Chapter VI
Federated Agent-Based Architecture for Collaborative Education Model

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This chapter presents the development of a conceptual, operational, and software architecture of a collaborative education model. The purpose of the model is to provide efficient communication services and an open scalable architecture for the uniform publication, management, and dissemination of distributed educational material developed by geographically dispersed educational providers, while maintaining the autonomy of the participating providers. Promotion of educational expertise, especially through expansion of specialisation, is of increasing importance. Within the educational arena, big providers tend to dominate the market, at the expense of smaller ones. For small providers, specialization within disciplines, coupled with collaboration among other providers might be the key to their survival. Intra-discipline specialization would promote development of quality services, and inter-provider collaboration would enable wide offering of these services. The proposed paradigm would require the development of a suitable model to support it. The model proposed in this chapter is a federation of independent providers that are loosely coupled to facilitate collaboration, and sharing and exchanging of information. The federated model, supported by agent-based communication over the Internet, can operate across geographical, cultural and organisational boundaries while promoting integration within those boundaries. Because of its potential ability to cross the various boundaries, the proposed model seems particularly applicable to distance education environments.
BACKGROUND

Significant changes in economic and technological developments are producing a global marketplace where competition extends beyond national borders. A major feature of modern economies is dependence on knowledge and on cheap and fast communication. Generation, selection, assimilation, and application of knowledge are fundamental to the economic growth and wellbeing of any modern society. All facets of society are becoming knowledge dependent. The very participation in the modern technological world necessitates a significant level of scientific and technological understanding. This applies to all areas of everyday living including banking, business transactions, health services, transportation, home appliances, utilities, communication and information exchange. Without the essential skills for modern living, people will remain on the margins of society, and a society itself will lose their vast potential contributions.

Within all countries there is a trend towards universalisation of tertiary education, and this trend is independent of the activities of government. However, as tertiary education becomes more universal, the opportunities for those without tertiary education become more limited, thus placing intense pressure on government to provide university places for all eligible citizens, and to provide those places in public-funded university systems. Increasingly, government is unable, in the less developed world, or unwilling, in the developed world, to meet the full cost of this provision. Currently, the responsibility for the costs of running universities is being increasingly transferred to the immediate consumer, the student, and, in latter times, to the individual universities themselves. This transfer takes many forms. In Australia, in recent years, student fees for university programs have increased while government funding of universities has been significantly reduced. On the other hand, countries in Asia and Africa have encouraged universities from the developed world to provide a variety of pathways to enable their own nationals to gain access to university qualifications.

The increasing cost of the provision of university education raises both economic and social dilemmas. In countries such as Australia, although students, and taxpayers, seek and approve university education, they seem reluctant to meet its increasing cost. This presents government with the problem of either reducing the number of university places or providing alternative means for making university education more cost effective. Consequently, institutions of higher education are driven towards “for profit education on a global scale” necessitated by “desperate need to improve income to compensate for the lack of public funding or budget cuts” (Gururajan, 2002).

One approach encouraged by the Australian government is for universities to find supplementary sources of funds, by, for instance, increasing their intake of full-fee paying students, both local and international. In Australia, foreign students have become crucial to the resource base of many universities, providing more than 10% of their average revenues (Marginson, 2002). However, while universities need to attract larger number of students to reduce cost of their programs, many of the current solutions may not be sustainable in the long term, while the costs of education can only be expected to rise.

Competition on the educational market presents yet another ‘threat’ to the traditional educational providers. The corporate world sees the potential in the educational market and challenges universities by providing alternative courses and training programs to meet the rapidly growing demand. Middlehurst (2003) identified the following categories of commercial educational providers and provision: corporate universities, private and for-profit providers, media and publishing businesses, and educational services and brokers.

Many corporations, especially large ones such as McDonalds, Ernst & Young, or Lufthansa, are developing corporate universities (Taylor & Paton,
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