Education, is and has always been, an economic activity. The provision of education consumes resources—not only financial (the cost of schools and the facilities they house), but, above all, in the form of the labour involved in transmitting knowledge, skills, and understandings to each generation of learners. In addition, learners incur certain opportunity costs: they spend both time and money on education. Moreover, while education has traditionally been viewed as a good in itself, it has increasingly come to be understood as an investment in the future productivity of those receiving the education, as measured by the value of the work they do for their employers, as well as the remuneration they receive over the course of their lives, and the taxes they contribute to the state. Behind the costs and benefits of education lie a complex web of choices that are determined, at least in the minds of economists, by answers to such questions as: How much will the provision of education cost? What financial benefits accrue to those who spend money on education? How good a rate of return does education offer in comparison to other forms of investment? Are there ways of reducing the cost of provision, so that the same education can be delivered less expensively? Is there a basic level of entitlement to education the cost of which should be met by the state? How should people and society pay for
education—through general taxation, or out of their own pockets? Should payment be deferred through state loans?

The economics of education emerged as a distinct field of study in the late 1950s and early 1960s with the publication in the UK of work by Vaizey (1958) and Wiseman (1959) and with the delivery in 1960 of Theodore Schultz’s lecture (Schultz, 1961) to the American Economic Association on investment on human capital (Johnes, 1993). Vaizey focussed on the costs and funding of public and private education in the United Kingdom; Schultz paved the way for the development of human capital theory which lead to Becker’s seminal work on human capital (Becker, 1964). Becker’s work was extended by Psacharopoulos, who looked at the rates of return on education at primary, secondary, and post-secondary education levels across 78 countries (Psacharopoulos, 1994), work that was subsequently updated by Psacharopoulos and Patrinos (2004). This analysis led the World Bank to conclude that in many countries public spending on education was being misallocated in view of the evidence "derived from the effect of schooling on earnings and productivity, that in many countries the average dollar invested in primary education returns twice as much as one invested in higher education" (World Bank, 1986, p. 1). Such thinking led to specific recommendations to favour expenditures on primary education (World Bank, 1988, 1995) and influenced the thinking behind the 1990 Jomtien Conference on Education for All.

Meanwhile, other work looked at the extent to which the level of education within a population is related to rates of economic growth (Blaug, 1972; Stevens & Weale, 2004) and at the social benefits to be derived from investment in higher education (Task Force, 2000; World Bank, 2002). While such studies initially supported the case for public investment in education, the trend in recent years has been to argue that because students pursuing post-secondary education directly benefit from it through a higher earnings capacity, they should be responsible for a greater share of the cost of such education (see for example, Johnstone, 1986; UKDES, 1988; World Bank, 1986; Wran Committee, 1988). How such cost-sharing should be accomplished—options include higher up-front fees, higher fees coupled with increased bursaries for the disadvantaged, repayable loans, income-contingent repayable loans, and graduate taxes—has occasioned much debates, as have questions concerning how to protect the interests of disadvantaged students (e.g., Woodhall, 2006), how to ensure the viability of loan schemes, and how appropriate such schemes are in countries with underdeveloped
administrative systems (e.g., Barr & Crawford, 2005; Chapman 2005; Chapman & Ryan, 2002; Ziderman & Albrecht, 1995).

WHY DID THE ECONOMICS OF EDUCATION BECOME AN IMPORTANT FIELD OF INQUIRY?

Interest in the economics of education developed in an environment in which the demand for education was increasing as individuals recognized that education was a passport both to a job (the more educated one is the less likely one is to be unemployed) and to a higher level of earnings (the more educated one is, the more one is likely to earn). These private benefits sit alongside public benefits—in particular the belief held by many that an educated labour force is one of the engines of national economic growth. This latter point led governments and development agencies to see spending on education as an investment in achieving and maintaining national prosperity. In addition, in the aftermath of World War II there was an increased emphasis on social justice and equality of opportunity in many countries—with the expectation that those who had at an earlier age been denied educational opportunities would now be given a chance to access education.

In response to these pressures two things happened. Firstly, the age at which compulsory initial education ended was raised throughout the developed and developing world. The pressure has been to move from universal primary education (roughly 6 years of schooling), through universal basic education (9 years), towards universal secondary education (13 years of schooling). Second, the rate of participation in education beyond that which is compulsory has increased at both secondary and tertiary levels. In higher education, the trend has been away from the provision of education to an elite (up to 15% of the relevant age group) towards mass education (participation by anywhere from 16% to 50% of the group) and ultimately to "universal" access (defined as participation by more than 50% of the group) (Trow, 1974; see also Trow, 2006). As a result, the proportion of those being educated has risen at the same time that a massive increase in population has occurred, which has seen the mid-year world population grow from 2.56 billion in 1950 to 3.04 billion in 1960 to 6.96 billion in 2011 (US Census Bureau, 2012). The global education sector is consequently huge and continuing to grow as the world population moves towards a projected 9.38
billion in 2050, according to the US Census Bureau (2012), which presages yet further growth in the sector.

**THE COSTS OF EDUCATIONAL PROVISION**

Traditional education is a labour intensive business. With expansion, the public sector’s ability to pay for education has been severely tested, and as a result the financing of education has become a major public policy issue. Generally, governments look for ways of reducing or at least containing costs. One strategy is to pass some or all of the cost on to the consumer—so-called cost-sharing. This approach has been especially popular at the post-secondary level but has also been advocated in connection with secondary and, particularly, upper secondary education. Another strategy is to reduce the unit cost of education. Within traditional classroom-based institutions of higher education, in particular, efforts to reduce unit costs have included:

- A move away from an overly simplistic reliance on increasing the student-staff ratio to a more sophisticated costing model that unpacks the relationship between staffing levels, class hours, and student numbers, thus making the specific cost drivers more transparent (Sheehan & Gulko, 1976)

- A shift from teaching models based on dialogue within small groups to large-scale lectures, in some cases using closed-circuit television to narrowcast the lectures into overflow classrooms (a technique taken to its logical conclusion in the Central Broadcasting and Television University in China);

- Reducing staff hours through a greater degree of independent, resource-based learning—an approach that ties in well with media-intensive distance teaching methods;

- Reducing the faculty costs by hiring cheaper adjunct staff who work on service contracts;

- Most recently, a greater reliance on peer-supported learning, in place of direct teacher-student interaction (see, for example, Daniel, Kanwar, & Uvalić-Trumbić, 2008).
The search for more cost-efficient methods has also extended to secondary education where there is a much greater interest in independent, resource-based learning.

**Research into the Costs and Economics of Distance Education**

For many years distance education, in its earliest technological guise of correspondence education, had been provided by commercial correspondence schools where the prime motivations were, with a few exceptions, to make a profit from fees by maximizing enrolments and minimizing costs; by governments providing an alternative form of public schooling to isolated rural populations (where cost was not the major concern); and by universities wanting to meet the needs of individuals who were unable to attend a campus full-time. Provided that such ventures were relatively cheap or—within the commercial and university sectors—covered their costs, there was no systematic exploration of their costs.

Then, beginning in 1975, in response to the paucity of cost studies available (Klees, Orivel, & Wells, 1977), and given the high absolute costs of the large-scale educational television (ETV) projects, UNESCO led the way in promoting both the discussion of methods of cost analysis for new educational media, and the dissemination of cost studies (see Eicher, Hawkridge, McAnany, Mariet, & Orivel, 1982; Jamison, 1977; Jamison, Klees, & Wells, 1978; UNESCO, 1977; UNESCO, 1978; Wagner, 1982). These studies not only established a methodology for analyzing the costs of media-based educational systems, but also saw the development of cost functions that described in broad terms the way in which the costs of such systems would behave given changes in the breadth of the curriculum offered by, and in the number of students enrolled on, particular projects. In parallel, and using a somewhat different approach, a group of researchers began to look at the costs of the British Open University (OUUK) where the escalating absolute costs of the project, and the apparently open-ended nature of the commitment to the project, were beginning to raise concerns within its funding body (Laidlaw & Layard, 1974; Smith, 1975; Wagner, 1972; Wagner, 1977). These studies, along with others undertaken between the mid-1970s and early 1980s (for example, Oliveira & Rumble, 1992; Perraton, 1982; Perraton,
1993), showed that distance education could bring the average cost per full-time equivalent (FTE) student/learner and/or per hour of instruction down to a unit cost that was lower than that achieved in traditional face-to-face educational settings. As a result, the application of mass communications technology and distance learning approaches came to be seen as a way of lowering the unit costs of education (Eicher, Hawkridge, McAnany, Mariet, & Orivel, 1982, p. 40; Jamison, Suppes, & Wells, 1974, p. 57; ).

By the early 1980s, education economists understood the cost elements involved in technology-intensive educational projects, the cost structure of such projects (Jamison, Klees, & Wells, 1978; Wagner, 1977), as well as the fundamental difference between the cost structure of face-to-face teaching (low fixed costs, high variable costs, apparently limited scope for economies of scale within a model based on teacher–student interaction) and distance education (high fixed costs, low variable costs, very considerable scope for economies of scale arising from the mass use of pre-prepared learning materials coupled with no or little face-to-face support). The factors affecting costs also became clearer over time. These include the following:

- the number of learners or students enrolled (which affects both the absolute costs and the degree to which economies of scale can be achieved)
- the relative degree to which a course relies on materials prepared by the instructor specifically for use in the course, in contrast to preexisting materials (such as books available through libraries) and/or assignments that do not require the use of materials
- the number of courses on offer (the more courses the greater the volume of learning materials needed)
- the number of years that courses once designed are presented, and hence the frequency with which materials have to be remade or replaced
- the technology used. Each technology has its own cost structure—basically the mix of variable and fixed costs, and the nature of the cost drivers underlying the variable costs (see Bates, 1995; Hülsmann, 2000).
- the local cost of technology. Institutions that rely on imported technology paid for in foreign exchange may find that the cost per
learner per hour of such technology is greater than the corresponding cost per learner per hour of face-to-face teaching, particularly in countries where labour is cheap. In countries where labour costs are high, the reverse may be the case, with the cost per learner per hour of a given technology being less than the labour costs of classroom teaching (Orivel, 2000).

- the level of student support provided by the institution (for example, tuition however offered, assignment marking), as opposed to unpaid peer support arranged between students
- the organizational structure (including the extent to which technologies and services are supported from within the institution, or bought-in from external suppliers)
- working practices (for example, whether course material writers are expected to do their own editing, or whether all texts are edited professionally)
- the nature of the internal labour market and the nature of the contracts of employment (and particularly the difference between contracts of service where staff are paid a salary or wage to do a particular job full- or part-time, and contracts for service where free-lance contractors are paid an agreed amount to do a particular task such as write a course book, edit a text, take a tutorial, or mark a script).

By the mid-1990s, the major lessons had been learned—at least with respect to the technologies then in use. However, there were some fundamental weaknesses behind the research (Rumble, 1998). Firstly, cost studies were based on data derived from standard approaches to cost accounting developed in the early 1900s. These did not accurately link overhead costs back to specific products, services, and activities (Johnson & Kaplan, 1987). Indeed, few distance-teaching institutions bothered to allocate teaching and support staff costs to courses, with the result that the costs of courses using differing mixes of technologies could not be established with any degree of accuracy. This failure was also true of dual-mode institutions (Rumble, 2012). Only with the development of activity-based costing around spreadsheets has it become possible to move beyond simplistic cost functions to identify cost drivers and track costs more closely to the activities (products, services, customers, business sustaining activities) that give rise to those costs (Rumble, 2012).
In the absence of activity-based costing, those working in the field relied on a broad brush approach to analyze the behaviour of fixed and variable costs. Smith (1975) and Wagner (1977), for example, assigned Open University costs to just three drivers: overheads (deemed to be fixed), courses, and students. Similarly, broad brush approaches were used to model the costs of ETV projects (Jamison, Klees, & Wells, 1978). The cost functions developed to model costs thus failed to identify “the fundamental variables, which affect costs, in sufficient detail to be of practical value to people who are trying to prepare an operating budget for an institution” (Rumble, Neil, & Tout, 1981, p. 235).

**EARLY RESEARCH FINDINGS AND THEIR LIMITATIONS**

Research in the 1970s and 1980s showed that the unit cost per student of teaching at a distance could be significantly less than that of face-to-face education but this was by no means always the case. Sometimes the unit cost of a distance education system was higher. Also, the tendency for distance education systems to have higher dropout rates meant that the same level of cost advantage was not carried through to comparisons in the cost per graduate (Rumble, 1997). However, these findings were all too often based on an analysis of operating costs alone, with the capital costs of projects being ignored. This was a fundamental weakness. So at best it was only possible to conclude with Perraton (1993) that in the right circumstances distance education might be cheaper than face-to-face education.

There was also an assumption that the cost structures of both types of institutions were optimized. Mace (1978), for example, queried the extent to which OUUK was internally cost-efficient. Could not, he asked, the same output be achieved at less cost? Was broadcasting, a hugely expensive element of the OU’s costs at that time, really necessary to OU’s teaching system? There was enormous reluctance to answer such questions at the time.

The 1980s and 1990s also saw significant budgetary cuts in traditional universities as higher education systems shifted from elite to mass coverage. Unit costs fell as student enrolments increased without a proportionate increase in staff numbers, student class hours were reduced, and the use of cheaper adjunct staff on contracts for service proliferated. Budgets continued to shrink during the following decade, even as institutions of higher education moved in the direction of universal coverage. Moreover, the concomitant
shift to teacher-moderated e-learning may actually have increased the costs in distance education by introducing a more labour-intensive form of teaching. The problem with these changes is that we do not know what affect they have had on the relative costs of distance and face-to-face teaching because the comparative cost studies are not being done.

There have also been changes in the cost of technologies: technology costs are relatively high when a technology is at an early stage of development but fall as the technology and the industry around it develops. When an institution adopts a technology at an early stage in its development, it may well have to provide its students with equipment to run the technology—as the OUUK did when it first experimented with computer-mediated communication within a course. What it gained was interaction—at a cost (Rumble, 1989). Once a technology becomes embedded in a society, one can assume that almost all students will have access to it at which point it is reasonable to expect the students to equip themselves with the technology so that they can participate in the learning. But while this may be reasonable in a rich country, it may not be so in a poor country.

In spite of all these caveats, in the 1990s it was possible to say that the costs and economics of distance education were relatively well-understood. It was clear that the cost structure of distance education differed significantly with that of face-to-face education, and that whatever the caveats about the quality and range of the cost studies available, distance education systems had the potential to be cheaper per equivalent student and per hour of instruction than traditional forms of education.

In conjunction with the work discussed above, some research has been conducted on the relative cost-effectiveness of distance education but most of this work has assumed, without any objective foundation for the assumption, that the quality of a graduate produced by distance education is the same as that of a comparable graduate from a face-to-face setting. An exception to this was provided by those studies that compared the performance of distance- and face-to-face-taught students sitting exactly the same examinations (see Rumble, 1997, for a summary of studies), and by studies that have sought to compare the post-qualification performance in similar jobs of persons whose training was undertaken by different means (Nielsen & Tattoo, 1993).

Although the basic cost structure had been mapped by 1980, the models used to explicate the costs were both crude and subject to serious caveats,
and they tended to be based on an idealized either/or distinction: either one was dealing with a pure distance education system, or one was dealing with a classroom-based system. Yet in practice few institutional models were like this (Rumble, 1998). The OUUK had always incorporated some face-to-face teaching at tutorial centres and summer school. By the 1990s, however, it was not unusual to meet Open University students who thought that they got more face-to-face teaching within the distance-teaching Open University than they did in campus-based UK universities, where students were increasingly expected to study independently. By then, too, blended learning approaches were beginning to erode the old distinctions.

RESEARCH INTO THE COSTS AND ECONOMICS OF ONLINE LEARNING

The effective and widespread use of computer-assisted instruction emerged in distance education following the development of personal computers (PCs); the replacement of analogue by digital technologies followed by the digitalization of text, audio, and video; and the linking of PCs through the Internet. The first two developments allowed distance education systems to create and distribute educational software supporting a variety of Computer Assisted Instruction (CAI) or Computer-Based Teaching (CBT) programs of increasing sophistication—enabling computer-mediated teacher-student communication and interaction among students.

Within this context what constitutes online learning varies enormously. Typologies have their dangers, but they can also be useful in sorting out one's thinking. The following typology was offered by Hülsmann (2004) based on ideas put forward by Rumble (2001a):

a. **Type-i models of e-education** offer internally developed *information* resources involving text, audio, and video in electronic format. No student support is involved.

b. **Type-c models of e-education** offer *computer-mediated communications* (CMC) supporting tutor–student and student–student interaction around course structures and pre-existing learning materials that involve minimal cost. Interactive support may be offered in synchronous (Type-c1) or asynchronous mode (Type-c2).

c. **Type-i/c systems**, which combine both approaches.
The cost elements of online learning have been explored (see Rumble, 2001b). There have been a number of studies of the costs of Type-i systems, all of which demonstrate the very wide spread of costs depending on the nature of the actual materials developed (e.g., Arizona Learning Systems, 1998). Simple web pages with a course outline and linked webliography/bibliography can be provided at very little cost. However, a virtual reality environment within which students can immerse themselves is very costly indeed. The very range of costs makes any generalization difficult, and in fact most online systems actually conform to Type-c2 systems with students accessing publicly available text, audio, and video resources electronically through webliographies, digitalized course “libraries,” and their own research. Here again, there are few detailed cost studies of particular systems (a notable exception being Hülsmann, 2003). The cost structure of such systems is much closer to face-to-face education than it is to mass-media distance education programs although there is in fact considerable evidence that academic staff spend more time teaching online courses than face-to-face courses (Rumble, 2001a; Seaman, 2009; McCarthy & Samors, 2009).

In response to this situation, Neely & Tucker (2010, p. 20) have argued that “college decision makers need to consider the full range of cost implications associated with . . . online offerings” (and, by extension, with other types of distance programs). Managers who wish to contain the costs of online learning will therefore encourage independent (non-supported) and peer-supported learning (see, for example, Daniel, Kanwar, & Uvalić-Trumbić, 2008) from open source materials (such as, MIT’s OpenCourseware, the OUUK OpenLearn projects, and the Commonwealth of Learning’s WikiEducator program).

As with the earlier generation of cost studies, there are relatively few well-founded cost studies available, and even where they exist the complex mix of cost elements and cost drivers in a single program make it difficult to transfer lessons from one system to another. This is especially so where the aim is to transfer a socio-technological mix involving technologies that attract developed country price levels into a developing country where the costs of imported technologies are high and labour costs low (Orivel, 2000). In this connection it is worth bearing in mind that, while in developed societies access to the Internet is increasingly taken to be the norm (although even here there may be disparities between rich and poor, old and young,
and members of different ethnic groups), in developing countries the situation may be very different. In a book biased towards the use of ICTs in Asian distance education, Latchem and Jung (2010) admit that “for reasons of cost, access, and equity, most ODL institutions still make extensive use of the traditional technologies dating back to the days of correspondence education” and that “audiovisual media, radio and TV” remain valuable especially where literacy is low. In addition, they note that “wherever possible, ODL providers also employ face-to-face teaching and learning” (2010, pp. 1–2, my emphasis).

There is, as Unwin et al. (2010) comment in respect of a survey of the use of learning management systems (LMS) in Africa, an enormous gap between rhetoric and reality on the ground. The fact is that in poor countries, many of the students who would most benefit from access to e-learning simply cannot afford it.

THE RESEARCH AGENDA

From what has been said it should be clear that there is now a reasonably solid understanding of the cost elements involved in distance and online education and in the way in which such costs can be influenced. But against this, there are very few comparative studies that allow one to say with any degree of certainty what the cost implications of a particular socio-technological design will be. There is also almost no understanding of the private and social benefits of distance and online education in comparison with those of face-to-face education, nor has any consideration been given to the way in which the costs of providing such education should be met in different contexts. The need to look more seriously at the relationship between the costs of distance and online education, and the price charged to accessing such education, has been raised by Rumble (1997) and Rumble and Litto (2005). Where prices go up, standard economic theory suggests that willingness to pay will be reflected in a demand curve for the product, and that if or when the price is increased the level of demand will change (elasticity of demand).

When first set up, the OUUK—while always believing that students should pay something towards their course—kept course fees as low as it could in order to ensure that the University was accessible to even the poorest of students. In response to this, the government, which met most of the
cost of studying at the University, fixed a maximum quota on the number of students admitted each year in order to limit its financial exposure. The result was that levels of frustrated demand increased. In the 1990s, however, the University agreed to raise its fees in order to remove its waiting list, while introducing a greatly increased bursary scheme for those students who were financially disadvantaged. More recently, the UK government has changed the way in which higher education is funded in England (although conditions in Scotland, Wales, and Northern Ireland where national assemblies and parliaments have devolved powers are different). For Open University students resident in England, the modular tuition fees rose from roughly £1,300 per full-time, full-year equivalent study in 2010–2011 (Rogers, 2010) to £5,000 in September 2012 (Open University, 2011a). It has yet to be seen how this will affect the University’s market, particularly in England, where the fee for the Science entry-level course rose to £2,500 in October 2012 (although it remained just £735 in Scotland, where Scottish students are still subsidized).

More generally, the entry costs of study can be considerable, particularly where students have to equip themselves with computers and printers, fund their own access to the Internet, and buy learning materials and study consumables. Latchem and Jung’s comment referenced above then becomes an important consideration (Latchem & Jung, 2010). Policy makers and providers need to take into account the extent to which target audiences can afford to meet the costs of study when designing institutions and pricing courses (Rumble & Litto, 2005).

What students are prepared to pay may, of course, depend on the benefits that they think they will attain in terms of employment, pay, and future job security. No research has been done here comparing the private and social costs and benefits of distance and online education on the one hand, and face-to-face education on the other. The OUUK carried out some surveys that consistently showed that Open University graduates felt that their studies had benefited them, with nearly half of Open University graduates reporting some kind of occupational benefit (Woodley, 1995), while an early study by Lee, Futagami, and Braithwaite (1982) calculated that the private rate of return to students of the Korean Air Correspondence High School was about 27%, compared with about 10% for those attending a regular high school.

One of the benefits enjoyed by OUUK students is that the flexible nature of distance study allowed them to study while they remained in employment. In 2009–2010 over 70% of Open University students were employed
full-time (Open University, 2011b). But the expansion of part-time higher education in the UK (where full-time study was once the norm) means that this is no longer an advantage available mainly to Open University students. In other societies more used to the concept of students working their way through college, such an advantage would be less apparent. Another factor is the age of individuals when they graduate.

In the early years of Open University almost all students were over the age of 21, whereas those entering the traditional universities were predominately school leavers. Mace (1978) found that in 1975 Open University graduates were on average 37 years old as compared to an average age of 22 for graduates of traditional universities. Assuming retirement at age 65 this meant that they had a working life of about 28 years to enjoy any earnings’ boost they derived from their studies, compared with some 43 years for traditional graduates. By age 37, too, their careers were more likely to be mapped out, with powerful institutional forces within the labour market that would inhibit mobility. This led Mace to conclude that the economic value of an open university degree would necessarily be less than that of a degree from a traditional college. However, although the average age of new undergraduate students at the Open University is 32 (Open University, 2011b), even before the sharp rise in the cost of university study, Murray (2010) reported that some 25% of new Open University students are aged 17 to 25 (up from 15% in 2009–2010 (Open University, 2011b). Many of these young students aim to complete their studies rapidly—they could graduate within three years, a rate equivalent to full-time study. With many universities in the UK charging the maximum tuition fee, students are allowed to levy GBP 9,000 per annum (the average fee is GBP 8,678, according to Shepherd & Vasagar, 2011), the financial attraction for students resident in England wishing to study in the OUUK is significant.

Against this, there is the related question of the credentialing power of distance teaching compared with face-to-face universities. In the mid-1970s Carnoy and Levin (1975) argued that “to assume the value of an Open University degree will be similar to one from Oxbridge [i.e., Oxford or Cambridge] or the ‘Red bricks’ [the large civic universities founded in the 19th and early 20th centuries, such as the universities of Birmingham, Manchester, and Leeds] . . . simply ignores the credentialing effect of higher education institutions.” An Open University’s graduate, they argued, “is not likely to receive either consumption or income benefits from his education.
that are as high as those of a person from the more conventional university setting” (pp. 390–96).

No doubt further case studies on the costs of particular institutions and technology applications would be useful—especially if they also look at the capital as well as the operating costs of such systems. It would also be interesting to see detailed studies, comparable to Laidlaw and Layard (1974), looking at the relative costs of distance, online, and face-to-face courses. Such studies, which could usefully be conducted across a number of national educational systems, are much needed given the changes in technology costs and the very considerable efficiencies that have been achieved in both distance and face-to-face provision. Given the interest in using distance and online education to expand the provision of places at secondary as well as at higher education level, it would be important for the studies to look at the costs of open schooling (Daniel, 2010) as well as at the costs of distance higher education. With so many institutions now engaged in various blended learning approaches, it would be important for such studies to unpack institutional costs at course level (see Rumble 2012 for an example of the methodological approach that needs to be adopted). More specifically, there is also a need for further studies on the way in which online education impacts on teacher time.

However, valuable though such studies might be, they pale in significance in relation to some of the wider issues that need to be researched. There is very considerable scope for a series of studies to look at the private rates of return of distance and online education, relative to the rates achieved by students who have studied by traditional means. Such studies should also look at the credentialing power of various approaches to learning, and in particular seek to unpack whether what is really important is not so much what one learns and where one learns, but who one gets to know in the process. Within this context, and against the background of the recent research by Brown, Lauder and Ashton (2011) that highlights the global production of graduates destined for high-skill, low-paid jobs, the role of technology in education may well be to bring down the costs of upper secondary and higher education so that the costs that fall on the individual and the state are more commensurate with the earnings and benefits open to an increasingly impoverished middle class.
REFERENCES


