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Realising the investment in ICT in schools: School Leadership the missing piece

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Abstract: This paper draws on a range of internal research and external reports to discuss the relationship between school leadership and the impact of Information and Communications Technology (ICT) in schools. Characteristics of school leadership and related decision-making processes are key determinants to the successful integration of ICT. While the Principal's role is important, having a leadership team that includes a curriculum leader who provides vision and support in the use of ICT is the most important component. The effectiveness of such a role depends on its connection with the leadership structure, the status of the person, and personal characteristics.

Keywords: school leadership; ICT and learning; ICT and curriculum; ICT Coordination

Introduction

In Australia there has been a massive investment in ICT for schools over the past two decades but the impact on teaching and learning has varied considerably between schools. As a result research organizations such as the Centre for Schooling and Learning Technologies (CSaLT) at Edith Cowan University (ECU) have investigated factors that explain this variation. This paper draws on this work, in particular a long-term evaluation of a one-to-one notebook program [4] (referred to as School J) and of a project involving over 50 schools. This paper does not discuss these evaluations in depth; references are provided if further details are required. The discussion is framed within theory developed nationally and internationally, in particular the report by Moyle [3].

1. School Leadership a Critical Factor

There is little doubt that leadership is a critical factor in almost all outcomes connected with a school, including for the integration of the use of ICT. Over the past decade much international research has found that the leadership and the organisation of a school are critical factors in the way in which educational technologies are used and their subsequent impact on teaching and learning [1][3][7]. The real question is not whether leadership is a critical factor but the extent to which particular features or components of leadership affect ICT integration. To this end Tondeur, Cooper and Newhouse [9] from CSaLT at ECU conducted a study in seven primary schools in Western Australia. These schools were selected to have similar characteristics in terms of financial resources, infrastructure, and staffing. A measure of the likely impact of ICT on learning outcomes and pedagogy was used for four data collection periods over a period of three years and then sets of qualitative data were interrogated to identify factors related to ICT coordination and

school leadership that may explain differences in impact between the schools and over time. The *Learning Outcomes and Pedagogy Attributes* (LOPA) measure was used; largely derived from a quantitative analysis of open-ended items from a teacher questionnaire (refer to [5]). For this study the inter-rater reliabilities on this measure were significant and between 0.8 and 0.9 ($p<0.01$). Scores for the seven schools from 2005 to 2008 are shown plotted in the graph in Figure 1 (2005 was a true baseline). The project intervention occurred in 2006 and 2007 during which time the schools were provided with, among other things, specific ICT leadership resources and professional learning.

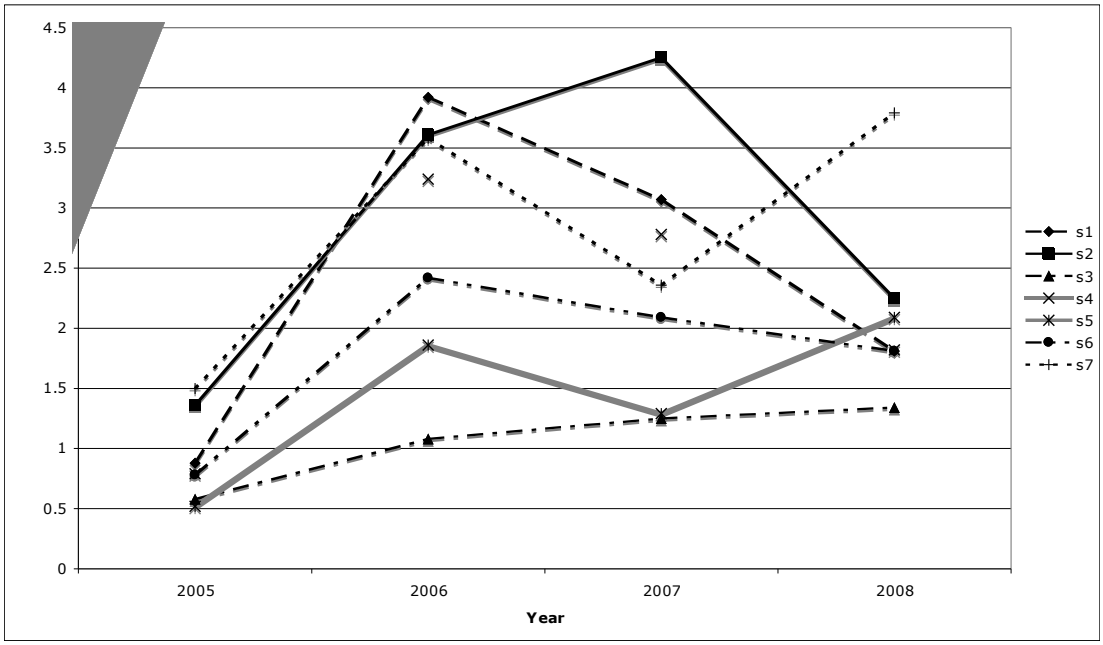

Figure 1 Changes in LOPA score over time [9].

Analysis of variance with post-hoc testing (Bonferroni) on these scores identified statistically significant differences over the four years. It was found that almost all of these differences occurred during the first year and to a lesser extent over the first two years. This is readily identified with the steep gradients of the graphs, particularly for S1, S4 and S6. These schools then became a special focus for the study, however, an overall trend for the schools apart from S7 was to start with similar scores in 2005, have varying degrees of increase over the ensuing two years, and then to regress and re-congregate at the end. There was a marginal increase for all schools over the period that was believed to represent the residual effect from improvements in infrastructure.

An analysis of a range of qualitative data in each school explained much of the similarities and differences in School LOPA scores. A major leadership resource provided in 2006 and 2007 was funding for a Curriculum ICT (CICT) coordinator role to support ICT integration. This analysis indentified that the role of the CICT coordinator was successful in the first two years when "adequately supported and driven by specific teaching and learning needs for a school" (p. 297)[9]. In the final year when this support largely disappeared there was a negative impact on the School LOPA scores. It was identified that "in schools where some encouraging progress was made in ICT integration, this was largely due to the CICT coordinator as the driving force with support from the principal". Further, the effectiveness of the role depended on its "connection with leadership in the school and a range of personal characteristics and the status of the person in this role". In particular the coordinator "needed to be viewed as a leader in the school by teachers, either on the basis of personal attributes, longevity at the school or position in

the school". It was clear that when the person was a, "strong leader, well supported by the principal and visible throughout the school community", positive outcomes were sustained. Improvements tended not to be sustained once support for the role was reduced partly due to a high turnover of inexperienced teachers.

During a similar time to this study a related study was conducted in School J at which a one-to-one notebook program was implemented. Some of the results from this comprehensive evaluation have been previously reported that show a similar, if not more dramatic, initial increase in School LOPA score [4]. However, a difference was that this increase was maintained and built upon in subsequent years. It was concluded that the most critical reason why this was maintained, despite other negative factors such as high staff turnover, was the continuing support given to a CICT coordinator role. This role had the status of a Deputy Principal and included responsibility for all curriculum development and teacher professional learning; in effect a Curriculum Director. Although over the years three people held the position each was successful and was supported by the Principal and was an integral part of decision-making processes.

2. School Leadership to Maximize the Impact of ICT Integration

A number of international reports (e.g. [1] [2]) and the Australian report by Moyle [3] have theorized the manner in which school leadership affects the use of ICT in schools. Typically these are stated as organisational conditions that provide a mechanism to explain this relationship. These conditions may be distilled to three: (1) Vision and Strategic Planning; (2) A Conducive School Culture and a Whole School Approach; and (3) School Infrastructure and Organisational Structure.

Vision and strategic planning is always the cornerstone for any organizational change and without this it is likely that only a few enthusiast teachers will battle alone [2]. The vision for the place of ICT in the school should be driven by pedagogical requirements to avoid what Papert [6] refers to as technocentric thinking. Thus school leaders should enunciate a clear vision, grounded in pedagogical understanding, and reflected in well-constructed strategic plans (p. 10) [2] as was found at Schools S2, S5, S7 and J [4] [9].

A conducive school culture and a whole school approach to the use of ICT can only be sustained with leadership support. This is a necessary but not sufficient condition because it also needs the involvement of teachers and students. Tearle [8] explains that a whole school culture and ethos are critical for motivating staff and Moyle [3] argues that the leadership in a school needs to foster this and then support teachers in implementation. At School S1 and J the leadership fostered a school culture of inquiry, innovation, excellence and participation that established communities of practice [4] [9]. This was achieved through involving staff in developing the vision and strategic plan, providing school-based professional learning and showcasing, using publicity opportunities, and leading by example. In addition more formal mechanisms such as performance management and mentoring were used.

School infrastructure and organisational structures are largely determined by the leadership of a school. Clearly infrastructure is critical, however, organisational structures also have an impact on the use of ICT with, for example, some structures better facilitating peer support amongst teachers. At School J system and school leaders provided and maintained increased and reliable ICT infrastructure and through the 'Curriculum Director' connected the use of the infrastructure with the organizational structures of the school [4]. For example, to combat the effects of staff turnover resources were developed

for induction. School J and schools such as S2 had long-term upgrading plans and routines to check the operation of infrastructure [9].

The Principal of a school is the prime instructional leader, however, the studies by CSaLT found that critical decision-making rested with other people as well. Some schools, such as School J, instituted a form of distributed decision-making, such as through committees to involve staff in policy development and implementation. Even so the Principal's "vision, belief and commitment for ICT use" (p. 21) [8] is pivotal in establishing and maintaining learning environments compatible with ICT use [3]. While most Principals espouse support for the use of ICT, for sustainable positive outcomes the vision needs to be operationalised through a leadership team with a variety of roles [3]. Research by CSaLT identified the value in having complementary leadership roles such as that provided by administrative assistants and librarians. However, most critical is that the executive includes someone who holds the responsibility and oversight for ICT integration [7]. This leader needs to have adequate knowledge and skills, be well supported by the Principal, be visible throughout the school community, and have a formal part in decision-making [1] [3]. The effectiveness of the role depends on four factors: (1) the nature of the role; (2) the provision of professional learning for teachers; (3) the support for whole school approaches to integration; and (4) liaising with technical support.

The nature of the role and the characteristics of the person in the role are critical to the effectiveness of the role. This includes the connection of the role with the leadership team, the range of personal characteristics brought to the role, and the status of the person in the role [1]. The person needs interpersonal and organisational skills and an ability to network, communicate and work well with a range of teachers. The most successful also have a combination of curriculum understanding and competence in the use of ICT [2]. However, the role is not for technical support and where this occurs the curriculum support role is compromised. The CICT coordinator role observed in the main study provided a model for this role [9] with perhaps one of the best examples provided by School J [4]. The role requires adequate support and where support disappears the impact of ICT integration is gradually eroded [9]. Clearly the formalisation of the curriculum leadership position is a powerful strategy to increase the linking curriculum and ICT.

The provision of professional learning for teachers is an integral component of the role. The CICT leader needs to consider how well developed the use of ICT is at the school, what goals have been set within the vision and strategic plan, the characteristics of the staff in order to meet the needs of teachers for ICT knowledge and skills, integration strategies, and strategies for the development of student ICT skills. In all schools in the main study the most effective strategy appeared to be one-on-one support in the classroom [9]. This was particularly realized in Schools S1, S4, and S6 through mechanisms such as teacher mentoring, augmented with workshops or professional learning days, along with access to resources on the school's intranet.

Supporting whole school approaches to integration is a key strategy for effective curriculum leaders [1]. With the increasing investment in ICT in schools and the increasing sophistication of ICT systems it is clearly ineffective and inefficient to have teachers working alone. Researchers such as Tearle [8] have found that there is a need to foster a "community of users" (p. 21) through informal support as part of the culture of the school. In all the schools in the main study at any time there were a number of curriculum initiatives [9]. In most cases it was likely that some use of the ICT infrastructure available would have enhanced the effectiveness of these other initiatives. This was more likely to occur in Schools S1, S4, and S6, and J where there were explicit connections between the use of ICT and these initiatives [4].

Liaising with technical support is a critical responsibility of the CICT leadership role whether that support is remote or local. It is important to recognize that to some extent the

agenda of IT technical support and curriculum ICT support are at odds. The former wants a standardized very limited system while the latter wants a very flexible extensive system. It is therefore important that the CICT leader has a good working relationship with all facets of IT technical support and has a strong voice in decisions made about the structure of technical support. Many schools have a technical ICT manager who liaises with the curriculum ICT leader, at School J this person reported to the curriculum leader [4]. While the effectiveness of CICT leaders would be severely limited if they were involved in technical support, some involvement, in a supervisory or collaborative sense, is necessary to provide appropriate support and maximize potential.

3. Conclusions

Research at CSaLT has supported the notion that successful ICT integration in a school requires teachers to have a sense of ownership of the vision and strategic plans, and then to be provided with adequate support for implementation. The Principal needs to foster a vision, belief and commitment for ICT use across the school but then needs to involve a wider range of personnel in decision-making and policy-making. Within this team a curriculum ICT leadership role is critical, however, the effectiveness of this role depends on selecting the right type of person and supporting the role. The role is that of a 'Curriculum Director' with responsibility for oversight of curriculum initiatives in the school, including the integration of ICT. The development of such as role is necessary to transform a school from isolated enthusiasts using ICT to a community of users providing powerful learning environments. It is the last piece of the jigsaw in the investment in the technology in schools, but without this piece the rest is largely wasted.

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