

# **Learning to Choose: Questioning the Use of Multiple Delivery Technologies by Australian Universities**

**Pauline Hagel**  
Faculty of Business and Law  
Deakin University, AUSTRALIA  
*hagel@deakin.edu.au*

## **Abstract**

*Communication and information technologies (CIT) have made possible a multitude of ways in which Australian universities can deliver their educational services. At the same time, universities face increasing pressure from new and emerging markets to diversify their delivery and to improve their efficiency. These pressures are the result of various policy, competitive, demographic and technological forces. In response to these forces universities are increasingly recognising the strategic importance of technology. However, for universities to act strategically, they need to move beyond the experimentation phase to make choices about what particular delivery strategies they should employ. This paper examines the diversification in delivery technologies by universities in terms of resource-based theories of competitive advantage. Resource-based theory suggests that sustainable strategies are those that make use of organisation-specific resources and capabilities that are dedicated to a specific competitive approach. This paper questions whether the pursuit of multiple delivery technologies is sustainable in the light of declining public funding of higher education and increasing competition in the sector.*

## **Keywords**

*Delivery technologies, Capabilities, Competitive advantage*

## **Introduction**

Communication and information technologies (CIT) have made possible numerous ways in which Australian universities can deliver their educational services. However, for universities to act strategically, they need to move beyond the experimentation phase with technology to make choices about what particular delivery strategies they should employ. This paper examines the diversification in delivery technologies by universities in terms of resource-based theories of competitive advantage. The first

section describes the technological and market changes occurring and the resultant convergence in delivery modes. Next, the resource-based perspective and the competitive role of capabilities are outlined. This is followed by a consideration of the production features and capability requirements of different delivery systems. The final sections examine the impact of CIT on delivery and consider the implications for capabilities and product market strategies.

### **Sector, Technological and Market Changes**

The environment in which Australian universities perform their functions of research, teaching and service has changed substantially in the past decade. Universities have been influenced by increasing 'massification' of the sector, reduced government funding, demands for greater efficiency and accountability, policy shifts towards system diversity and life-long learning (McCann, Christmass, Nicholson & Stuparich, 1998) and growing competition from within and from outside the sector (Cunningham, Tapsall, Ryan, Stedman, Bagdon & Flew, 1997).

At present the majority of Australian universities provide largely undergraduate education to students who attend a campus full-time, for a face-to-face learning experience. In 1999, approximately 14 per cent of students were studying by distance education supporting the contention made by Cunningham (1998) that distance education remains a marginal activity for most universities. Approximately 80 per cent of higher education institutes had some external enrolments, ranging from two to 76 per cent of total university enrolments (DETYA, 1999). In practice, however, there is growing evidence of a convergence occurring in teaching modes, as universities world-wide move towards resource-based and technology intensive study, fuelled by the desire to improve the productivity of on-campus teaching (Rumble, 1994). This trend is intensifying as both conventional and distance education universities diversify their delivery by using a range of CIT applications (Daniel, 1996; Yetton & Associates, 1997). As a result, official figures of university enrolments disguise the extent to which students are combining both internal and external units in their study programs or are enabling virtual attendance via, for example, the Internet, videoconferencing or computer conferencing.

The widespread experimentation of CIT in teaching delivery is being driven by a variety of learning, economic and strategic objectives. For example, it is argued that these technologies can produce more effective learning by: increasing the flexibility, and customisation of programs

(McCann et al, 1998); supporting collaborative learning (Cecez-Kecmanovic, 1996); and increasing interaction between learner and teacher. Further, CIT is said to reduce the human resource costs of delivery via economies of both scale and scope and to enable universities to compete across national borders (Cunningham et al 1997; McCann et al, 1998). Yetton (1997) pointed to the strategic opportunities for universities in using CIT to tailor their services to different market segments while King (1999) suggests that the application of technology to delivery enables universities to demonstrate their innovativeness.

These diverse and often competing objectives have fuelled an accelerated interest and experimentation in CIT based delivery. While the experimentation phase is important to explore the potential of the technology and the responses of students, at some point deliberate choices must be made if staff and resources are not to be spread too thinly. At present, alternative teaching and learning systems tend to be used, not in replacement of conventional systems, but in addition to them. Two typical

*Case 1:* Large metropolitan university with 80% on campus students makes available audio recordings via the WWW for the majority of first-year lectures. In addition, normal lectures and tutorials run with three to four hours allocated per week per unit.

*Case 2:* Large regional university with strong distance education tradition provides full service, face-to-face teaching to on-campus students. In addition, approximately 60 per cent of these students use

examples that illustrate this point are given in Figure 1.

*Figure 1: Use of alternative teaching systems*

It is the contention of this paper that duplication of delivery systems will not be sustainable as new technology and delivery systems are 'mainstreamed' and as competition and deregulation in the sector progresses. The essence of adopting a strategic approach is to make choices and commit scarce resources to the chosen strategy (Porter, 1996). In a 1997 study, Yetton examined how 12 universities were managing the use of CIT in teaching and administration and found evidence of three emerging strategies: 'value-added', 'cost-based' and 'hybrid'. These different approaches reflected the different initial conditions of universities. Yetton (1997:1) argued that:

While constrained by a common regulatory environment, universities have competed differently in the past because they have different histories, and they will compete differently in the future because they have different 'presents'. Underlying these different histories and different competitive positions are the inter-related factors of age, resources, reputation and location.

Here, Yetton (1997) applied directly to a resource-based perspective of competitive advantage to explain the competitive options facing universities in the use of CIT. While a resource-based perspective implies that each university may find successful ways to compete based on its own particular history, resources and capabilities, this perspective also implies that specific choices must be made so that the university's resources and capabilities are dedicated to a particular technology and delivery strategy.

## **Resources, Capabilities and Organisational Performance**

The notion that an organisation's capabilities may influence its performance and strategic opportunities arises from the resource-based view (RBV) of strategy. The RBV points to the existence of relatively stable, systematic differences in resource endowments across organisations as the explanation of performance differences and the source of competitive advantage (Foss, 1997).

A basic premise of the RBV is that resources are heterogeneous and immobile. Heterogeneity results from the different possible configurations of resources that evolve over time within an organisation. Heterogeneity enables organisations to earn above average returns as long as the resources are of value to customers (Barney, 1991) and ex post limits to competition exist (Peteraf, 1993; Barney, 1991). These limits arise due to the difficulties of imitating or substituting the resource and the imperfect factor markets for trading such resources (Barney, 1991; Peteraf, 1993). Two forms of intangible resources may be distinguished: relational resources and organisational knowledge (Nanda (1996). That is, some intangible resources, such as reputation or public goodwill, arise out of an organisation's relationships with its external constituents. Other resources accumulate from learning and are a by-product of the production process (Nanda, 1996:104). Resources that accumulate from learning are often referred to as capabilities.

The definition of capabilities adopted in this paper is that of Sanchez, Heene and Thomas (1996:7) who defined capabilities as 'repeatable patterns of action in the use of assets to create and/or offer products to a

market'. Underlying any action pattern is a complex set of knowledge, skills and resources. Knowledge and skills may reside within the individual but can be captured in organisational routines. Leonard-Barton (1992) proposed that a capability consists of several interrelated knowledge dimensions: employee knowledge and skills; technical and managerial systems; and values and norms. The complexity, multilayering and path dependency of capabilities make them potential sources of competitive advantage when they are embedded in products or services that customers demand. Competitive advantage is sustained by these unique capability configurations due to particular historical conditions, causal ambiguity and social complexity (Barney, 1991; Amit and Schoemaker, 1993).

Collis (1996:152) contends that for a capability to be a source of profit it must be able to create a singular product market position (such as low cost or differentiation) but also be sufficiently dynamic to allow the organisation to continuously advance its production frontier (Nelson and Winter, 1982). The investment required to create this position must be irreversible if it is to act as a credible deterrent to imitation (Collis, 1996:151). Irreversibility requires durable and specialised production capabilities that cannot be used easily for different purposes.

This resource based view of competitive advantage can be applied to the university sector to examine performance differences and strategic behaviour. In particular it can be used to examine the trend towards diversifying technology and delivery modes. What are the critical resource endowments of different technology and delivery modes and which should each university adopt?

## **Competing On Capabilities**

Theories of competitive advantage based on the role of internal resources and capabilities are only relevant insofar as Australian universities actually compete on their internal capabilities. To what extent do they do so? In their teaching function, universities compete for the best students, the best credentialed academic staff, private funding and corporate training contracts. In attracting these inputs the important resource is reputation. Reputation is an intangible resource that is difficult to imitate, substitute or trade (Barney, 1991). It is strongly correlated with age (Daniel, 1996:8). Age, location, exclusivity of access and reputation operate in a virtuous circle that reinforces the privileged position of some universities over

others (Marginson, 1997a). This situation exists due to the positional nature of education (Hirsch, 1976).

Positional goods are those which confer on a consumer a relative advantage in the competition for jobs, income, social regard and prestige (Hirsch, 1976). These goods are scarce in real terms and are valued for their exclusiveness. Positional advantage, which accrues to both individuals and universities, is derived from attending the elite universities and faculties. Demand for entry to the elite universities is relatively impervious to the quality of teaching. Marginson (1997b) contends that competition on quality is likely to be more intense at the lower ends of the market.

For the elite universities, their critical resource is reputation, embodied in their brand name. To protect the brand they need to maintain exclusivity of access. Their superior access to capital and other resources, and the demands of their key markets, will determine how they apply technology to their teaching delivery. Universities at the lower ends of the market do not have positional advantage and will increasingly require capabilities that enable them to compete on some combination of cost, quality or market focus. Each of these competitive approaches requires a different set of resources and capabilities.

Capabilities, a by-product of the production process, accumulate slowly in a complex, firm-specific way. Over time, each university has developed capabilities specific to its dominant technology and delivery mode, markets, technologies and models of teaching. These capabilities have the potential to provide a university with an 'operations-based advantage' (Hayes & Upton, 1998) if they are valuable, unique and difficult to imitate or trade. Alternatively, capabilities may present rigidities (Leonard-Barton, 1992) that prevent a university from responding to new market and technological opportunities.

The preceding analysis suggests that the starting point for developing sustainable competitive strategy is a thorough understanding of the university's capabilities that are embedded in its production or delivery systems.

## **A Typology of Delivery Modes: Technology and Capability Features**

Two stereotypical delivery modes can be distinguished: traditional distance education (TDE) and traditional campus-based (TCB). Figure 2 compares these delivery modes on their distinctive production/technology

and capability features. Capability features are suggested in terms four dimensions: employee knowledge and skills, technical systems, managerial systems, and values and norms (Leonard-Barton, 1992).

In Australia traditional distance education (TDE) involves the 'commodification' of teaching into written materials leading to a decoupling of production and consumption. Standardised curriculum is developed in a team-based, industrialised process (Peters, 1983). Academic control of teaching is limited by the need to meet deadlines and ensure consistency and quality. There is a heavy reliance on the skills and knowledge of multidisciplinary teams who translate content into learning 'packages'. Central to delivery are management and technical systems for materials production, scheduling, inventory management, mailing and assignment tracking. Distance education relies on such values as teamwork, public scrutiny of teaching output and mass efficiency.

Traditional campus-based delivery (TCB) is craft-based, relying heavily on the academic for the entire teaching process (Renwick, 1998). Production and consumption take place simultaneously by dispersed and autonomous service providers. Output is consequently heterogeneous, relying on the credentials and values of the academic rather than the prescriptions of curriculum and instructional designers. The TCB delivery relies on the knowledge creation ability of academic staff, on collegial management systems and technology that supports research and publication output.

Delivery Modes	Production/Technological Features	Capability Features
<i>Traditional Distance Education (TDE)</i> (paper-based materials delivered to geographically remote students)	Product largely intangible Product can be stored Asynchronous production and consumption Standardised output Team-based, industrialised system High formalisation Centralisation	Knowledge of adult and part-time learners and requirements for independent learning Teambased expertise in translating content from oral to printed & visual media Expertise in multidisciplinary teamwork Efficient planning, scheduling, inventory systems Peer review and moderation systems Orientation towards

		customer service
<i>Traditional Campus-based (TCB)</i>  (students attend a campus for face-to-face learning via lectures & tutorials)	Product largely intangible Synchronous production and consumption Heterogeneous output Craft-based teaching system Low formalisation Decentralised	Publication status Individual production system Collegial management system Selection and deployment of technology for producer activities Academic autonomy Producer orientation

*Figure 2: Delivery Modes - Production/Technological and Capability Features*

The massification of undergraduate education in most developed countries has placed enormous pressure on craft approaches to teaching. At the undergraduate level at least, universities have increasingly moved to a 'transmission' model of teaching, with reduced face-to-face contact and the specialisation of the teaching process resulting in a more industrialised system (Rumble, 1992). Daniel (1996:16-17) argued that the traditional campus-based model of teaching is under challenge because it is up to 50 per cent more expensive than distance education and cannot meet the increasing demand for access to higher education. Further, students are demanding better provision for part-time study and greater flexibility and customisation of teaching. As a result both traditional providers of distance education and conventional campus-based universities are converging towards modes of delivery which incorporate features of both distinct systems and employ a range of technologies. It is unclear, however, how well this marriage between delivery modes and multiple technologies is working, or what new capabilities universities require to manage the complexity of providing multiple delivery technologies.

## **Applying CIT**

CIT technology has no in-built bias towards one particular delivery or competitive strategy. As Bates (1997:101) suggested, the Internet can be used for information transmission modes of teaching. Alternatively, the conferencing facilities supported by the WWW can be used for collaborative and discussion learning modes. Consequently, CIT can be used in both dominant modes of delivery to fill the gaps in existing services to students. For predominantly distance education universities, CIT can be used to complement their capabilities by reducing the costs of



updating and customising materials and simulating, online, the discussion experience more common in campus-based teaching. Campus-based universities can use CIT to reduce their direct labour costs, improve the consistency of the product and offer students more flexible modes of study.

Where does CIT leave the Australian universities? Clearly, the use of CIT has the potential to make every university a multiple mode university and render the distinction between modes, or types of enrolments, meaningless. In so doing, individual universities may lose their distinctiveness and fail to maintain and protect existing competencies. Further, Australian universities will be more open to competition from dedicated single mode universities, new virtual universities and various consortia of media groups, international universities and book publishers. In using CIT and dealing with increasing competition, all universities will need some new capabilities but not all will be in a position to develop or acquire them. The skills and experience gained by experimenting with CIT will not necessarily transform into organisational capabilities unless these build on or enhance existing production capabilities. In turn, these capabilities will not necessarily translate into a sustainable competitive advantage unless they are dedicated to a particular competitive strategy.

## **Time for Strategy**

Resource-based theories suggest that a university's capabilities can influence its performance and strategic opportunities. Capabilities that are rare, difficult to imitate and valuable can be a source of competitive advantage. Establishing the rarity and value of capabilities is difficult in Australian higher education where markets are newly emerging and activities are still subject to regulation. In the absence of full competition, a university cannot be assured what its capabilities actually are or whether its capabilities are still relevant with the changes occurring in technology and markets. Further, Collis (1996) argued that a capability must be specialised to a particular strategy if it is to be irreversible and thereby, a deterrent to imitation. This raises the issue of whether a university should simultaneously pursue multiple delivery technologies. This paper has argued that universities need to start making the hard choices so that their resources and capabilities are focused on achieving defensible product-market positions.

## **References**

- Amit, R.H. & Schoemaker, P.J.H. (1993). Strategic Assets and Organizational Rent. *Strategic Management Journal*, 14, 33-46.
- Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17, (1), 99-120.
- Bates, A. W. (1997). The impact of technological change on open and distance learning. *Distance Education*, 18, (1), 93-109.
- Cecez-Kecmanovic, D. (1996). *A Collaborative Electronic Classroom--and Emerging Teaching and Learning Environment*, Paper presented at the Conference Universities in the 21st Century -- Education in a Borderless World, 13-14 August 1996, Singapore.
- Collis, D. (1996). Organizational Capability as a Source of Profit, in B. Moingeon & A. Edmonson Eds. *Organizational Learning and Competitive Advantage*, Sage Publications, London, chp 7.
- Cunningham, S., Tapsall, S., Ryan, Y., Stedman, L., Bagdon, K. and Flew, T. (1997). *New Media and Borderless Education: A Review of the Convergence between Global Media Networks and Higher Education Provision*, Higher Education Division, Department of Employment, Education, Training and Youth Affairs, AGPS, Canberra.
- Cunningham, S. (1998). Technology and delivery: Assessing the impact of new media on 'borderless' education. *Australian Universities Review*, 14, (1), 10-14.
- Daniel, J. S. (1996). *Mega-Universities and Knowledge Media: Technology Strategies for Higher Education*, Kogan Page, London.
- Department of Employment, Training and Youth Affairs, (DETYA) (1999). *Selected Higher Education Student Statistics* AGPS. Canberra.
- Foss, N. J. (1997). Resources and strategy: A Brief Overview of Themes and Contributions, in N. J. Foss (Ed) *Resources, Firms and Strategies: a Reader in the Resource-Based Perspective*, Oxford University Press London, chp 1.
- Hayes, R. H. & Upton. D. M. (1998). Operations-Based Strategy, *Californian Management Review*, 40, 4, Summer, 8-24.
- Hirsch, F. (1976). *Social Limits to Growth*, Harvard University Press, Cambridge.
- Leonard-Barton, D. (1992). Core Capabilities and Core Rigidities: A Paradox in Managing New Product Development. *Strategic Management Journal*, 13, Special Summer Issue) 111-125.
- King, B. (1999). Distance Education in Australia, in Harry K. (Ed) *Higher Education Through Open and Distance Learning*, Routledge, London, chp 11.
- Marginson, S. (1997a). *Markets in Education*, Allen and Unwin, Sydney.
- Marginson, S. (1997b). Competition, Contestability in Australian higher Education 1987-1997. *Australian University Review (AUR)*, 5-14.
- McCann, D., Christmass, J., Nicholson, P. & Stuparich, J. (1998). *Educational Technology in Higher Education*, Evaluations and

- Investigations Programme, Department of Employment, Training and Youth Affairs, Canberra.
- Nanda, A. (1996). Resources, Capabilities and Competencies, in B. Moingeon & A. Edmonson Eds. *Organizational Learning and Competitive Advantage*, Sage Publications, London, chap 5.
- Nelson, R. R. & Winter, S. G. (1982). *An Evolutionary Theory of Economic Change*, Belknap Press of Harvard University Press, Cambridge, MA.
- Peteraf, M. A. (1993). The Cornerstones of Competitive Advantage: a Resource-Based View. *Strategic Management Journal*, 14, 179-191.
- Peters, O. (1983). Distance Teaching and Industrial Production, in Sewart, D., Keegan, D. and Holmberg, B. (Eds) *Distance Education International Perspectives*.
- Porter, M. (1996). What is Strategy? *Harvard Business Review*, Nov/Dec.
- Renwick, W. L., (1998). The Future of Face-to-Face and Distance Education in Post-secondary Education. *Information Technology and the Future of Post-secondary Education*, OECD, Paris.
- Rumble, G. (1992). The Competitive Vulnerability of Distance Teaching Universities. *Open Learning*, 7, (2), 31-45.
- Rumble, G. (1994). The Competitive Vulnerability of Distance Teaching Universities: a reply. *Open Learning*, November.
- Sanchez, R. Heene, A & Thomas, H. (1996). Introduction: Towards a Theory of Practice of Competence-Based Competition, in R. Sanchez, A. Heene & H. Thomas, *Dynamics of Competence-Based Competition*, Pergamon, Exeter.
- Yetton, P & Associates, (1997). *Managing the Introduction of Technology in the Delivery and Administration of Higher Education*, Evaluations and Investigations Programme, Department of Employment, Training and Youth Affairs, Canberra.

Copyright © 2000 Pauline Hagel

The author assigns to ASCILITE and educational non-profit institutions a non-exclusive licence to use this document for personal use and in courses of instruction provided that the article is used in full and this copyright statement is reproduced. The author also grant a non-exclusive licence to ASCILITE to publish this document in full on the World Wide Web (prime sites and mirrors) and in printed form within the ASCILITE 2000 conference proceedings. Any other usage is prohibited without the express permission of the author.

