An Investigation of the Role of the Information and Communication Technologies Leader in Secondary Schools

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ABSTRACT: While growing numbers of secondary schools have an Information and Communication Technologies (ICT) leader, there is surprisingly little consensus on who an ICT leader should be or what the position should entail. In Victoria, Australia, ICT leaders in secondary schools have been given a variety of position titles as the role is defined in a variety of different ways. In some schools the position is treated as a senior role, while in others it is not important. In addition, no system-wide description of an ICT leader exists. This article presents findings from exploratory research into the ICT leadership role, through perspectives from a variety of personnel in key leadership positions in schools as well as teacher perspectives.

Introduction

In Victorian secondary schools, computing first appeared as a subject in its own right in the classroom in the early 1980s, when Year 12 Computer Science was introduced as a Higher School Certificate (HSC) subject (Jones, McDougall & Murnane, 2004; Victorian Institute of Secondary Education, 1984) and it was largely technical (Holloway & Rae, 1986).

From early on, however, there was a move toward integrating computers across the curriculum (National Advisory Committee on Computers in Schools, 1984) as the focus shifted toward emphasising the computer as a pedagogical tool for improving learning.

Using computers throughout the curriculum required direction within the school and from early on it was understood that teachers would need help (Grundy et al., 1987). In some schools this direction was coordinated by a person or a small team in the school following a strategic plan and driven by the needs of the curriculum (Education Victoria, 1998; McDougall, Nicholson & Marshall, 2000). Schools began to appoint Learning Technologies Coordinators.

Despite ongoing attempts to integrate computers into the curriculum, several reports highlighted on-going barriers to integration such as access to computers, emerging technologies, pedagogy, professional development and leadership (Cuttance, 2001; Hennessy, Ruthven & Brindley, 2005; Victorian Curriculum and Assessment Authority, 2002).
Recent trends which have emerged, such as portability, connectivity, communication and collaboration, are the new challenges faced by educators (BECTA, 2006; Johnson et al., 2011). The rapid influx of change has made it difficult for schools to predict the likely adoption and evolution of emerging technologies (Johnson et al., 2011; Johnston, Adams & Haywood, 2011; Millea, Green & Putland, 2005).

With significant investment in ICT being made in the belief that the quality of learning will be enhanced, leadership is a critical requirement. Principals are often ill equipped for the challenges presented by technology (Lee & Gaffney, 2008a). In some schools this has almost certainly led to something of a leadership vacuum when it comes to Information and Communication Technology. A key question to ask is: Who is leading in this area and what kind of leadership is provided?

**Literature Review**

**Leadership for teaching and learning**

Any definition of leadership must necessarily be complex and needs to take into consideration the context in which that leadership takes place (Leithwood & Jantzi, 2005b; Southwood, 2005). Moreover, school leadership has been described in a variety of ways including transformational leadership (Gurr, 1996, 2002; Leithwood & Jantzi, 2005a, 2005b); instructional leadership (Gurr, Drysdale & Mulford, 2007; Hallinger, 2005; Southworth, 2002; Timperley, 2005); distributed leadership (Gronn, 2008; Harris, 2008; Robinson, 2008; Spillane et al., 2008; Spillane, Halverson & Diamond, 2004); and leadership for learning (Hallinger, 2011). While there are many different descriptions of leadership, it is worth noting that the various labels:

- primarily capture different stylistic or methodological approaches to accomplishing the same two essential objectives critical to any organization’s effectiveness: helping the organization set a defensible set of directions and influencing members to move in those directions. Leadership is both this simple and this complex. (Leithwood et al., 2004, p. 6)

It is important to keep in mind that there is a purpose to leadership. Leithwood et al. provide a useful definition of leadership (Leithwood et al., 2007; Leithwood, Harris & Hopkins, 2008). Leadership consists of four essential elements:

- building vision and setting directions;
- understanding and developing people;
- redesigning the organisation;
- managing the teaching and learning program.

**Principals and information and communication technologies**

Most of the leadership literature has focused on the principal but there is a major problem with this focus on principal leadership. This problem concerns the ability of the principal to exercise effective leadership with respect to ICT. Two studies (Dawson & Rakes, 2003; Gurr, 2000) emphasised that principals are often not experts in the use of ICT. Schiller (2003) argued that
principals have not been prepared for their ‘role as technology leaders, nor have they had opportunities for meaningful experiences in using computers with children’ (p. 172). This means that there is an expectation that a person with minimal ICT expertise is expected to make major financial, pedagogical and developmental decisions. Furthermore, some principals rely on advice and guidance given by staff or ‘over-eager’ sales people who have their own vested interest (Schiller, 2003). Dawson and Rakes (2003) argued that ‘[t]oo many Principals are uninformed about and uninvolved in the role technology plays in their school’ (p. 32). Schiller (2003) concluded that ‘Principals need to understand the capacities of the new technologies, to have a personal proficiency in their use, and be able to promote a school culture which encourages exploration of new technologies in teaching, learning and management’ (p. 172).

Gurr (2000) commented that two of the crucial roles for principals in ICT are in leadership and planning, and that principals rely on staff to assist with technology. If the principal is relying on others for decisions with respect to technology, the question is: to whom does the principal turn? The answer to this question is important because whoever is providing the advice to the principal is likely to be the person setting the agenda. For example, where decision-making about computers in the curriculum is seen purely in financial and resource terms, the principal is likely to rely on the business manager or the Information Technology services manager.

A problem arises when principals do not have an understanding or an appreciation of how to use the technology within a classroom. They may make poor decisions, spend money on unnecessary hardware and software, or, conversely, not provide sufficient funds to purchase technology (Dawson & Rakes, 2003). Moyle (2006) contended that ‘integrating ICT into teaching and learning requires schools to have a “whole school” strategic focus on student learning, teaching and organisational improvement’ (p. 52). Therefore school principals are ‘critical people’ for maintaining environments that are conducive to teaching and learning (Moyle, 2006). Both Moyle (2006) and Lee and Gaffney (2008b) have argued that few principals are well placed to understand what it means to lead a digital school.

In fact, the effective integration of computers into teaching and learning in other areas of the curriculum – which is fundamentally a question of pedagogical leadership – has proven difficult. These difficulties include computers being ‘tacked onto’ other subjects (Dyson, 1996), student difficulties in transferring skills across the curriculum (Little, 1997), and inappropriate pedagogy when using computers for classroom use (Newhouse, 1998). In fact Newhouse’s (1998) research on student achievement and teacher attitudes on the effects of computer-based tools across grade levels found ‘the lack of use of the computers is largely related to the teacher’s pedagogy, their lack of experience and knowledge in using computers in the classroom, and a lack of time to experiment with computer application’ (p. 15).

Others have emphasised the necessity for teachers to develop new approaches when using computers. These approaches can be constructivist in nature (Atkin, 1999; Heppell, 1999) and concentrate on engaging the learner (Romeo, 2001), whilst others prefer the theory of connectivism (Drexler, 2010; Siemens, 2004; Siemens & Tittenberger, 2009).

Compounding the problem of appropriate pedagogy in secondary schools is the resistance of a significant number of teachers to embrace the use of computers in their subject areas (Godfrey, 2001). Leadership is the key to ensuring that this takes place. In essence, the ICT leader needs to demonstrate strong instructional leadership (Southworth, 2002).
Considerations of equity and the provision of resources such as Internet, intranets, networks, infrastructure, hardware and software, peripheral devices and technical expertise require leadership (Kirkland & Sutch, 2009).

From the first attempts to introduce computers across the curriculum, the issue of professional development has been an important one. Leonard (1998) believed that for successful professional development within schools, it was necessary to develop a shared vision; a collegial culture; appropriate organisational structures and allocated sufficient resources. These are all clearly matters for leadership.

Professional development is critical to the use of computers throughout the curriculum because:

[there is an acknowledged need for ongoing support and development to help teachers acquire and develop the technical skills and pedagogical understanding required so they can extend and enhance teaching and learning through the creative use of Information and Communication Technology. (Tearle, 2002, p. 4)]

Despite the importance of professional development there has been little clarity amongst schools and educators in terms of the content to be delivered, the amount of time devoted to it, the cost, and who leads it (Cuttance, 2001; Glazer, Hannafin & Song, 2006; Jenson, Lewis & Savage, 2002; Schrum, 1999). One-off professional development sessions or workshops do not translate to productivity in the classroom, especially when taught out of context and not linked to the curriculum (Little, 1997; Schrum & Levin, 2009). Instead, professional development needs to be sustained and continuous (Downes et al., 2002; Hodgkinson, 2008). Central to this issue is whether professional development is delivered as it is needed; a mode of delivery which is referred to as just-in-time, or whether it is delivered against a future need which is just-in-case professional development. Jenson, Lewis and Savage (2002) agreed with Schrum (1999) that just-in-time learning is more practicable and beneficial as ‘teachers don’t learn stand alone skills, but instead use computers in relation to the activities they design and will ask their students to do’ (Jenson, Lewis & Savage, 2002, p. 493). Just-in-time professional development refers to training that is provided for a particular purpose, or as suggested by Glazer, Hannafin and Song (2006), ‘support on demand’ (p. 61).

The Making Better Connections (Downes et al., 2002) report argued ‘professional development is effective where it is identified and implemented within the school context to meet the needs of their teachers and students, for the continuous improvement of professional practice’ (p. 22). For this to be achieved within the school context, someone must take the lead.

Flanagan and Jacobsen (2003) identified four issues as barriers to implementing Information and Communications Technology in schools:

1. pedagogical issues;
2. concerns about equity;
3. inadequate professional development;
4. lack of informed leadership.

These four barriers are, in different ways, reflected in the literature on the implementation of Information and Communications Technology in the curriculum. Each of these issues can be understood as being concerned with leadership.
Towards understanding the role of the information and communication technologies leader

There is no one settled model for ICT leadership in schools. Tearle (2003) suggested that ICT implementation in schools does not necessarily rest on discrete aspects such as training, hardware and software but rather on ‘mindsets, assumptions, beliefs and values of individuals and organisations’ (p. 581). She believed that ‘piecemeal approaches which address discrete elements which are perceived to impact on increasing ICT use, will at best have limited outcomes’ (p. 581). Without proper leadership and coordination, ICT implementation in schools will stagnate. Moreover, Lee, Gaffney and Schiller (2003, p. 202) argued that the ICT leader, unlike a head of a subject department, needs to oversee the ‘total operation’ of the school as opposed to just concentrating on small segmented areas.

Lee, Gaffney and Schiller (2003) further argued that it is necessary to have an ICT leader in schools. They believed that the person responsible in this significant senior leadership position should oversee the work of the network manager or ICT subject coordinator to stop their agendas being pushed in discrete and piecemeal segments.

Some writers have been critical of an over-reliance on the expertise of network managers who tended to set the educational agenda by default (Lee, Gaffney & Schiller, 2003). This meant that ICT technical staff wielded significant power in schools, as they not only controlled one of the largest budgets, they also set the educational agenda, without necessarily having a background in pedagogy or the ability to oversee the total operation of the school. Lee (2006) argued that it was unsatisfactory when network managers unilaterally decide on the choice of technology and what is best for teachers. This highlights the dangers of network managers exercising educational leadership, and hence the necessity to ‘confine the role of the network manager or Information and Communication Technologies coordinator to their expertise in the technical arena’ (Lee, Gaffney & Schiller, 2003, p. 203).

It is paramount to secure the right type of person for the position in ICT leadership (Lee, 2003; Murray, 2008; Tearle, 2003). Tearle (2003) believed that the appointment of key staff in the area underpinned the success of ICT implementation in schools. However, it was more than just the leadership position that determined the success. Tearle (2003) attributed the success to ‘the brief of the role which had been drawn up, and the subsequent particular strengths of the person appointed (good inter-personal skills and focused commitment to the task in hand) which really made the difference’ (p. 575).

The research question addressed by this study examined the role of an ICT leader in Victorian secondary schools. The following research questions were put to participants:

1. What makes for effective leadership in the provision of ICT in secondary schools?
2. What qualities and skills would the ideal ICT leader possess?
3. How does an ICT leader fit into the organisational structure of a secondary school?
Research Methods

Participant characteristics
In describing the ICT leadership role, the goal of this research was to obtain perspectives from a variety of personnel in key leadership and teaching positions in schools to evaluate the similarity and differences of perspectives compared to the literature. For this purpose, seven secondary schools from Victoria, Australia, took part with 51 participants in total. The participants’ roles in schools were carefully targeted so that there was representation from classroom teachers, computer technicians, curriculum co-ordinators, heads of departments, heads of library, network administrators, deputy principals and principals.

The schools that took part in this research included four male single sex schools, two female single sex schools and one co-educational school. Consequently, personnel possessing a range of backgrounds and various teaching methods and experience completed questionnaires. Teaching experience, for example, ranged from less than 5 years experience, to over 35 years. The teaching staff that participated in this study were generally teachers who taught subjects other than Information Technology.

Data sources
The data informing this study consisted of 51 questionnaires administered over a period of 2 months. The themes and inferences were then further explored by engaging six people who participated previously in the answering of the questionnaires. This represented 12% of the participants. The interviews occurred after the questionnaires and were recorded and transcribed.

In addition to completing the designated questions in the questionnaire, respondents were encouraged to provide further comments if they wanted to qualify a question or believed that they had more to add to a particular line of questioning. In all, 30 respondents felt compelled to make additional comments to the questionnaires. This represented 59% of the completed questionnaires.

TABLE 1: NUMBER OF PARTICIPANTS FROM EACH SCHOOL

<table>
<thead>
<tr>
<th>Position</th>
<th>School A</th>
<th>School B</th>
<th>School C</th>
<th>School D</th>
<th>School E</th>
<th>School F</th>
<th>School G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Teacher</td>
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<td>0</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Curriculum Coordinator</td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Head of Department</td>
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<td>3</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Deputy Principal</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Head of Library</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Network Administrator</td>
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<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Principal</td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Computer Technician</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
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<td>3</td>
<td>10</td>
<td>8</td>
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</table>
Data analysis
A mixed method was chosen as the method of evaluation because it was sufficiently open-ended to enable the researcher to reflect the complexity of the situation. All sources of evidence were reviewed and analysed together, so that the study’s findings were based on the convergence of information from different sources, not quantitative or qualitative data alone.

Inferences drawn from the data gathered from both questionnaires and interviews were compared to the Literature Review. These were analysed and a list of core functions formed the paradigm that would lead to an understanding of the role of the ICT leader.

Research Findings
The research found that the ICT leadership role as perceived by the eight groups of participants in this study was similar. There was essentially a common understanding of the role and functions of an ICT leader in a secondary school. The findings emerged from the questionnaires and are grouped under the following thematic headings:

- Knowledge and Skills – both in terms of having a sound educational background and knowledge of hardware and software;
- Professional Development – with regards to all staff in terms of professional development;
- Leadership – with particular respect to vision and strategic leadership;
- Place in the Organisational Structure – especially with respect to belonging on senior teams within a school and being able to have direct communication with the principal.

These components are strongly connected to key aspects of the questionnaire and provide important points of amplification in terms of developing a position description. Each will now be discussed in turn.

Knowledge and skills of the information and communication technologies leader
The vast majority (82%) of the participants in this study agreed that the ICT leader in schools should have a formal teaching qualification. In addition, all respondents stated that the ICT leader should have Information and Communication Technologies related studies in addition to their teacher qualifications. Some of the participants in this study criticised their current ICT leaders as being too technical and not in tune with the curriculum/classroom teacher’s needs: ‘Too many Information and Communication Technologies leaders are very technically competent, but curriculum/learning needs insensitive’. Another participant stated, ‘The network manager doesn’t allow students to use memory sticks for security reasons, and won’t allow them to email attachments larger than 2MB because of bandwidth issues. How do students work on files at home and at school?’

Although the ICT leader needed specific network qualifications, it emerged from this research that the ICT leader could not be completely removed from the operation of the school’s network. There was universal agreement (100%) amongst the participants that the ICT leader required some
qualifications, expertise or understanding of the network itself. The suggestion reflects the lingering concern that the ICT leader needs to be ‘connected’ to the operation of the network. Clearly, then, the ICT leader is an educational leader with an educational background, but also needs to have some relationship with the operation of the College network. This is an important aspect in understanding the role of ICT leader.

**Professional development**

Most respondents (84%) believed that one-to-one professional development was needed. This was especially true of heads of department, curriculum coordinators, deputy principals and principals. It seemed that the more senior the role, the more their need for one-on-one assistance. This could possibly be explained by the fact that personnel in these roles are often time poor and are often not in the position to devote large blocks of time to develop a new skill in a training environment or learning new skills – many of which will soon be forgotten if the user does not have an immediate need for them. There also appears to be some confusion here between an immediate need for assistance which can only be satisfied by one-to-one help, training in some aspect of hardware and software which might be useful for the future, and professional development which genuinely builds on current knowledge and understanding. It may also be the case that more senior staff have, or believe they have, information technology needs which are particular to their position.

Overwhelmingly (96%), the respondents believed that professional development should be delivered within the context of subject departments. Professional development in the use of hardware was a theme that was reoccurring. Approximately 73% of participants in the study wanted to be trained in the use of hardware while a larger number of participants (88%) believed that professional development should be in the use of software. The danger here is that this approach will not address the bigger picture of how to use ICT in learning and teaching. Cuttance (2001) argued that there was a problem when there was: ‘systemic training and development initiatives on technical skills, with little or no provision of programmes to support professional development in the integration of technology into the practice of teaching and learning’ (p. 16).

**Leadership role**

Over 61% of participants in this study believed that the ICT leader should be represented on the school’s leadership team (made up of the principal and senior nominees), given the overall responsibilities they have in the school. Despite this general agreement, it was noted that fewer principals (33%) and deputy principals (37%) agreed that the ICT leader should be included on the leadership team.

The study also found that it is paramount for the ICT leader to be placed on a number of key teams within the school. Especially, the curriculum executive – the body that oversees all the learning areas; the curriculum team – where all the learning area leaders meet; and additionally, the whole school ICT strategic team – where decisions are made in terms of network infrastructure, hardware, software and key items for budgeting purposes.

Participants agreed that the ICT leader needed to be senior in ranks. ‘Leadership is very important. They should be on the College’s executive team in the school. The position carries
more responsibility than Subject coordinators and Year level coordinators’. Another respondent stated, ‘The position should be considered as important as the principal’s position’. The ICT leader needs to oversee the ICT needs of the entire school and needs to have a thorough understanding of the operations of the school.

**Place in the organisational structure**

In different schools, the ICT leader reports to different people in the organisational structure. Whilst the ICT leader may be an important position in the school, the line management structure is not always clear.

Nearly 75% of the participants agreed that the ICT leader should report to the principal, with the same number agreeing that the leader should report to the head of curriculum. This seemed to reflect the central place of ICT in teaching and learning. In contrast, 40% of respondents believed that the ICT leader should respond to the network administrator, while the same number (40%) disagreed with this view.

**Discussion**

When we consider the rapid historical changes in ICT in the last 25 years, what emerges is a shift from the ICT leader ensuring the stability of the network and perhaps requiring some technical expertise, to the development of the ICT leader as a leader in teaching and learning. Therefore, it follows that the background and qualifications of the ICT leader need to enable the leader to give direction to the technical staff as well as to the teaching staff. For the technical staff, the direction is essentially strategic, while for the rest of the staff the emphasis is likely to be on skill building. If the ICT leader is going to provide leadership to the teaching staff, then central to the role of the leader is the provision of professional development to the staff.

Given that professional development is most effective when it is based on the school context (Downes et al., 2002), it follows that the ICT leader needs to be in a strategic position to be able to oversee the school’s priorities and work within the school’s aims to provide the necessary professional development. While many respondents of this study believed that the leader needed to provide one-to-one professional development to staff, a more productive model is when the ICT leader coordinates the delivery of professional development. In a modern school, this professional development is likely to be multifaceted, and multidimensional. It would encompass help-desk functions, developing staff skills and planning for future learning as can be seen in Figure 1.

It follows that a major aspect of the provision of professional development in this role is in determining the strategic aspect of ICT professional development. Condie et al. (2007) reported that ‘teachers were looking for staff development beyond managing the technology and, increasingly, for guidance and advice in embedding ICT in everyday practice, particularly in relation to specific subject areas’ (p. 19). Central to the role, then, is the ability to identify and develop professional development in strategic, whole-school terms.

The central role of the ICT leader in terms of providing professional development to staff has implications for the leader’s membership in teams. It seems vital that the ICT leader should not act in isolation and must not be cut off from others in the school. Given the fact that professional
development is an important aspect of the role, the ICT leader needs to be in a position to shape the professional development agenda. This is especially important when it comes to capacity building in key teaching and learning stakeholders because, unless the ICT leader is connected to these key people in schools, the ability to develop others is significantly diminished.

FIGURE 1: PROFESSIONAL DEVELOPMENT INTEGRATION

Whilst this may appear self-evident, the position of the ICT leader does not fit easily into the obvious teams that schools might have. ICT leaders are clearly not pastoral leaders nor do they fit neatly in the traditional discipline-based subject areas. Leadership in ICT is not necessarily tied into the teaching of Information Technology, as this is separate and distinct from responsibility for ICT for the whole school. This makes it difficult in school organisational structures to find where the ICT leader belongs. Whereas most middle managers in schools have a defined area of responsibility, the ICT leader has responsibility across the whole school curriculum – albeit only one aspect of that curriculum. Nor would it be thought that the ICT leader necessarily belongs on a school leadership team because it might be perceived that the ICT leader’s focus is narrow. This represents something of a paradox. On the one hand, the ICT leader’s position is not easily understood in the middle management section of a school’s structure because of the broad nature
of the position’s responsibilities, while on the other hand from a whole school perspective the ICT leader might be thought to have a narrow focus. This paradox helps explain the difficulty experienced in arriving at a satisfactory role for the ICT leader in schools.

The questionnaire identified four key teams that are found in some form or variation in schools – leadership, curriculum executive, curriculum committee, ICT strategic team. What is significant is that there is strong support across a range of respondents for the ICT leader to be a member of these teams. However, there wasn’t uniformity of opinion from all of the respondents to the questionnaire.

In general terms, the ICT leader can be seen to have legitimate claim to interaction with three broad kinds of teams – in addition to the network team – commonly found in schools.

**FIGURE 2: BELONGING TO SIGNIFICANT TEAMS**

In defining the relationship of the ICT leader to these teams, it is noted that the relationship can be expressed differently. For example, the ICT leader leads the network team by providing strategic direction and understanding the curriculum needs of the teaching staff. As reflected in the responses from the questionnaire, the ICT leader needs to belong to relevant teams in the school which have a broad learning and teaching focus. These teams might include curriculum executive, curriculum committee, ICT strategic team. Finally, it was interesting to note that there was a variety of opinion about whether the ICT leader should be a member of the school’s leadership team. While membership might well depend on the local context and the specific needs of the school, what seems clear is that there is likely to be a significant relationship between the leadership team and the ICT leader regardless of whether the ICT leader is part of the team.

The central dilemma for the question of who the ICT leader should report to is largely a problem of expertise. It is entirely likely that the ICT leader will be the expert in the field so that in one sense reporting to someone further up the line in a line management structure means reporting to someone less knowledgeable. This means that the ICT leader’s experience is different from that of the teaching staff who can be expected to report to a senior colleague whose experience is in comparable areas.

What seems clear, though, is that no one disputes that the ICT leader’s role is complex and strategic, and that reporting structures need to reflect the nature of the position. Naturally, the...
reporting regime for the ICT leader needs to be contextually relevant. More importantly, the reporting structure for the ICT leader needs to take into account the significance and the special knowledge of the position. The wrong structure for reporting is likely to inhibit strategic planning.

**Conclusion**

With the growing emphasis on ICT as interdisciplinary, the role of the ICT leader has become more complex, more curriculum-focused and more significant. The role has evolved from understanding the operation of specific hardware and software to a much broader base with an emphasis of understanding ICT in learning and teaching context. As is argued above, the role of the ICT leader is a major and significant leadership position supported by an appropriate team.

There are clear signs that school leaders are increasingly of the view that ICT needs to be led by someone with educational experience who will put the needs of learning and teaching ahead of the purely technical requirements of running a network. Nevertheless, important questions remain. In many schools, the precise role of the ICT leader is not well-defined and, where the position exists, there is a danger that the position will be either marginalised or under-utilised.

As the research has suggested, there is a significant role for the ICT leader in terms of facilitating professional development for all staff in the use of computers. The research has highlighted the wide variety of views by school leaders about the best kind of professional development to meet their own needs. Moreover, it is clear that the teachers and leaders who responded to this research believed that they have professional development needs in ICT. There is still much to do with respect to professional development, especially as the research suggests that the use of ICT for learning and teaching remains underdeveloped.

The central question of who should lead ICT is, in one sense, a non-question. The confusion about who should lead ICT is an historical accident that comes about because people who were leading computers in the beginning were people who grew up with some computer knowledge. It is clear from the research that principal knowledge hasn't kept up with ICT and it seems some principals are placing exaggerated trust in the network administrator, because, for them, the crucial question is what happens when the network breaks down. This is the wrong question.

The key to improving teacher use of ICT as a way to improving student learning outcomes is having an Information and Communication Technologies leader in a senior educational leadership role.

**References**


