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Information and communication technology (ICT) in secondary schools: the role of the computer coordinator

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Abstract

A study was conducted in 2002 to evaluate the use of information and communication technology (ICT) in 21 secondary schools in one region of New Zealand. As part of the study, the role of the ICT coordinator was investigated. All the ICT coordinators were surveyed and 14 of them were interviewed in-depth. It is found that they were all well-equipped to take up a significant leadership role in their schools and some of them have already demonstrated visible leadership. This paper also identifies some obstacles that have reduced their effective leadership in ICT use in their schools.

Introduction

In the last few years there has been a great increase in the accessibility of computers in schools. For example, in the United States, the computer-to-student ratio in public K–12 schools has improved from 1 : 9 in 1996 to 1 : 4.2 in 2001 (Market Data Retrieval, 2001). Internet access has also increased from 70% of the public schools having Internet access in 1997 to 92% of schools in 2001 (Market Data Retrieval, 2001). In New Zealand, one recent study (Lai *et al*, 2002) reported a computer-to-student ratio of 1 : 6.3 in secondary schools, and a subsequent study reported a ratio of 1 : 9.5 in primary schools (Lai and Pratt, 2002). These studies also found that with the increase of accessibility, more teachers had better computing skills and were using more information and communication technology (ICT) in their work than previously; however, the level of technology integration in the school curriculum remained rather low (Lai *et al*, 2002). It seems that Cuban's 1999 comments regarding classroom use of ICT as being 'uneven, slow, and of decidedly mixed variety' has continued to be the case.

A number of factors have been suggested as affecting teachers' use and integration of ICT in teaching. For example, both our own research (Lai and Pratt, 2002; Lai *et al*, 2001) and others' (Becker, 1999; British Educational Communications and Technology Agency [Becta], 2000; Falloon, nd; Murray and Campbell, 2000) found that teachers' ICT-related skill and confidence levels, and their knowledge of ICT, affected the likeli-

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hood that they would use ICT, both personally and in their teaching, as did their knowledge of how to utilise and integrate ICT in their classrooms. In addition, we found teachers' pedagogical beliefs regarding the value of the use of technology, and their attitudes toward technology in general, affected their use of ICT (Lai *et al*, 2001). At the school level, it is important that schools have a culture in place that encourages and supports the use of ICT (Education Review Office, 2000; Sheingold and Hadley, 1990). Schiff and Solmon (1999) found that in order for ICT to be effectively utilised within US schools, there was a need for a well-designed technology plan driven by strong leadership. A 2002 Becta report on the effect of ICT on educational standards in British primary schools, also emphasised the importance of good leadership, both in terms of ICT leadership and general school leadership, while Somekh *et al* (2001) commented that the ICT coordinator's approach to ICT affected the approach of the whole school. Our own research also highlighted the role of the ICT coordinator in managing changes (Lai *et al*, 2002).

While these are factors that need to be considered in integrating technology into the school curriculum, this paper focuses on the leadership role of ICT coordinators, and their roles and responsibilities in providing a vision, developing a school culture and providing a plan for professional development. The importance of the need for informed leadership when innovations are to be implemented successfully is noted. For example, Becta (2002) investigated what factors were necessary for schools to make good use of ICT. Five crucial factors were found: (1) ICT resources, (2) ICT teaching, (3) ICT leadership, (4) general teaching and (5) general school leadership. Each of these five factors needed to be present in schools if ICT was to be used well. The report noted that

> Although ICT opportunities are typically provided by the classroom teachers, the quality of leadership and management of ICT in a school is crucial to the provision of good ICT learning opportunities. As the quality of ICT leadership improves, so does the percentage of schools providing good quality ICT learning opportunities (20–21).

Although recognising the school principal as a key change agent for innovations (Fullan, 1991), the notion of shared leadership at the school level has been suggested as a better model for the implementation of innovations, with the principal not being considered the single source of direction and inspiration (Hopkins *et al*, 1994). Hopkins and his colleagues argue that school leadership should not be constrained by one individual's (ie, the principal's) intellectual, emotional and physical energy. Moreover, task-relevant expertise is considered to be a major factor contributing to leadership effectiveness. For example, school-based professional development is better organised and facilitated by the ICT coordinators, who usually have a deeper understanding of integrating computer technologies into the school curriculum and can provide a role model for teachers (Lai *et al*, 2001).

A search of the ERIC database revealed that little research has been undertaken to investigate the leadership role of the ICT coordinator. Earlier work was mainly conducted by Moursund (1992) and Strudler (1994; Strudler and Gall, 1988), who investigated the roles and responsibilities of the ICT coordinators (also called technology

coordinators) both at the school and district levels in the US. Moursund (1992) suggested that a technology coordinator had four general categories of duties, including working (1) as a computer facilities manager, (2) with school administrators and district-level educators, (3) with teachers and (4) with students. He also listed 13 specific duties for technology coordinators, including technical support; short-term and long-term planning of instructional use of ICT; helping teachers to develop curriculum materials and lesson plans; providing professional development for teachers; managing hardware and software, and resource budgets; supporting students; and evaluating ICT programmes and professional learning.

A study conducted by Strudler and Gall (1988), which investigated the role of technology coordinators in three US primary schools, found that the ICT coordinators were responsible for training teachers, providing technical support, organising the school's instructional computing programme, and supporting and energising teachers. A follow-up study by Strudler (1994) showed that school-based technology coordinators, as change agents, could support teachers to overcome various obstacles encountered when using technology in their teaching. Strudler (1994) suggests that without the support that technology coordinators provide it is unlikely that technology would have an impact on teaching and learning. Similar conclusions were noted by Becker (1994), who found that exemplary computer-using teachers in the US were more likely to be found in schools with adequate professional development and computer coordination.

One clear conclusion from the literature is that the ICT coordinators should not end up doing everything related to ICT in the school, simply by default. According to Lucock and Underwood (2001), the ICT coordinator is primarily a teacher, and therefore his/her main responsibility is to guide ICT teaching and learning in the school. Their suggestion is echoed by Reilly (1999), who maintains that the ICT coordinator should be the curriculum leader but not the 'electronic janitor'. The need for curriculum support is found in a study by Moallem *et al* (1996). This study investigated the roles and responsibilities of the technology resource teachers and the effects of their roles on the integration of technology in the classroom in six middle schools in the US. They found that although the resource teachers spent around 75% of their time on technical support, teachers in these schools expected their role to be instructional, providing them with instructional support through workshops and demonstrating the application of software. They recommended that these teachers should be trained in the field of instructional design so they could follow the analytical, systematic and evaluative approach necessary to help teachers better integrate technology into their teaching.

A study exploring an ICT initiative in British schools (Somekh *et al*, 2001) found that the ICT coordinators in many of the schools were responsible for a number of areas, including professional development, students' skill levels, the development of infrastructure, and the use of ICT to support teaching and learning. They noted that coordinating the use of ICT to support teaching and learning was usually the area that received little attention when they were needed to provide technical support.

In an earlier study of Otago ICT coordinators (Lai *et al*, 2002), the present authors found that other than spending a lot of time maintaining equipment (ensuring everything was working), the ICT coordinators also had major responsibilities related to professional development and curriculum support such as:

- Keeping up-to-date with new innovations in the field
- Deciding future directions for their schools
- Organising and offering in-school professional development workshops and seminars, mentoring other teachers, and team teaching with other teachers
- Providing pedagogical support for use of ICT in their schools, envisioning and leading staff
- Presenting in conferences and leading staff development sessions in other schools (p. 541)

The need for the ICT coordinator to be a curriculum leader and policy maker has been suggested in more recent research on the leadership role of the ICT coordinator. For example, in his case study, Marcovitz (2000) suggested that besides supporting the immediate needs of teachers by walking around, doing nuts-and-bolts activities similar to what a technician does, the ICT coordinator was also involved in policy making. Similarly, Lai *et al* (2002) maintained that ICT coordinators had multiple leadership roles in the school. In addition to having responsibilities associated with the purchase of hardware and in dealing with technical matters, the ICT coordinator also served as planner and manager, as well as envisioner.

Purpose of this study

This paper is based on data collected from the first year of a three-year study (2001–2004) investigating the use of ICT in secondary schools in the province of Otago in New Zealand. It is part of a larger study investigating the effects of a financial grant to secondary schools in the province for the purposes of promoting the integration of ICT across the curriculum. The New Zealand education system has increasingly recognised that if ICT is to be used to its potential, the focus needs to shift from schools' infrastructure and teachers' ability to use ICT (see Ministry of Education, 1998) to its use across all curriculum areas to enhance teaching and learning (Ministry of Education, 2002).

This paper focuses on the ICT coordinators: their role, their responsibilities and the issues they face. It argues that the ICT coordinator is generally well equipped to take up a leadership role in promoting the integration of ICT across the curriculum within their schools. As well, there is evidence from this study that some of the ICT coordinators are already in a dominant and visible leadership role in the school. This paper also identifies some obstacles limiting effective leadership of the ICT coordinator, particularly in terms of the integration of ICT into all aspects of teaching and learning.

All 26 secondary schools in Otago were invited to take part in the project. The schools were located within an urban population area of about 115,000, as well as in several provincial and rural towns. Twenty-two schools agreed to take part during 2001, including four rural, eight provincial and 10 urban schools. Fourteen of the schools

were co-educational and eight were single sex. These schools had between 12 and 875 secondary students and between 20 and 162 computers available for students.

Questionnaires were administered to the ICT coordinators of the 22 schools that agreed to take part, and 21 (96%) responded. The questionnaires included yes/no and 5-point scale items, as well as open-ended questions, and covered a wide variety of areas related to the current and desired states of ICT use in the ICT coordinator's school, including teachers' and students' access to ICT; professional development; technical and teacher support; ethical, health and safety issues; skill levels; level of integration; and their role in the decision-making process. As part of the larger study questionnaires were also sent to principals, teachers, Board of Trustees members and students. For the purpose of this paper, findings from the ICT coordinators, principals and teachers are discussed. Table 1 shows the response rates of the groups reported in this paper.

Follow-up interviews were conducted with 14 (67% of the total) ICT coordinators. The interviews were conducted at the ICT coordinators' schools at times convenient to them, and lasted for up to an hour. The interview questions were designed as a follow-up to the questionnaire survey. The ICT coordinators were asked open-ended questions regarding their role, responsibilities and beliefs regarding ICT use in their schools, particularly in terms of policies and planning, integration and the needs of their schools.

Who were these ICT coordinators?

The vast majority (81%) of the ICT coordinators in this study were male with only 19% being female. (The distribution was similar for the interviewees, with 79% of them being male). The ICT coordinators had been teaching for between two and 34 years (18 years on average) and had been at their current schools for between one and 30 years (11.6 years on average).

None of the ICT coordinator positions was a full-time position, rather it was considered as an add-on responsibility. For example, eight ICT coordinators were in senior management positions (principal, deputy principal, assistant principal) while six of the ICT coordinators were also network managers in their schools. One of these ICT coordinators was also the Head of Department (HOD) of Maths, and six of the ICT coordinators reported being the HOD or teacher-in-charge of ICT or Technology. One ICT coordinator did not report any responsibilities other than those associated with the role as a teacher,

Table 1: Number of questionnaires sent and percentage of questionnaires returned

	Sent	*Received*	*Response rate (%)*
Principals	22	22	100.0
ICT coordinators	22	21	95.5
Teachers	342	207	60.5
Total:	1405	844	60.1

while all teachers taught at least one class. It is noted that the majority of the ICT coordinators in this study were either senior managers or senior teachers, which was typical in New Zealand secondary schools, as evident from findings of previous studies conducted by the authors (Lai, 2001; Lai *et al*, 1999).

A profile of the ICT coordinator

Better computing skills

The Mankato Scale [URL: http://www.bham.wednet.edu/tcomp.htm] was used to rate the participants' levels of ICT skills. The Mankato model has four levels of competencies in each skill category with Levels 3 and 4 representing advanced level skills, and use of these advanced level skills in teaching, respectively. From the study it was found that a higher percentage of the ICT coordinators had advanced level skills than did teachers. Even though 81% of the teachers had advanced level email skills, 95% of the ICT coordinators reported being at this skill level, whereas 95% of the ICT coordinators compared to 75% of the teachers had advanced level word-processing skills. Only 42% of the teachers reported having advanced levels of research/information searching skills, compared to 95% of the ICT coordinators.

More frequent ICT users

Proportionally more ICT coordinators used ICT at work. For example, close to half of the ICT coordinators used ICT to prepare teaching materials, as compared to less than one-quarter of the teachers. The coordinators were also much more likely to use ICT for communication (20% vs 2.5%), for professional learning (33% vs 7%) and for administration (81% vs 34%). When asked whether they used ICT in their teaching, close to one-quarter of the ICT coordinators reported using ICT to a large degree (this percentage has excluded those ICT coordinators who only taught ICT-related subjects) as compared to only 7% of the teachers who used ICT in their teaching to a large degree.

Higher expectation for students to use ICT

The ICT coordinators in this study had greater expectations for their students to use ICT in schools. For example, nearly 80% of the ICT coordinators expected their students to use word processing, and the Web to search for information, while 45% of the teachers who reported having such expectations.

Higher level of technology integration

The ICT coordinators in this study were at a higher level of technology adoption in their teaching than the teachers. In this study a six-stage model developed by Knezek and Christensen (1999) was used to measure teachers' and ICT coordinators' levels of technology adoption. These six stages are (1) awareness, (2) learning the process, (3) understanding and application of the process, (4) familiarity and confidence, (5) adaptation to other contexts and (6) creative application to new context. The overwhelming majority of the ICT coordinators were at Levels 5 (45%) or 6 (50%). In contrast, very few teachers (8%) were at Level 6, and most teachers were only at the stage of being familiar and confident with using the technology in their classes (Level 4).

More knowledgeable about ethical, health and safety issues

The ICT coordinators in general were more knowledgeable than teachers on ethical, health and safety issues related to the use of ICT. For example, more than half of the ICT coordinators had high or very high levels of understanding of these issues, as compared to no more than one-third of the teachers who had similar levels. In some areas, such as plagiarism on the Internet, the knowledge gap between the ICT coordinators and teachers was particularly large (71% and 30% of the ICT coordinators and teachers, respectively, had high or very high levels of knowledge in this area).

More willing to acquire knowledge and skills

Whereas both the ICT coordinators and the teachers considered professional development to be very important, proportionally more ICT coordinators (81%) considered professional development to be very important to their work than teachers (73%). The ICT coordinators appeared to be more willing to finance their own professional development (with an average of 27% of their professional development being funded by themselves) than teachers (19%). The ICT coordinators also spent more than three times the amount of time than teachers in independent reading to upgrade their knowledge and skills in ICT (48 hours), and seven times the amount of time than teachers in learning how to develop units of work using ICT (29 hours). On average the ICT coordinators spent 133 hours doing ICT-related professional development in the last year (nearly a month's full-time work), largely in their spare time. As commented by one respondent:

'I've been teaching computers for 17 years… all the upskilling I've done has been done in my own time, privately.' (School A)

The ICT coordinators we interviewed were very resourceful and they used different ways to upgrade themselves. For example, one ICT coordinator commented he was very 'much self taught' (School K) and another ICT coordinator had the following comments:

'I've always tried to make sure that I've had the professional development that I've needed to do the job and to stay with where I believe things are. So I've got… a past student, four years ago, he's in the profession now, and I rely on him a heck of a lot… I ask him to train me… now I meet with him probably once a month… he and another guy who's doing the degree or just finished a degree in computer science… I take them out to meals and we talk computing non-stop and so I find out what's going on and how certain things work… It's important for the teaching… I'd rather do it in this way because I like learning in the social context.' (School L)

Roles of the ICT coordinator

The previous discussion shows that the ICT coordinators in this study were a group of teachers who were knowledgeable and enthusiastic about the use of ICT in their schools. We also found evidence that some of them were already in a position to lead their schools in the development and implementation of ICT. Specifically, the ICT coordinators in this study have demonstrated their leadership in the planning and management of ICT, as well as in the provision of professional development.

Envisioning and planning

The ICT coordinators in this study had great influence in planning and formulating plans for their schools.

'I think I get a lot of choice in deciding how to get from where we are to where you envision.' (School R)

Although this role was often shared with the principal or an ICT committee, and was usually developed after consultation and discussion with interested staff, it was generally the ICT coordinator who developed the ICT plan for the school. One ICT coordinator commented:

'...the [principal] has always been very, very supportive. But for his role... it has always been administrative... so he hasn't had the thought or the vision to go and do what I've done, that's been left up to me to go away and dream and go and build something. And so that's what I've done.' (School S)

Other ICT coordinators developed plans in line with the direction decided by the school management:

'The ICT [plan] has been mostly developed by me over a period of about four years, with input from other teachers who say what they want but there's also quite a large group of teachers who don't know what they want.' (School A)

'What I do is I tend to liaise with the rest of the staff... I put together a proposal, just a draft proposal of next steps and we talked together, anyone who's interested in ICT in school and we had a meeting with the principal and talked about what possibilities might be to give a clear indication, and then I went back and modified the draft... I think the liaison's really important with what's needed and anecdotal information from students as well as to what they're after. The final decision rests with the Board and the principal so all I ever do is recommend. ...' (School I)

In using and teaching ICT in schools, there is an articulation issue as suggested by Moursund (1992) that has to be considered. The articulation issue refers to the need to coordinate ICT knowledge and skills taught at each grade level so that teachers at a lower grade level would prepare students who meet the expectations of teachers in higher levels. Thus short- and long-term plans of educational goals and objectives of integrating technology into the school curriculum have to be developed and evaluated. This must be done by someone who has the knowledge and understanding of the pedagogical issues related to the use of ICT, someone who also can plan and who has a vision in mind.

Budgetary and resource allocation

Another aspect of planning is resource allocation and budgetary issues related to the purchase of ICT. The ICT coordinators in this study were responsible for purchasing hardware (100%) and software (91%), and over half (56%) of them also engaged in software selection and evaluation. Most of the principals relied on them to provide the information necessary for decisions relating to the purchase of ICT hardware, either on

their own or in conjunction with a committee 'in discussion with Principal and ICT group' (School K). They were 'always consulted and usually have a large say in decisions' (School A), and they also provided advice to the Board of Trustees to help them make decisions.

The ICT coordinators were also generally responsible for the purchasing of software to be used school-wide, with specialised software purchased generally by individual departments, often based on the advice of the ICT coordinator, as the following comments show:

'I have the ultimate say in any purchases, when we purchase the hardware... But I'm always advised by people like [the ICT coordinator], and... people just can't go out and purchase, they have to go through him... I always then say to [the ICT coordinator], well where does this request fit in our understanding? And he says, don't be silly, or he says, it's reasonable, or whatever.' (Principal, School R)

'All network administration software is my responsibility. Principal has introduced MUSAC [a school administration software]. Specialist software purchased after HODs have consulted coordinator.' (ICT coordinator, School O)

Technical and curriculum support

In this study approximately 40% of the ICT coordinators reported that their role was primarily technical, and the same percentage of the ICT coordinators reported that their role was primarily a curriculum support role. The remainder of the ICT coordinators reported their role was fairly evenly split between technical and curriculum support. As Somekh *et al* (2001) noted, needs for technical support tended to take precedence over curriculum support in terms of the time the ICT coordinators could give to these tasks.

'My other big issue with that is the number of times that I still get called out of class because little Johnny's got a problem, or whatever it might be. And I have to leave my class... to go and fix that problem.' (School C)

'[I show them] how to mail merge, clearing printer jams, where the on/off button is! Everything and anything in fact—all day long—at intervals and lunchtimes I'm frequently tempted to hide.' (School F)

Many teachers felt that too much was being asked of the ICT coordinators in terms of technical support. There is a need for the support of a technical person to enable the ICT coordinators to spend their time more effectively in terms of enabling and encouraging the integration of ICT into the curriculum.

'My main role is curriculum based... Mainly getting teachers up to speed, with software and using computers in general, you know, targeting particular software to curriculum needs or immediate needs at the time.' (School K)

Similar to what has been reported in the literature (eg, Moallem *et al*, 1996), teachers in these 21 schools expressed a need for more curriculum support than technical

support (Lai *et al*, 2002), with 58% of the teachers considering curriculum support provided by the school as inadequate (47% of the teachers had similar responses on technical support). More than 70% of the teachers reported having no, or very limited, help with using ICT in their particular curriculum area (Lai *et al*, 2002). They were asking for 'someone available with vision re teaching possibilities and use of ICT' (teacher, School Y). So a major responsibility for the ICT coordinator is to provide curriculum support, rather than technical support, to their colleagues.

'Yes, that's most probably my driving sort of and underlying, and you are aware of what we are trying to do and when I'm talking about pedagogy that's really where I want to start and where I want it to stop.' (School M)

Leading professional development

In this study nearly 60% of the ICT coordinators were frequently asked to deliver professional development in their schools, but only 13% of the ICT coordinators were frequently given time to deliver it. In-house professional development was provided in a variety of ways. Examples found in this study included 'breakfast with gifts' (School L), a 'buddy system' (School I) and serving as a walking 'help desk' for school (School N).

'I ran a two-day (after school) course for staff in the ICT lab. I also help staff during and after school (frequently).' (School A)

'I've got a database which... has asked staff things like their level of comfort, what they're really using them for, whether they've got computers at home, whether or not they are happy with email, and we've got a buddy system... where there's no more than five teachers with a buddy, and we fire that up from time to time and to be honest, the formal stuff that I've planned, we focus specifically on Word and on the Web... didn't work half as well as the informal things that happened...' (School I)

'I also set up a "little helper" [who]... would just fire out to everybody on the staff just little sites that people might go to or, like for email, all I did was email everybody and say, reply to this and I want you to attach the answer to the question that I've attached which was 4 + 4 and if they emailed me back in any way, shape or form, an eight as an attachment, then I knew there was no need for any in-service.' (School I)

One ICT coordinator suggested that professional development activities 'have to be specific, generated from the grass root level [and] ongoing' (School B).

Obstacles to effective leadership

Although it is apparent from the findings that these ICT coordinators were knowledgeable about ICT, had used and integrated ICT more than teachers, and currently had a role in planning and managing ICT within their school as well as providing in-school professional development related to ICT, the school-wide integration of ICT into the curriculum was progressing only slowly. Although these ICT coordinators played some role in leading ICT within their schools, their leadership was generally not recognised, and they were not given the support necessary for it to be effective. A number of

obstacles impinged on their effectiveness as leaders, with a lack of time and a lack of professional development standing out.

Time for planning

In New Zealand, the ICT coordinator is not a full-time position and the majority of the ICT coordinators interviewed in this study received little or no time allocation for their work. It is reported in this study that only just over half of the ICT coordinators (57%) had received time allocation for their role as the ICT coordinator while the rest (43%) did not receive any time allocation at all. Similar to a previous study (Lai *et al*, 2002), it is evident from this study that the ICT coordinators needed more time to be effective leaders. One school had recognised this issue, with its Board of Trustees funding their ICT coordinator to be employed full-time, but to teach only 12 periods per week (the minimum allowable to be still called a teacher in New Zealand). In most cases, however, schools were not in a position to increase the time allowance their ICT coordinators had for this role. For example, one ICT coordinator had no extra time allocated for his role and he had to use his own time to complete work during holidays (School M). The lack of time was a real problem for the ICT coordinators as the following complaints show:

'I've got two hours allowed. I spend between 20 and 30 hours every week over and above my teaching commitment. Yeah, so I work a 60 to 70-hour week and that's why I said I can't keep it up.' (School O)

'I'm almost at the stage where I'm probably thinking of giving it away because it's frustrating, it's too much hassle and I'm not getting the time to do so it so, I'm getting hassled by people about it, and, cripes I can't be bothered with this. I think you need half a load really if you want to do a decent job, if you want to be able to get around into teachers' rooms and help them out.' (School K)

The lack of time in supporting colleagues to integrate technology into the school curriculum was clearly an obstacle for these ICT coordinators to provide more effective leadership. Time is needed for planning.

'The two hours a week I've got is not realistic. I would like to think the school could find a little bit more time for me to support colleagues professionally, particularly with classroom planning… that's how I see my role, is [to] talk about the teaching programme, because you have two people sharing ideas, you can develop something. What we need to be able to do is to talk to them, find out what their vision is.' (School O)

Strudler's (1994) study on the role of the technology coordinators in US schools led him to recommend that schools should consider staffing on-site technology coordinators if they wish to integrate technology into the school curriculum. He maintains that without the time allocation for the coordinator to provide the leadership to establish a shared vision and develop a school plan, integrating ICT into the school curriculum is unlikely to occur. Having an ICT coordinator fulfil this role, although not sufficient to ensure the effective integration of ICT within schools, is a necessary factor (Becta, 2002), and one that needs to be addressed.

The need for professional development

The ICT coordinators in this study needed more professional development for themselves, not on technical skills, but on how technology could be integrated into the curriculum. They were particularly keen to visit other schools with exemplary practice in ICT use and to attend conferences specifically on teaching and learning with ICT (see Table 2).

What they needed were 'IDEAS... [and] Examples of good practice' (School L).

'I think we should have... people who are responsible for school networks to get together and talk about some issues or some problems. Maybe based around some theme... these are the kinds of things that I would love to be able to sit down with... It doesn't matter what platform you're running.' (School C)

'I personally believe there's a big PD [professional development] issue here. That we can make people happy and comfortable using word processor and email and the Internet and all those things. But what we've actually got to... not give them, but to show them, is how that can be incorporated into your day-to-day teaching. And that I still think is the hard thing.' (School C)

Generally, the teachers felt that they needed relevant courses and teaching materials of how to use ICT in the classroom, and needed support from people who could aid with the integration of technology into the curriculum. It is thus important that ICT coordinators not only have technical knowledge, but also an understanding of the way ICT is to be used.

Research has suggested that self-contained and one-off ICT professional development is ineffective (Lai, 1999), and that it is more effective if there are ongoing sessions, discussions and classroom support (Joyce and Showers, 1988). If this is the case, the role of the ICT coordinator has become even more important as they are the ones who would have the knowledge of the teachers and their needs, as well as the skills to provide on-site support.

Table 2: Areas of professional development related to their role as ICT coordinators that they wish to undertake, in percentages

Area of professional development	*Would like to go very much*
Opportunities to visit other schools to see exemplary teaching and learning using ICT	80
Conference attendance that concentrates on teaching and learning with ICT	79
Opportunities to see how ICT can be successfully integrated into classroom practice	75
High level network training courses	50
School visits by highly trained support people	45
Conference attendance that concentrates on keeping up with technical aspects	35

Different understandings

The ICT coordinators often perceived the needs of the school differently from the principal. For example, when asked about the barriers of further use of ICT in the school in this study, the principals considered the cost of equipment as the most important obstacle, whereas the majority of the ICT coordinators considered professional development as the most important, and over one-quarter of the ICT coordinators identified the lack of teacher understanding of the value of ICT use as the biggest barrier. It appeared that the ICT coordinators showed a deeper and better understanding of the issues. However, in this study some principals considered that they should provide the school with a vision on ICT use and the ICT coordinator should implement this vision.

'It's my job to have the vision and articulate it to get [the staff] to follow it… So you ask me what we need to get there, I don't know… So I'll be going to [the ICT coordinator] and saying that's what I want to do, what do we need to do? You know, that's his job.' (Principal, School C)

Lack of recognition

The teachers in these schools who had undertaken the role of ICT coordinator had done so for a number of reasons. Several had acquired this role through being the teacher who showed the initial interest, or had expertise in the area of ICT, while others were the ICT teacher within the school. Their position as the ICT coordinator was not getting the full recognition it should:

'I still have this issue of time, for people like myself, I won't say it takes every waking hour, but it certainly takes huge amounts of my time. Way, way out of proportion to the seniority I've got in the system because of it… I in theory run a small department, in the school, as well as the network. And both are supposed [to be] of equal value. But the network takes… over a year, hundreds and hundreds of hours more than does running the department.' (School C)

'We had a lull area where no one was doing anything and things were just sitting, somebody had to do something. I got a wee bit of direction so I just started trying to put some direction in it.' (School K)

'I think people have been really… like we've done a lot but in actual fact, I've done a lot and it's done on a voluntary basis, and I've never actually been officially appointed ICT, it's only been done by default because, well, I guess most probably initially, I've had an interest in computers and then I was seen as being the main architect with the ICT plan and then… had that understanding of how it all fits together and when things fall over I become the technician.' (School M)

'My hand maybe went up higher than everybody else's when questions are asked and then I was tapped on the shoulder… actually sort of the start of my role in ICT coordination was the fact that I voiced strong opinions about, you know, how we have used the Internet and how we structured the use of the Internet.' (School Y)

Conclusion

From the data collected in this study it is clear that the ICT coordinators were both knowledgeable and enthusiastic about ICT use and this placed them in a good leadership position to guide and implement ICT use in the school. Although respected by their colleagues as leaders, their leadership role had not been formally recognised either at the school or national levels, with this position often seen as an add-on to their existing

responsibilities. The lack of time allocation to their job was a huge issue and professional development is needed for them to plan and support other teachers.

The importance of the role of the ICT coordinator has been shown in this paper and it is therefore recommended that their leadership role be recognised both by the schools and the funding authorities. A full-time ICT coordinator is essential if ICT is to be successfully integrated into the school curriculum. The work of the ICT coordinator has to be focused on providing curriculum support to teachers, with technical support provided by a technician.

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