

1. The Customer or the User lodges a query through a system
2. A Customer Services Representative (CSR) is shown the query and the following supporting information: the history of the query, the history of the customer and a knowledge base of relevant articles which they can use to address the issue
3. The CSR can then either: respond to the query, request additional information from the user or allocate the request to another CSR

An important aspect of the system is that it is only the customer that can mark a query as resolved and until the query is resolved it will be flagged for escalation, perhaps to the central university. The fact that the support is traceable and auditable means that it becomes possible to make stronger quality statements about the operation of the system.

Student life cycle

Credit transfers and academic pathway planner

Increasingly students expect to be able to transfer some credit from their previous formal or informal education into the new program. It is beyond the scope of this paper to describe our approach to assessing Credit Transfer Applications but a DLS should allow the student and the course advisor to:

- Prepare a proposed pathway through the current program including any course credits which have been transferred into the program
- Log that this proposed pathway has been approved by the relevant people
- Log progress through this pathway

It is essential that all relevant people (the student, the advisor at the local centre, Academic Directors at both the Learning Centre and the university) have access to this pathway and modifications are logged.

Teaching and learning and management in a course

This section examines processes which focus on the individual course.

Location of the course content

In additional to ensuring that student support is distributed to the local learning centre, a DLS should allow the content to be located on a local server in the learning centre. This is recognition of the cost of providing high bandwidth Internet connections as well as reliability and speed limitations. This is especially important in the case of media rich courseware, e.g. English language instruction.

The fact that content is located on centre based servers means that there must be a sophisticated replication system allowing the content to be updated when connectivity allows.

If continued this principle of placing the content closer to the student, will result in students having personal versions of the course environment on a laptop which they can use independent of other systems. When reconnected to the Internet the personal version of the site synchronises with the server based site. Increasingly universities and publishers are talking about "mlearning" (Ryerson, 2002) and using mobile devices such as palm computers or mp3 players as a way of allowing students to access course materials while mobile.

Online presence of course participants

An important concept which has received much research lately is the concept of "online presence" or "social presence" (see Wallace, 2003 for a recent review).

> The learning community is the vehicle through which learning occurs online. Members depend on each other to achieve the learning outcomes for the course. If a participant logs on to a course site and there has been no activity on it for several days, he or she may become discouraged or feel some sense of abandonment--like being the only student to show up for class when even the instructor is absent. (Palloff & Pratt, 1999, p. 29)

It is easy to sympathise with a student who is excited by the prospect of online learning but after several enthusiastic forum messages or emails is left wondering if anyone else is in the class.

> I love the idea of learning anytime and anywhere. But, when I took my first course online I found myself feeling lonely! I was surprised by my reaction, since I am fairly quiet and rarely ask a lot of questions in class. What's happening?" Signed, "Lonely in e-learning Land" (The MASSIE Centre, 2001)

A DLS could provide the following tools to enable the creation of an "online presence" for course participants. Of course, it is also necessary to ensure that the tools are used in a thoughtful and informed way.

A simple class list providing a link to a student generated profile page allowing the student to say as much or as little as they want about themselves. This page should include a photo, a short audio introduction, links to email (or chat identities or phone numbers) and links to web pages. The student could also provide a link to a more extensive web site located outside the course environment.

It is ironic that most online courses provide the student with fingertip access to information within the course but generally don't indicate whether other students are online in the course. It is as if the students are working in a single room which has been partitioned with soundproof study cubicles.

A notable exception to this is Janison's Presence Awareness Tool that clearly shows whether anyone in a course is online and allows you to

> … send them an instant message or a quick email makes all the difference to personalising the online environment. Successful online learning depends on support networks and our Presence Awareness Tool helps you to build a healthy online community…. You will wonder how people ever studied online without the opportunity to form an online neighbourhood with our Presence Awareness capabilities. (Janison, 2004)

A common critique of much learning is that is done for an audience of one, the person who will assess their work. Finding a way of allowing students to demonstrate their leanings to their classmates or even to others outside the course is an ideal way of increasing the authenticity of learning.

Students monitoring their own learning

A DLS should also provide tools to allow students to embed their work in the social environment of their classmates. Such tools allow students to create a presence in the course and monitor their own learning against their classmates.

In a face to face educational environment, students can monitor their own level of learning by listening to other student questions in lecturers and tutorials and also discussing classes in the student cafe. One way of allowing online students to leave "learning footsteps" would be to place a brief survey at the end of each page or each module. Not all students would want to enter this information but those who did would immediately see a similar table containing the percentages of people within the course within each cell and the list of big ideas, questions and links.

Table 2: Reporting the "class" use of a module allowing the individual student to compare their own responses (in the shaded cell) to that of their classmates

100 of the 300 people in this course (33%) have visited this page	Answers related to this page or article (You replied in the shaded cell)		
Have you read this page?	[??%] No	[??%] partly	*[??%] Yes*
Do you agree with this page?	[??%] No	*[??%] unsure*	[??%] Yes
Do you understand this page?	[??%] No	[??%] unsure	*[??%] Yes*
What is the big idea on this page?	List of comments		
What is the big unanswered question on this page?	List of comments		
Do you have other comments?	List of comments		
Comments from the lecturer	List of comments		

Building such activity indictors into course will be useful for both students and teachers.

Managing learning groups

Many people have written about the importance of utilising group work in learning. If group work is so important, it is critical that the DLS provides tools to allow the course leader and students to form groups easily, work together in a flexible way and then to disband the group when needed.

If the mechanism for establishing groups is sufficiently easy to use then teaching staff and tutors can use it to structure the learning environment in a number of ways e.g. using groups to allocate students to markers, tutors or even allocate students to groups to allow different analyses of performance within the class and thus different comparative benchmarking upon which quality statements can be based (CVCP, 2000)

Marking, moderation and returning assessment items

As mentioned, the digital nature of a DLS allows different educational functions to be performed by different people at different locations. For example, an assignment could be submitted in Korea, marked in Malaysia and moderated in Australia before being returned to the Korean student. While this division of labour is possible using any system, the administrative and logistical overhead will prevent it from occurring unless the system provides flexible management tools. Below is one such way in which a DLS could support the cost-effective processing of assessment items in a multi-site learning environment.

This assessment environment is basically a threaded discussion forum with the following special features:

- The student can not see any messages posted by another student or any replies to a message from another student
- When a staff member replies to a student submission they can elect that the message will be visible to the student or hidden (if the assessment items is to be moderated the first marking will generally not be shown to the student)
- Notification messages are sent to various people depending on when items are send

The life cycle of an assessment item would be as follows:

- A reminder is automatically sent to the Course Marker and the Course Administrator when the student submits an assessment item
- The Course Marker downloads the assessment item, marks it electronically and then uploads it entering the Mark, Grade and sets the status to "First marked"
- The Moderator downloads the assessment item, moderates it, alters the mark if necessary, uploads it and enters the status as "Moderated" and releases it for viewing by the student
- Once the item is released the student is notified that the returned item is available and that the gradebook has been modified.

The fact that all the assessment processing occurs within a secure assessment forum means that the assessment process can be quickly audited and there is no need to use other systems to move assessment items around (e.g. secure email) or track assignments. Educationally powerful ideas such as student defined assignment assessment criteria, draft assignments also become more feasible. In addition these processes are easily scalable and by increasing the number of markers (from anywhere in the world).

Quality assurance

As already cited, the UK Committee of Vice Chancellors and Principles (CVCP, 2000) has argued that transnational educational enterprises need to make more use of internal quality management processes and comparative benchmarking. These comments are well supported by the fact that "the transitory outputs of the learning process will be recordable, storable, and open to judgement. (Mayes, 2001)

Much quality assurance depends on the ability to actively monitor system operation and quickly identify processes which are not occurring as they should. An Executive Information System (EIS) must provide relevant people with access to aggregated reports allowing them to make timely decisions. A DLS must also be able to generate notifications based on processes occurring outside defined level or based on statistical analysis of historical data. The DLS must also be able to aggregate data and present it in ways that provides educational managers with information allowing them to make decisions to guide the distributed educational business.

Issues to do with course supply, course purchases and other financial data need to be also reported in an integrated way allowing effective management and quality assurance.

Business processes and business reporting

Business processes and reporting

A multi-site transnational educational business is a complex business involving multiple organisations. These organisations generally have existing incompatible administrative, business and management systems and it is a real challenge to ensure that the basic information can flow between these organisations in a format that is timely and useful. For example, items like a student records system storing student numbers (often one from the university and one from the local centre), official communication to the student and basic information on payments. These processes are complicated because the system is multilevel-tiered system and different business units should be able to access different subsets of the entire database.

Summary

This paper has presented a vision of how a Distributed Learning System (DLS) might be used to support cost effective, scalable and high quality educational provision in a multi-site distributed education environment.

The presentation will contain our experiences based on the use of the NextEd DLS in several locations both in Australia and overseas. Additional information can be obtained by contacting me at the email address given below.

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