

INFORMATION TECHNOLOGY AND CONTROL IN EDUCATIONAL MANAGEMENT

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Abstract: The use of information technology in educational management offers many advantages to schools, but in this paper we will argue that it also serves a role in acting to control schools. School systems in Victoria, Australia and Ontario, Canada have in recent years decentralised many of their administrative functions, and similar decentralization appears to have occurred in other countries. At the same time that many countries have been decentralising their educational administration, however, they have often also strengthened central control in other areas, most notably in curriculum and overall accountability. In this paper, the authors examine the use of information technology in educational management (ITEM), and argue that this technology may play a significant role in tightening the coupling between schools and central education authorities. We will argue that this leads to greater standardisation and control over the way that schools perform their administrative functions.

Key words: Educational management, information technology, school systems, control.

1. INFORMATION TECHNOLOGY AND CONTROL

There is considerable evidence that the implementation of Management Information Systems in schools have had many benefits (Visscher et al. 2001) and that the effect on schools has generally been positive. One effect that has not, to our knowledge, been commented on though is that of how these systems affect the control of schools and of teachers performing administrative functions. In this paper, we will argue that School

The original version of this chapter was revised: The copyright line was incorrect. This has been corrected. The Erratum to this chapter is available at DOI: [10.1007/978-0-387-35689-1_19](https://doi.org/10.1007/978-0-387-35689-1_19)

Management Information Systems (SMIS) have acted to control a number of activities in schools. We hasten to add that we are not suggesting some major Machiavellian plot, or that this control has necessarily been consciously exerted by the people involved in the design or use of these systems. We will, however, argue that it has nevertheless been exerted.

We have observed that, in at least the two different educational systems discussed in this paper, the use of SMIS has led to a greater degree of standardisation of administrative practice in schools. We are not suggesting that this is necessarily a bad thing, and the reason it has occurred is quite simple to find. Whereas in the past, schools in these two systems often followed their own individual directions in determining how to go about performing their administrative functions, they now all use the same software package to assist with this administration. The control arises from the manner in which most SMIS software packages insist that they be used in a specific way. Whereas previously when there were, say, five different ways in which a given administrative task could be performed, it is likely that different schools would perform it in different ways. Now the software encourages everyone to perform any given task in the same way. In other words, the software has acted to control the way that this task is performed. Whether this should be seen as a good thing or a bad thing depends on whether you like the idea of standardisation of schools or not, and it is not for us to comment on this. What should be commented on, however, is that this control is being exercised by these systems.

The prevailing rhetoric on educational management around the world has been towards policies of decentralization (Bottery 1999; Chapman 2000), but despite the advantages claimed for it, it is apparent that decentralization is rarely total. Some degree of central control is usually retained in functions such as curriculum and testing (Chapman 2000). We have written more about issues of decentralization and central control in Tatnal and Pitman (2002). This paper will not question the supposed advantages of decentralization, but rather investigate how forms of central control have remained in decentralised systems due to the agency of the technology itself. In particular we will explore the role of information technology in supporting this control. We will argue that the role of IT, through the use of School Management Information Systems (SMIS), is pivotal and investigate how these systems are able to exercise such control.

2. INFORMATION TECHNOLOGY AS AN ACTOR IN EDUCATIONAL MANAGEMENT

An important question to consider when investigating the use of any technological innovation in an organization is the role, if any, that the *technology itself* plays. Various individual humans, including the School Principal, and organizations such as the Education Department and the software developer, are rightly considered as significant actors. But what of the technology itself? How should we consider the influence of the information system?

A research approach often used in investigating the introduction of information systems into organizations is to focus on the technical aspects of the change, and to treat 'the social' as the context in which its development and adoption take place (Tatnall and Gilding 1999), so assuming that the outcomes of technological change are attributable to the 'technological' rather than the 'social' (Grint and Woolgar 1997). Bromley (1997), however, argues that as long as 'technology' is seen as a distinct type of entity which is separate from 'society' the question will always need to be asked 'does technology affect society or not?' The argument that it does leads to the technological determinist position of viewing technology as autonomous and as having some essential attributes that act external to society. The argument that it does not, means that technology must be neutral and that individual humans must decide on their own account how to use it; a view close to the social determinist position. Bromley maintains that neither answer provides a useful interpretation of how technological innovation operates and argues against an either/or stance like this. He argues that we should abandon the idea that technology is separate from society.

Actor-network theory (ANT) provides a useful framework for dealing with the related contributions of both human and non-human actors. By denying that purely social or purely technical relations are possible, and by asserting the world to be full of hybrid entities containing both human and non-human elements (Latour 1986; Latour 1996), ANT offers a socio-technical approach in which neither social nor technical positions are privileged. It deals with the social-technical divide by denying that purely technical or purely social relations are even possible.

The notion of a non-human entity, such as an information system, being able to act in such a way as to apparently exert its own influence on things may seem a little strange (Latour 1988). In ANT, however, an actor can also be considered as a network of interactions, and the network underlying the School Management Information System consists of the information system designers as well as programmers, computers, programming languages,

databases, telephone lines and interconnections. In ANT, an actor is any human or non-human entity that is able to make its presence individually felt by other actors, and is made up *only* of its interactions with these other actors (Law 1992). When ANT speaks of the information system acting in some way, this action can always be traced back to an origin in the actions and interactions of the components of its network. Most of the time, however, we can consider the information system as just a single actor. Actor-network theory uses the concept of a *black-box* (Callon 1986; Callon 1987) to describe the process of setting to one side the details of the network that constitute a given actor, and allows a researcher to use this simplification to facilitate explanations. This detail is not lost though, and the researcher can, at any time, lift the lid of the black-box and investigate its contents when this is necessary. We will make use of aspects of ANT to discuss the role of information technology in educational management.

3. TECHNOLOGY AND SCHOOL MANAGEMENT IN VICTORIA AND ONTARIO

In most countries, primary and secondary school education is regarded as being the responsibility of the State, and is subject to some degree of government control. This control is typically manifested in two distinct areas:

- the system: its structures and personnel, and
- the curriculum: the work content of the schools.

In each of the two systems we refer to in this paper (Victoria, Australia and Ontario, Canada), schooling is the responsibility of the state or provincial government. At the individual school level, both systems have some form of school council consisting of members of the community, teachers and school administration. These organizational similarities, however, mask deep differences in the ways in which power is distributed, as the following discussion makes evident.

3.1 ITEM in Victoria, Australia

The Commonwealth of Australia is a federation of six states and two territories, each of which has almost complete control of its own education system. The only influence coming from the Australian federal government relates to funding for non-government schools, and initiatives with special funding for specific educational projects seen to be of national significance.

In the 1980s, along with most other Australian states, Victoria began to decentralise the administration of its school system. The intention was to devolve much of the administration formerly done centrally to schools, known at the time as 'Schools of the Future', which would then become self-managing. This meant that as well as student administration, assets management and finances, additional personnel tasks such as teacher absences and leave, as well as some payroll and other functions were to be devolved to the school level (Tatnall 1995).

Also during the 1980s, in an apparently contradictory trend, the Education Department in Victoria began to re-centralise the control over school curriculum that it had largely relinquished in the 1970s. At the same time that administrative control was undergoing a process of devolution, the Education Department set up a team to develop and build its own computer-based administrative system. This team was based at the School's Administrative Computing Unit (SACU), which shared premises with the State Computer Education Centre (SCEC). When initial development was complete, SACU began distributing this new system free to all government schools. Birse (1994), who was at that time head of SACU, notes that an important aim of this computerisation project was to improve the financial accountability of schools to the Victorian government, and that in its first implementation it consisted primarily of a standardised school accounting system. Soon the system was extended to cover all elements of school administration and reporting both to parents and back to the Department of Education.

Although the stated purpose of this School Information System was to assist schools in managing their own affairs, they were soon being asked to do most of their reporting back to the Education Department using reports incorporated into this software (Tatnall 1995). It was no secret that these reports constituted an important aspect of the information system, and its designers readily acknowledge that a major aim of its introduction was to make schools more centrally accountable (Birse 1994).

Today, overall control of the system is by the Department of School Education (DSE), a central bureaucracy located in Melbourne, with the assistance of Regional Offices of Education. Each Victorian school is managed by a School Council consisting of the School Principal, elected teachers, parents and community representatives. The School Council or its executive (the School Principal) controls most school administrative functions under the overall direction of the Victorian Department of School Education. Although some administrative functions are co-ordinated at a regional, rather than central level, the only significant controlling body in school management is the DSE. School curriculum remains under the central control of the DSE for years K-10 through its Curriculum Standards

Frameworks (CSF), and through the Victorian Board of Studies (VBOS) for years 11 and 12 in the form of the Victorian Certificate of Education (VCE). The DSE administers a series of standardised tests of all students at several points during their schooling. While schools have some flexibility in interpreting the curriculum, the basic structure and content is determined and standards are set centrally.

School Councils thus manage each individual school with the School Principal (acting as School Council executive) exercising day-to-day control of all administrative functions. Regional education offices oversee some administrative functions and act to assist individual school principals where necessary. The DSE retains overall administrative control, and schools send back regular reports on their finances and other administrative activities. The DSE also retains control over the school curriculum.

3.2 ITEM in Ontario, Canada

Canada is a confederation of ten provinces and three territories, each of which has constitutional control over its own education system. Like Victoria, except at the higher education level, the national government has at best marginal influence on the school systems. In Ontario, schooling is the responsibility of the province and is controlled from the Ministry of Education in Toronto with the aid of District School Boards. The school system in Ontario is one in which, traditionally, a good deal of authority has resided at the local level, at least in respect to employment and supervision of the conduct of teachers. Following the Hall-Dennis Report (Provincial Committee on Aims and Objectives of Education in the Schools of Ontario 1968), curriculum decision-making was also devolved to the local school board level, continuing a trend, which saw weaker and weaker specification of curriculum content from the centre. This period also saw the abolition of the Provincial examination system: individual schools award graduating grades to students in a context in which the content of the final two years of schooling have maintained fairly explicit content requirements in each subject. This took place in conjunction with an apparently countervailing trend of consolidation of local boards (from 5649 in 1945 to 1446 in 1967), a trend that has continued to the point that there are now fewer than one hundred in the province. In the period from 1968, the size of individual board bureaucracies grew, in particular in the support of curriculum developed at that organizational level.

The 1990s has seen a determined effort by government to re-grasp control over the curriculum and organizational structures of the province's school system. Under a leftist NDP administration and later a conservative government, school boards have been stripped of much of their power over

finances, teacher working conditions and curriculum. Conversely, School Councils, presently advisory and with very little power, have been established at the individual school level in a first step towards local control over some aspects of the system. Teachers are employed by individual boards, under the rules governing eligibility to teach in the province.

The Province now has a mandated curriculum in place. *The Ontario Curriculum* specifies subjects, their content by grade, and expected levels of achievement by students at each grade level. This is augmented by a series of provincial tests administered by the quasi-independent Education Quality Assessment Office (EQAO) at grades 3, 6 and 9 in literacy and numeracy, soon to be supplemented by tests in other subjects in the intervening years. These tests are specifically constructed to reflect and sample the outcomes specified in *The Ontario Curriculum*. A system for re-certification of teachers on a five-year cycle is being implemented through a newly established Ontario College of Teachers, created by the government through Act of Parliament. The data storage and communication implications of these moves draw attention to the centrality of information systems in the efficacy of their implementation and subsequent operation.

The *BAS* accounting system is used to provide financial data, lists of approved suppliers, school budgets and details of expenditure. Local monies, collected for activities such as school excursions, are handled using *Quicken*. *Trillium* is an information system used in Ontario schools to enable the maintenance of student records, enrolment information, attendance, class lists and facilitating the production of student reports. Individual teachers must complete student reports using the computer-based student report card system, in the standard format determined by the Ministry of Education. In summary, School Boards manage much of the operations of schools, with principals acting as their agents and exercising day-to-day control. School Councils are weak, with principals having primary reporting responsibilities to the Board and, for some aspects, the Ministry directly.

3.3 School e-mail and web use

In Ontario both the School Boards and the various central authorities (Ministry, College of Teachers and EQAO) make considerable use of electronic mail for the transmission of memoranda, advertisements and the like. In Victoria the situation is much the same with notices from the DSE coming to schools by way of e-mail. Ontario Ministry of Education web-sites provide access to policy documents and administrative forms. In Victoria, policy statements and advertisements for teacher appointments vacancies each appear on the DSE web-site.

4. HOW IT PLAYS ITS ROLE

Most computer software is written in such a way that it forces the user, to a greater or lesser degree, to use it in a certain way. For instance, if the designer of a student records database has decided that 15 characters is sufficient to allow for a student's surname, the names of some students from countries like Thailand will need to be abbreviated. When filling in a paper form, if only fifteen character spaces are left for a surname it is usually possible to write the overflow nearby on the form. In this respect the form acts differently to the computer software.

For most people, the process of writing a paper, a letter, a book or a thesis using a word processor is quite different to that of writing with pencil and paper or, in former times, with a typewriter. That the word processor lets you make corrections without obvious crossings out, that it enables you to insert and move text, and that it allows you to view the document in its final formatted form at any time, make the writing process quite different to working with the other tools. Even different word processors play their roles in different ways. A user of the MS-DOS version of Word Perfect (e.g. Word Perfect 5.1) had to get very familiar with using the computer's function keys, while the user of Microsoft Word was forced to learn to use a mouse. Discussions with a number of former typists suggest that they found using Word Perfect to be no great problem, but had terrible difficulties with using a mouse in Microsoft Word. Other people had the opposite problem.

In the context of school management information systems, we would argue that the software also plays a role that affects the way school administration is undertaken. For instance, if the SMIS requires that certain financial and student data must be collected, but does not require the collection of certain other data, then this is what is likely to happen at the school level. If the designer of the system has not thought to provide an option for recording more than one home phone number and one work phone number for each family, it becomes impossible to enter both parents' numbers if they are living apart, or even if both parents are working. The system has thus acted to control the way that the administrative processes take place. In ANT terms, use of an SMIS, and the resulting additional interactions between all the actors, has resulted in a lengthening of the actor-networks in administration and in curriculum, both within and between schools. These lengthened networks can also be seen in terms of a tightening of the degree of coupling (Weick 1976) that exists within and between schools.

That there has been a tightening of the coupling between schools and the central education authority, at least in Victoria and Ontario, is apparent. For example, in both these education systems teachers must now write their

student reports in a standard format using the SMIS, in contrast to the previous situation where individual schools, and even teachers could, to a large extent, determine the layout and structure of student reports. The use of the SMIS has given head office a greater degree of control in this respect. Within individual schools also, Principals are now able to expect that their teachers will all produce their student reports in a similar format, and in electronic form, representing a tightening of the coupling within a school between teachers and the Principal.

5. CONCLUSION

We contend that an important result of the use of School Information Systems is their tendency to tighten the coupling within schools between teachers and the Principal, and also between schools and central education authorities by coercing schools into performing many of their administrative functions in a standard way determined by the software. We note that Telem (1998) also reports similar findings.

In ANT terms, the software has acted to enforce this way of doing things. While not taking a deterministic position that would suggest some form of causal relationship, we do suggest that use of an SMIS acts to tighten these couplings, so enabling central education authorities to exercise a form of 'control at a distance' over school operations without appearing to intervene directly. King and Sethi (1999) have argued that the use of information technology is fundamental to effective operation of firms operating globally, as it provides a co-ordinating mechanism for their dispersed activities and also enables coalitions to be established. In a similar way we have argued that the use of school information systems provides a co-ordinating mechanism so that central education authorities can keep track of what schools are doing, and also to enable coalitions of human and non-human actors to be established in the administration and managements of schools.

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