

# Technology Planning in Schools

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## INTRODUCTION

Information and communication technology (ICT) planning as it relates to schools can be defined as the process of identifying the information and communication technologies used to support the educational and administrative goals of schools and of deciding how these technologies will be developed and managed (Lederer & Sethi, 1988; Smits & van der Poel, 1996). This article presents a model reflecting the evolution of ICT planning maturity in schools and identifies the factors that influence and characterize integration between ICT planning and educational strategy. The model suggests a common evolutionary pathway for ICT planning in schools and provides a foundation on which to propose a “stages of growth” model for characterizing and evaluating ICT planning in these settings.

## BACKGROUND

Information systems (IS) planning<sup>1</sup> and the degree to which that planning is clearly linked into an organization’s strategic goals have been widely recognized as key factors in the successful use of information technology (IT)<sup>2</sup> within the organization (see, for example, Watson, Kelly, Galliers, & Brancheau, 1997; Segars & Grover, 1998). Over a decade ago, Telem (1993) suggested that the use of IT as a management tool in educational contexts was a neglected area of research, particularly in terms of lack of an underlying knowledge base. Although in the ensuing years, an increased research focus on ICT in educational management has been seen, this focus has concentrated more on evaluative analysis of the efficacy of management information systems, computerized school information systems, and specific applications of information technology (see, for example, Barta, Telem, & Gev, 1995; Fung, Visscher, Barta, & Teather, 1997; Visscher, Wild, & Fung, 2001) than on understanding how schools develop their ICT systems and integrate them into their management systems and practices. Passey (2002) noted the continuing lack of research relating to ICT and school management within the school sector.

The notion that organizations evolve is encapsulated in various stages of growth models that are widely used in both organizational and IS research. In IS literature,

these models are based on the premise that organizations move through various stages of maturity in their use and management of IS (Nolan, 1973; Huff, Munro, & Martin, 1988; King & Teo, 1997; Teo & King, 1997). For example, King and Teo (1997) proposed a four-stage model conceptualizing the integration of IS planning and business planning over time, to better enable the effective support of business strategies. These four stages are separate planning with administrative integration, one-way linked planning with sequential integration, two-way linked planning with reciprocal integration, and integrated planning with full integration between business planning and IS planning.

Although researchers debate the accuracy and completeness of these various models, the models provide organizations with useful benchmarks to determine their current state of maturity and planning for future growth. More specifically, Robson (1997), for example, suggested that such knowledge provides organizations with a base from which to develop appropriate IS-related strategies, management styles, control approaches, and investment levels. Schools similarly can use such models to determine their ICT planning maturity and to develop appropriate strategies for future growth.

## ICT PLANNING IN SCHOOLS

The complexity of the educational environment provides an interesting context in which to consider ICT planning. First, unlike businesses, schools tend to focus on the use of ICT to support learning objectives rather than business objectives, yet, like businesses, they work with limited resources and financing. Second, technology in schools is not always well established (Latham, 1998; Knezek & Christensen, 1999), and an Educational Review Office (ERO) report stated that “the overall implementation of ICT was still in its early stages” (ERO, 2001, p. 2). As such, schools provide a contemporary context in which to demonstrate how ICT usage evolves within an organization. They also provide a venue to examine how this process is affected when many of the people within an organization have only a limited understanding of ICT development and planning, as tends to be the case in schools. Teachers and school administrators often acquire their IT skills “on the job” yet are expected to initiate

the planning and implementation of ICT within the school (Ministry of Education, 1999). Third, much of the small amount of research that has been conducted on the integration of ICT plans and educational strategic plans focuses on large tertiary institutions (see, for example, Barta et al., 1995; Fung et al., 1997; Rice & Miller, 2001), which have very different organizational structures, more complex IS needs, and greater numbers of specialist IT staff than do elementary and secondary schools.

Identifying how ICT planning evolves within schools and the characteristics of each stage of that evolution enables school administrators to better understand the factors contributing to ICT educational strategy alignment and successful ICT integration and growth.

## STAGE THEORY OF ICT PLANNING

The proposed model is based on an interpretive case study that examined the status of ICT planning and its integration with educational strategic planning in eight New Zealand state elementary schools. The model is based on data gathered from interviews with the principals, and analysis of the schools' strategic and ICT plans. The data identified factors that seemed to influence ICT planning in the eight schools, and highlighted a pattern across the schools in which ICT planning appeared to evolve from an unplanned state through to some form of alignment with educational objectives set in the schools' strategic plans. This pattern provided the basis of the proposed four-stage model of ICT planning maturity. The model, detailed in Figure 1, presents not only the characteristics that appear to define stages of planning maturity within schools, but also the evolutionary progression through these stages over time. In addition to outlining the four stages of the model, Figure 1 provides a set of benchmarks that corresponds to each of the stages. These benchmarks are organized across the four categories of *curriculum*, *professional development*, *infrastructure development*, and *school administration*.

The four stages of the model are not intended to be discrete but are signal points along a continuum of planning maturity. The benchmark characteristics associated with each stage are, therefore, similarly, indicators of progress along an evolutionary pathway rather than examples of discrete categories.

Progress in planning appeared to be influenced by internal, rather than external, factors. Even though all of the schools in the study were state elementary schools operating within similar parameters, they were demonstrably different in terms of their ICT-related competence and commitment. The factors that appeared to influence ICT planning and development were related to school size

(which impacted human and physical resources); ICT competence and attitudes of top management; ICT competence and attitudes of teachers; the existing ICT infrastructure (relating to the effectiveness of past planning and legacy systems); and the alignment between the school's ICT-related strategies and educational strategies.

Figure 2 identifies some of the drivers that appear to enable schools to progress in their ability to plan effectively for the alignment of ICT and strategic educational goals.

## FUTURE TRENDS

The development of a stage model of ICT planning maturity for schools provides a tool for analyzing current planning processes and assessing maturity vis-à-vis each of the planning categories proposed by the model. In this regard, it also offers further evidence of the usefulness of stage theory in understanding organizational development and IS strategy and business/educational strategy alignment. The model descriptors (Figure 1) provide benchmarks for highlighting areas of deficiency, assessing future directions, and providing assurance to school leaders as they work toward planning maturity. The stage drivers (Figure 2) go beyond the basic stage model to provide direction on aligning ICT planning with school strategic planning.

In similar vein to the study conducted by King and Teo (1997), the model depicts a progression from unformulated ICT plans with piecemeal implementation of hardware and software, through to the development of coherent and focused plans that emphasize the strategic goals of the school in the areas of teaching, learning, and administration. It seems that as schools develop skills in planning for ICT, they tend to identify opportunities to enhance the core business of teaching and learning through the innovative use of ICT in administrative, collaborative, and support roles.

The model provides a basis for investigating and analyzing ICT planning maturity in small organizations and, in particular, education contexts. There are opportunities to refine and enhance the model as schools mature in their planning and integration of ICT to achieve educational goals.

## CONCLUSION

ICT planning and strategic planning in schools is not a clearly defined area, and numerous factors, both internal and external, impact the planning process and outcomes.

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