Edith Cowan University

Research Online

Research outputs 2012

1-1-2012

Effective School Leadership for Return on Investment in ICT

Christopher Newhouse

Follow this and additional works at: https://ro.ecu.edu.au/ecuworks2012

 Part of the Education Commons

Newhouse, C. P. (2012). Effective School Leadership for Return on Investment in ICT. Proceedings of Australian Computers in Education Conference (ACEC). (pp. 7). Perth, Australia. Australian Council for Computers in Education (ACCE). Available here

This Conference Proceeding is posted at Research Online.
https://ro.ecu.edu.au/ecuworks2012/124

EFFECTIVE SCHOOL LEADERSHIP FOR RETURN ON INVESTMENT IN ICT

C. Paul Newhouse
Associate Professor, School of Education, Edith Cowan University

Abstract

Research in Western Australian schools and reports from studies across the nation over the past decade have supported international research to find that the leadership of a school is a critical factor in the way in which of Information and Communications Technology (ICT) are used, and their subsequent impact on teaching and learning. This paper discusses this relationship by drawing on a range of local research and international reports. In a range of school situations it was found that particular characteristics of the leadership of a school and related decision-making processes are key determinants to the successful integration of ICT by teachers. While the Principal is a key component it was found that involvement of a leadership team that includes a Curriculum leader who provides vision and support for teachers' in the use of ICT is the most important component. The effectiveness of such a role depends on its connection with the leadership structure of a school, the status of the person in the role, and a range of personal characteristics, including a combination of curriculum understanding and competence in the use of ICT.

In Australia, as in many nations, there has been a massive investment in ICT for schools over the past two decades, particularly over the past few years. This investment in hardware, software and teacher training has typically had massive variation between schools in impact on teaching and learning. 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. A major factor has been shown to be the nature of ICT leadership in the school. This paper aims to discuss how leadership is critical to getting the intended 'learning' return on the investment in ICT in a school. It draws on the work in CSaLT, in particular a long-term evaluation of a one-to-one notebook program (Newhouse, 2008) (this school is referred to as School J) and a five-year evaluation of a project involving over 50 government schools. Both of these studies used a similar methodology as outlined by Newhouse and Clarkson (2008). This paper does not intend to discuss these evaluations in depth; references are provided if further details are required. Rather, the discussion of the results of these studies are framed within theory developed nationally and internationally, in particular the report by Moyle (2006), *Leadership and Learning with ICT*.

School Leadership a Critical Factor

There is little doubt that the leadership is a critical factor in almost all outcomes connected with a school and this is likely to include the integration of the use of ICT by teachers and students. In fact over the past decade much international research (Becta, 2006; Moyle, 2006; Stuart, Mills, & Remus, 2009) has found that the leadership and organisation of a school are critical factors in the way in which educational technologies are used and their subsequent impact on teaching and learning in a school.

> *Schools making progress in using technology to support learning in sustained ways are those where there is strong vision and leadership for ICT from senior management, ... (Becta, 2006, p. 7)*
>
> *...this study suggests that school leaders need to be more practically involved in the ICT projects in their school and in ICT management. (Stuart, Mills & Remus, 2009, p. 740)*

A national government report, "Leadership strategy - learning in an online world" (Curriculum Corporation, 2006), claimed that effective school leaders "understand the transformative potential of ICT" and have skills in "the appropriate and purposeful integration of ICT in learning, and in high-level management and communication processes" (p. 3). The report went on to explain how school and system leaders are "proactive in creating productive 21st century schools" when they,

> *... raise awareness ... connect new knowledge and technologies... provide teachers with necessary resources ... connect teachers ... engage teachers ... leverage students' expertise ... foster shared beliefs ... (p. 5)*

The real question is not whether leadership is a critical factor but the extent to which particular features or components of leadership affects ICT use by teachers and students. To this end Tondeur, Cooper and Newhouse (2010) from CSaLT conducted a study into the impact of leadership on the use of ICT by students in seven public 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 at particular periods of time. The Learning Outcomes and Pedagogy Attributes (LOPA) measure was used to quantify the likely impact of ICT use; or ICT integration. It is largely derived from a quantitative analysis of open-ended items from a teacher questionnaire (refer to Newhouse & Clarkson (2008) for further information on the LOPA measure). For this study the inter-rater reliabilities 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 (the 2005 score was a true baseline). The project intervention occurred in 2006 and 2007 during which time the schools were provided with specific ICT leadership resources and support, and access to additional professional learning support.

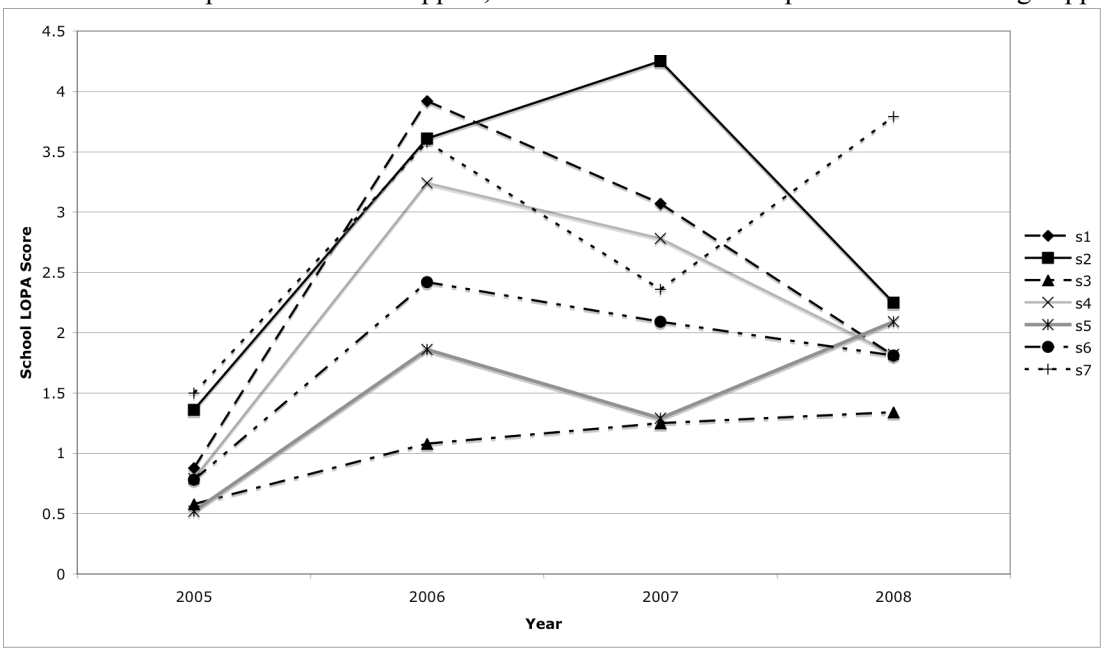

Figure 1. Changes in LOPA score over time (Tondeur, et al., 2010).

Analysis of variance with post-hoc testing (Bonferroni) on these LOPA scores identified statistically significant differences over the four years. It was found that almost all of the statistically significant changes in school LOPA scores occurred during the first year (2005-2006) and to a lesser extent over the first two years (2005-2007). This is readily identified with the steep gradients of the graphs, particularly for S1, S4 and S6 (statistically significant increases). These schools became a special focus for the study, however, the trend for the schools apart from S7 was to start with similar scores, 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 in the scores for all schools over the period of time that was believed to represent the residual effect from improvements in hardware and network infrastructure. For School S7 there was a serious fire in 2007 that destroyed a substantial portion of the ICT infrastructure and therefore in essence the project was put on hold until the following year.

An analysis of a range of qualitative data examining the ICT leadership in each school explained much of the similarities and differences in School LOPA scores over this period for these schools. A major

leadership resource provided in 2006 and 2007 in these schools was funding for a Curriculum ICT (CICT) coordinator role to support ICT integration in teaching and learning. This analysis indentified that this role was successful in the first two years when "adequately supported and driven by specific teaching and learning needs for a school" (p. 304). Then in the final year when this support largely disappeared there was a negative impact on the school LOPA score (Note: In School S7 this support was carried over into the final year). 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" (p. 304). 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. In particular the people in this role tended to be more effective when they had a "formal part in the leadership and decision-making structures of the school". Improvements in these schools tended not to be sustained once support for the role was reduced because there tended to be a high turnover of inexperienced teachers at these schools.

The study concluded that an effective CICT coordinator was an important factor in "motivating staff and encouraging a whole school facilitation of ICT use to support learning" (p. 305). These leaders employed strategies such as "one-to-one support, role modelling, scaffolding, peer collaboration and peer support" to improve the use of ICT by teachers. The study supports the importance of including a CICT coordinator role as a part of the "leadership and decision-making structures of the school". It also identified the key required characteristics of the person taking on the role and the necessary school environment conditions required for the role to be successful.

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 (Newhouse, 2008). However, a difference was that this increase was maintained and built upon in subsequent years. It was concluded that the most critical factor 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 the position was that of a Curriculum Director with responsibility for curriculum support of teachers; with technical support was provided by non-teacher specialists.

The Affect of School Leadership on ICT Use

A number of international reports (e.g. Becta, 2006; Lee & Gaffney, 2009) and the Australian report by Moyle (2006) 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. Each of these is dependent on school leadership with implementing the effective use of ICT in schools being a complex task usually requiring school leaders to facilitate substantial organisational change.

The communication of 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 to implement effective use of ICT to support learning (Lee & Gaffney, 2009). The vision for the place of ICT in the school should be driven by pedagogical not technological requirements to avoid what Papert (1987) refers to as technocentric thinking. School leaders can avoid this by enunciating a clear vision, grounded in pedagogical understanding, and reflected in well-constructed, short-term and long-term, strategic plans. As Lee and Gaffney put it, "The power and potential benefits of digital technology, as

well as its substantial resource demands, mean that it must be considered in relation to the other elements of school and system planning" (Lee & Gaffney, 2009, p. 10). Such vision and strategic planning was found at Schools S2, S5 and S7 and School J.

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. However, as Tearle (2004, p. 21) explains a whole school culture and ethos are critical for a "well motivated staff" in the integration of ICT use. The leadership in a school plays a pivotal role in motivating staff and encouraging such a whole school culture and ethos. Moyle (2006) argues that the leadership in a school needs to foster this sense and then support teachers in implementation. At School S1 and School J the leadership fostered a school culture of inquiry, innovation, excellence and participation. This was achieved through involving all staff in developing the vision and strategic plan, providing school-based professional learning opportunities, providing opportunities for showcasing, using publicity opportunities both inside and outside school, and generally leading by example. In so doing communities of practice were established to support teachers across a school. In addition both schools used more formal mechanisms such as performance management and mentoring programs to maintain whole school approaches and a conducive culture.

School infrastructure and organisational structures are largely determined by the leadership of a school. Clearly the provision of ICT infrastructure is critical to the successful implementation of ICT use. However, organisational structures that leadership puts in place also has an impact with, for example, some structures better facilitating peer support amongst teachers. At School J system and school leaders provided adequate and reliable ICT infrastructure, and through the role of the 'Curriculum Director' connected the use of this infrastructure with the organizational structures of the school. This was achieved through line management and the opportunity of all staff to contribute through regular meetings. For example, to combat the effects of staff turnover School J developed resources for staff induction into facilitation of one-to-one computer use. School J and schools such as S2 had long-term plans for ICT infrastructure upgrading and replacement and developed routines to regularly check the operation of workstations and networks. They provided mechanisms to connect with the regular organizational structures in the school.

Principals Leading Leadership Teams

The Principal of a school is the prime instructional leader in a school, however, the studies conducted by CSaLT tended to illustrate that success was more likely in schools where critical decision-making concerning ICT rested with more than just the Principal and/or a coordinator. Some schools, such as School J, instituted a form of distributed decision-making, such as through committees that involve staff in policy development and commitment to new practices. Even so the Principal's "vision, belief and commitment for ICT use across the school" is critical (Tearle, 2004, p. 21). In her report Moyle (2006) explained the importance of the role of Principals as pivotal in establishing and maintaining learning environments compatible with ICT use and as being seen by local communities as curriculum and pedagogy leaders. The two studies at CSaLT indicated that the Principal usually needed to possess some ICT technical competence and/or experience in using ICT in teaching, as suggested by Lee and Gaffney (2009). This was definitely the case for Schools S2 and S7.

While in most schools Principals tend to espouse support for the use of ICT to support teaching and learning for sustainable positive outcomes the vision needs to be operationalised. This means that the Principal includes others in a leadership team, including a Curriculum Director role. With the complexity of implementing ICT systems in schools a leadership team has a range of roles. Moyle (2006) suggests a variety of different leadership roles and levels and suggests key positions for supporting the incorporation of ICT into teaching and learning: Principal; IT Systems or Information Systems Manager; Curriculum Coordinator; Professional Development Coordinator; Learning Area/Subject Coordinator; Teacher-librarian; Teachers; and Technical support officers. Research conducted at CSaLT identified the value in having complementary leadership roles related to the use

of ICT in a school and in particular the valuable roles that may be provided by administrative assistants and librarians. For example, at School J these people took on tasks such as managing student accounts, managing access to online sites (e.g. unblocking URLs) and finding resources for teachers and making them available online. However, the most critical role is that the executive team of a school includes someone who holds the responsibility and oversight for ICT issues across the school – any initiative needs someone to champion and manage it (Stuart, et al., 2009).

The Curriculum ICT Leadership Role

Increasingly research is showing that for sustained positive outcomes in the use of ICT in a school there needs to be a strong curriculum leader in the school with adequate ICT knowledge and skills, well supported by the Principal and visible throughout the school community (Becta, 2006). Typically this person has a formal part in the leadership and decision-making structures of a school (Moyle, 2006). This is a necessary but not sufficient condition. The effect of a strong curriculum leader can be thwarted by other factors such as inadequate ICT infrastructure. Such a leader may be a leading teacher in the facilitation of ICT use by students but not be able to provide adequate leadership in a school. A major component of the role is to foster a sense of ownership across the school staff that may be assisted by structures such as ICT committees and ICT integration becoming a part of the performance management of teachers and leaders. The effectiveness of the role depends largely 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) coordinating with technical support.

The nature of the role and the characteristics of the person are critical to the effectiveness of the role. This includes the connection with the leadership team, the range of personal characteristics brought to the role, and the status of the person. The person needs to be viewed by teachers as a leader in the school. A report from the UK noted "… the need to appoint staff at a senior level to facilitate change, are essential for the successful implementation of e-learning." (Becta, 2006, p. 5). The person needs interpersonal and organisational skills and an ability to network, communicate and work with a range of teachers. The most successful also have a combination of curriculum understanding and competence in the use of ICT (Lee & Gaffney, 2009). However, the role is not for technical support and where this occurs the curriculum support role is compromised. The "Learning with ICT" project in Western Australia provided a model for this leadership role in its Curriculum ICT Coordinator position (Tondeur, et al., 2010). Perhaps one of the best examples of the role is provided by School J to support the student notebook program. This ensured that the notebook program was connected to all curriculum-related activity in the school and that the use of ICT was always fore-grounded in decision-making.

Clearly the formalisation of the teacher curriculum leadership position is a powerful strategy to increase the leadership capacity linking curriculum and ICT. This is principally achieved through the provision of professional learning for teachers, supporting whole school approaches to integration, and liaising with technical support.

The provision of professional learning for teachers is an integral component of the role. Exactly how this should be provided is largely dependent on how well developed the use of ICT is at the school, what goals have been set within the vision and strategic plan, and the characteristics of the staff. Most teachers know that they need to have continuing professional learning to support them in making better use of ICT infrastructure but they will not necessarily be able to identify exactly what type of learning they require. The CICT leader needs to consider their needs to develop their own ICT capability along with that of their students. In particular they need implementation strategies modelled for them to integrate the use of into their curriculum and implement in typical classroom environments. In all the schools in the CSaLT studies the most effective professional learning strategy appeared to be one-on-one support in the classroom. This was particularly realized in Schools S1, S4, and S6. This was provided by the CICT leader or through mechanisms such as teacher buddy and mentoring systems. Workshops along with placing resources on the school's intranet augmented

classroom support.

Supporting whole school approaches to integration is a key strategy for effective curriculum leaders (Becta, 2006). These are built on the vision and strategic plan constructed by the leadership team. Researchers such as Tearle (2004, p. 21) have found that there is a need to foster a "community of users" through informal support as part of the culture of the school. Whole-school curriculum approaches may include the use of systems such as Mathletics™; the use of an ICT integrator role within teaching teams; programs for ICT skills development; and whole-school policy initiatives such as 'lighthouse classes'. In all the schools in the CSaLT studies there were a number of short-term and long-term curriculum initiatives that were likely to be enhanced through some use of the ICT. This was more likely to occur in Schools S1, S4, and S6, and School J where there were explicit connections between the use of ICT with students and these curriculum-related initiatives.

Coordinating 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. Ideally the leader of technical support will be part of the leadership team at a school. Many schools have a technical ICT manager who attends school executive meetings and liaises with the Curriculum ICT leader, at School J this person reported to the curriculum leader. Most CICT leaders lack the skills and knowledge for technical support, and this role severely limits their effectiveness for their substantive role. However, some involvement with technical support, in a supervisory or collaborative sense, is necessary to ensure support is appropriate and to increase understanding of system potential.

Conclusions

Research at CSaLT has supported the notion that successful integration of ICT in a school will require teachers having a sense of ownership of the vision and strategic plans and then being provided with adequate support for implementation. The Principal and leadership team at a school 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. This research has demonstrated the critical value of a curriculum ICT leadership role within a school leadership team. However, the effectiveness of this role initially depends on selecting the right type of person and supporting the role with both leadership status and credibility. The role is that of a 'Curriculum Director' with responsibility for oversight of curriculum initiatives in the school, including the integration of ICT. The role will oversee the professional learning of teachers, foster a whole school approach to ICT integration, and will liaise with technical support. The development of such as role is necessary to transform a school from some isolated enthusiasts using ICT to a community of users providing powerful learning environments that improve the learning of students. It is the last piece of the jigsaw in the necessary investment in the technology in schools, but without this piece the rest is by and large wasted.

Acknowledgement

This paper draws on research conducted at the Centre for Schooling and Learning Technologies (CSaLT) that involved researchers and research assistants associated with the centre.

References

Becta. (2006). The Becta Review 2006: evidence on the progress of ICT in education: Becta ICT Research.

Curriculum Corporation. (2006). Leadership strategy - learning in an Online world. Canberra: MCEETYA.

Lee, M., & Gaffney, M. (2009). Leading schools in a digital age. In M. Lee & M. Gaffney (Eds.), *Leading a Digital School*. Melbourne: Australian Council for Educational Research.

Moyle, K. (2006). *Leadership and learning with ICT: voices from the profession.* Canberra: Teaching Australia, Australian Institute for Teaching and School Leadership Ltd.

Newhouse, C. P. (2008). Transforming Schooling with Support from Portable Computing. *Australian Educational Computing, 23*(2), 19-23.

Newhouse, C. P., & Clarkson, B. D. (2008). Using learning environment attributes to evaluate the impact of ICT on learning in schools. *Research and Practice in Technology Enhanced Learning, 3*(2), 139-158.

Papert, S. (1987). Computer criticism vs. technocentric thinking. *Educational Researcher, 16*(1), 22-30.

Stuart, L. H., Mills, A. M., & Remus, U. (2009). School leaders, ICT competence and championing innovations. *Computers & Education, 53*, 733-741.

Tearle, P. (2004). The implementation of ICT in UK secondary schools: The Telematics Centre, University of Exeter.

Tondeur, J., Cooper, M., & Newhouse, C. P. (2010). From ICT coordination to ICT integration: a longitudinal case study. *Journal of Computer-Assisted Learning, 26*(4), 296-306.