

Computer Skill Requirements for New and Existing Teachers: Implications for Policy and Practice

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Abstract

The integration of technology into the classroom is a major issue in education today. Many national and provincial initiatives specify the technology skills that students must demonstrate at each grade level. The Government of the Province of Alberta in Canada, has mandated the implementation of a new curriculum which began in September of 2000, called Information and Communication Technology. This curriculum is infused within core courses and specifies what students are “expected to know, be able to do, and be like with respect to technology” (Alberta Learning, 2000). Since teachers are required to implement this new curriculum, school jurisdictions are turning to professional development strategies and hiring standards to upgrade teachers’ computer skills to meet this goal. This paper summarizes the results of a telephone survey administered to all public school jurisdictions in the Province of Alberta with a 100% response rate. We examined the computer skills that school jurisdictions require of newly hired teachers, and the support strategies employed for currently employed teachers.

Background

Various government authorities have recognized that Information and Communications Technology (ICT) has a major impact on our economy. The Alberta Science and Research Authority (1998) acknowledges that ICT is “the world's strongest, fastest growing economic sector” and the Government of Canada (2000) recognizes that “Canada can benefit by becoming a world leader in the development and use of advanced information and communications technologies.” Furthermore, the U.S. Department of Education (2000) has stated that technology is transforming the American economy. As a result, these authorities are pursuing initiatives to incorporate technology into K-12 schools

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not only to prepare students for this new economy, but also because they see the “potential for technology to transform the teaching and learning experience” (U.S. Department of Education).

One initiative making an impact in the K-12 school system in Alberta is the integration of technology into the classroom. Beginning in September of 2000, Alberta Learning has mandated a new curriculum called the *Information and Communication Technology (ICT) Program of Studies*, which is to be infused within core courses and specifies what students are “expected to know, be able to do, and be like with respect to technology” (Alberta Learning, 2000). Since trained teachers are required to carry out this new curriculum, school administrators are turning to professional development strategies and hiring standards are being revised to upgrade teachers’ computer skills to meet this goal.

This study examines the computer skill requirements of newly hired teachers and the professional development strategies for currently employed teachers and reports any plans by school jurisdictions to implement changes in policy. The topic of standards will be discussed in the context of current literature, and the hiring processes of these jurisdictions will be reviewed.

The Study

Purpose

The developments in technology over the past few years have influenced expectations by governments, school jurisdictions, teachers, parents, and students. Schools are being asked to prepare students to use technology in the 21st century. Since teachers are integral to any integration plan, they have been under pressure to learn and incorporate technology skills into their teaching. The purpose of this study is to become familiar with the current status of computer skills required for teachers being hired by school jurisdictions in Alberta, so that the Faculty of Education at the University of Alberta can try to improve the match between the needed skills identified by the respondents of this study, and the curriculum being offered. Whether school jurisdictions planned to change the computing skill requirements for teachers in the immediate future and what those changes might be is investigated. We also examine the professional development strategies used for existing teachers to learn computer skills and how computer skills are being assessed.

Method

In January 2000, a letter explaining the purpose of the study was sent to the superintendents of each of the public, separate, and francophone school jurisdictions in Alberta with an attached interview guide. The superintendents were asked to nominate an appropriate person for participation in a 10-minute telephone interview. The designated respondents were then sent a copy of the contact letter along with the interview guide to provide them with an opportunity to review and prepare their responses.

From February to April, participants were contacted by telephone to obtain informed consent for their voluntary participation in the structured telephone interview. A 100% response rate was obtained from the 60 representatives, one from each school jurisdiction. They included 17 superintendents, 22 assistant superintendents, 12 technology coordinators, 5 human resources representatives, and 4 other individuals who were nominated by the superintendent.

Limitations

Two limitations were identified during the study. First, participants’ interpretation of requirements differed. While some considered only written policy to be a requirement, others had definitions of requirements that consisted of only expectations. To address this issue, the categories, “no, but expected” and “no, but ask in interview” were included in the coding of responses.

The second limitation involved the sample of participants. Because participants differed in job position, they had different perspectives on hiring policy and/or different degrees of familiarity with applicant profiles. Furthermore, participants had different degrees of experience with technology, which influenced their interpretation of technology preparedness. No correction, however, could be made for this limitation.

Findings

Current Computer Skill Requirements for Newly Hired Teachers

The respondents were asked whether their jurisdiction had mandatory computer skill requirements for newly hired teachers (see Table 1). Seven respondents indicated that they did have such requirements, but three of these said they were minimal. One respondent stated: “Well, it’s kind of an odd situation. We do have – we would have requirements. Unfortunately, they don’t come with them, and so we have to hire and then train on their own. Many of them don’t come with it.”

Table 1
Does your school jurisdiction require computer skill for newly hired teachers?

	Frequency
Yes	4
Yes, but minimal	3
No	11
No, but expected/seen as asset	22
No, but ask in interview	20
Total	60

The other 53 respondents indicated that their jurisdiction did not require computer skills from their newly hired teachers. Of these respondents, 20 reported that while computer skills were not required, prospective teachers were asked if they had these skills during the interview. One respondent best summarized this: “We do, however, ask questions with regard to their level of competency in dealing with technology, and it is more or less a subjective as opposed to objective list of criteria.” Twenty-two respondents indicated that while computer skills were not required, they were expected and were seen as an important asset. One typical respondent in this group said: “I think there is a general level of expectation related to that. For example, we would not place an advertisement in any Alberta newspaper for a teaching vacancy that did not include some reference to our need to hire people with these skills.” While it is important to note that the vast majority of respondents indicated that computer skills were viewed as very important, a few indicated that other skills and knowledge were more important than computer skills. One such respondent stated: “With an elementary generalist, computer skills is not a requirement and it would not be the decision-maker as to whether we hire or not. There would be many other things that would be more important to us in that hiring decision.”

Expected Changes in Computer Skill Requirements for Newly Hired Teachers

We asked the respondents, who indicated their jurisdiction did not require computer skills from prospective teachers, whether their jurisdiction planned to introduce such a requirement. Table 2 shows the results of this question.

Table 2
Does your school jurisdiction plan to introduce computer skill requirements for new teachers?

	Frequency
Don't Know	1
Yes	5
No	28
No. Would like to but...	19
Total	53
Already require	7
Total	60

While five respondents said their school jurisdiction planned to implement such requirements, one did not know if they were being pursued and 28 responded that there were no plans to employ such requirements. The jurisdictions that planned to introduce requirements were not at a stage where they could describe their proposed requirements, but one respondent summarized the general tone that they were going to “step up the volume, so to speak,” in what they would require

from new teachers and computer skill requirements.” The respondents, who said there were no plans for such requirements, raised specific issues about requirements. These issues are well represented by the following quotations:

The only time we would ask for specific skills with regard to technology would be when we’re looking for teachers who are going to be teaching in the CTS [Career and Technology Studies] area – especially in that area.

I think the question that our board is asking is: the resources that we put into technology – are they making a difference for student learning?

I still believe strongly that give me a teacher with a good attitude and I can teach them the rest, so no, I would not choose a candidate who has high computer skills over a candidate who demonstrates a very positive attitude.

Nineteen respondents indicated that they would like to implement such standards, but identified some reasons why they could not do so. The majority of these respondents indicated that they would experience trouble finding applicants with these skills:

We’d like to [implement requirements]. It would be pretty darn hard to do so.... I’ll tell you, though, that if we have got an applicant who has got that kind of knowledge – that instructional knowledge in how to use multimedia tools and such – digital cameras, scanners, you name it – they would certainly have a definite edge in employment over anyone else. At this stage, we could not require that, and, you know, demand a certificate, for example, or even coursework in that area, because we certainly wouldn’t get the applicants.

Another respondent, however, felt applicants met their expectations: “In general, we are finding that the majority of teachers coming to us now have the skills we need in terms of basic computer use and are comfortable with it.” In this case, the respondent indicated that her/his jurisdiction was interested in basic skills such as being able to use e-mail and word processing.

What Kinds of Computer Skills are Required or Expected?

We asked the respondents to identify what kinds of computer skills they required or expected their teachers to have. Table 3 summarizes these results. Fifty-five of the 60 respondents answered this question and each respondent could give multiple answers. Of the 55 respondents, 50 identified “basic skills” as required. Basic skills were generally defined as being able to utilize word processors, spreadsheets, databases, presentation software, and the Internet. Twenty-eight respondents indicated that knowledge of technology integration into the curriculum was also required, and five identified subject-specific skills. One respondent described the challenge in specifying skills: “I guess part of the

difficulty is you are trying to draw a line in the sand in the middle of a sandstorm because the line is going to keep moving.”

The issue of what kind of computer skills teachers should have was one of the areas that created the most divergence in answers. All 28 of the respondents who included technology integration in their list of skills, also indicated they understood that to do this, their teachers would need a command of basic computer skills; however, 22 respondents did not indicate that their teachers needed more than basic computer skills. Many of those who said teachers needed to be able to integrate technology into the curriculum felt very strongly about this point. One respondent said, “we’re really looking for people who can build this bridge between technological expertise and helping kids learn better, more effectively, more quickly than previously.” Another respondent from a jurisdiction that requires computing skills outlined their teacher performance expectation as follows:

The teacher utilizes computer technology successfully to assist in the delivery, enrichment, remediation, and monitoring of student learning. This would include content presentation, delivery and research applications, enrichment and remediation where appropriate, word processing, information management and record keeping, and electronic network usage. The extent to which technology is utilized will vary depending on the age of the students and the availability of hardware and software.

The respondent went on to state that hardware and software were “very available” in that jurisdiction. A different respondent was quite specific that:

Particularly for new people who are entering the field of teaching, I think it is not unrealistic to expect that they have complete familiarity with technology and are able to have a comfort level – certainly how they integrate it into the instructional process, I think is part of the training that they go through in university and in the actual experience that they receive in the schools, but I think they should have a general familiarity with operating systems, programs, etc., and should be comfortable with technology as opposed to afraid of it.

It must be noted that a few respondents were much less positive about the need for teachers to have computer skills. A statement from one respondent summarized this view: “My whole point is that the verdict is still out – has technology really improved learning for students? We spent all this money and that on the technology, and do we really see better teaching and better learning that’s going on? I don’t know. I hope so.”

Why Have Requirements or Expectations

We asked respondents why their school jurisdiction decided to introduce requirements or held expectations for the use of technology by their teachers. The results of this question are presented in Table 3. Fifty-one respondents provided answers to this question and each respondent could give multiple answers. Thirty

respondents said the computer skills were needed because the government had mandated the ICT curriculum, and 21 of these respondents gave this as their only answer. One response summarizes this, “Our job is to deliver the curriculum and now there is a curriculum – the ICT outcomes, and so in terms of why are those requirements there? – Because they’re there for the same reason that we would require math teachers to be able to deliver the math curriculum.” Eleven respondents said these skills were “important” with one summarizing it this way:

Because of their sheer importance. For one thing, there is a strong expectation on the part of government and there is even a stronger expectation on the part of parents.... The parents are still quite critical of the amount of time students spend and the level of skills that they are attaining.

Table 3
Why are these skills required/expected?

Category Label	Frequency
Mandated ICT curriculum	31
Important/Necessary	11
Societal Change	10
Finally have infrastructure	7
Cost of preparing teachers	4
Parent Expectation	1
Alternate Education	1
Total Responses	65
Total Respondents	51

Ten respondents indicated that societal changes demanded such skills from those entering the work force. Seven respondents said they had been in the process of installing technology within the jurisdiction and had finally reached a stage where they could ask teachers to incorporate it within their teaching. One of these respondents stated:

Basically, because of 1)our program for our alternate education and 2) the way society has been changing. We have been changing this way since, I guess, the early 90s, and we finally have the infrastructure in place, so we can actually go ahead and do this in our various schools with our Local Area Networks.

How are currently employed teachers expected to learn these skills

When asked how currently employed teachers are expected to learn technology skills, the most common response, given by 41 of the 55 people who responded

to this question was “in-service.” While many respondents did not expand upon this, 24 indicated that they provided “after school short course” and 11 jurisdictions encouraged their teachers to take summer courses. Eighteen respondents said a “teacher of teachers” had been hired to work one-on-one with their staff. According to twelve respondents, their jurisdictions had joined consortia or alliances to take advantage of economies of scale. Eight of these respondents referred specifically to the Telus Learning Connection (Because We Care Society of Alberta, 1999), which is an educational Internet alliance specifically aimed at helping teachers learn to integrate technology skills into their teaching. Two unique approaches to professional development employed by school jurisdictions were described as follows:

The majority are doing their report cards at home, using zip drives to bring them back, and downloading – it’s like you have to force them to use the skills and with email – I send email all day long ... to force them.

We have dedicated a significant amount of our money towards professional development activities. We’ve developed a computer purchase plan for all of our employees so that they can purchase this equipment over a period of time. That helps with the cost of the purchase. We encourage our staff to take programs outside of our division and will pay for those.

It is interesting to note that a number of respondents indicated that they were quite uncomfortable about requiring existing teachers to develop technology skills. A respondent from this group said, “you always have to grandfather some people.” Some respondents expressed an expectation that new teachers would take a leadership role and “help the older teachers.”

How are Computer Skills Assessed

Twenty-nine respondents indicated that they assessed the computer skills of their new applicants while twenty-six respondents indicated that their jurisdictions did so for their current teachers. Table 4 summarizes the responses.

Table 4
How are Applicants/Current Teachers Assessed?

Category Label	Applicants	Current Teachers
Questions in job interview	22	
Self-assessment/survey	6	14
Application Pkg/Courses Taken	7	1
Computer test	1	
Observations (principal/trainer)		7
Professional growth plan		6
Total Responses	36	28
Total Respondents	29	26

By far the most common method of assessing new applicants, used by 22 jurisdictions, involved asking questions during the interview. Six respondents said their jurisdictions employed self-assessment measures and five said they assessed applicants based on their application package and the courses taken. One jurisdiction was unique in that they tested the applicants' computer skills:

We provide them with an educational situation that they have to respond to, and they have to respond on the computer and they're given a laptop or a station, depending on the situation ... part of the way the question is worded ... they must have a set of computer skills to answer the question properly.

Half of the respondents who said they assessed computer skills for currently employed teachers said they did so through the use of a self-assessment measure. Seven respondents identified observation by a principal or trainer and six respondents described the use of a professional growth plan for the assessment of computer skills.

Issues and Implications for Policy and Practice

A number of issues emerged from this study that have implications for both policy and practice. These issues will provide a foundation for future discussions of the implementation of standards, and inform school administrators about the current state of hiring policies in the province of Alberta.

Preservice Teacher Education

Extent of Preparation

Several respondents suggested that it is not unrealistic to expect that universities should be graduating students who have "complete familiarity with technology and how to integrate it" within the curriculum. While this perception is shared among many of the respondents, there is a difference in opinion as to whether universities are fulfilling this role. The responses vary from the view that "many applicants do not come with the requirements so we have to hire and train them" to those who believe that "universities have skill requirements for graduates which are going to essentially allow us to put something down on paper saying this is what you need to teach here." Those respondents who were more critical of the extent to which universities prepare teachers to use technology indicated that the "courses being offered were not keying in on curriculum integration." Regardless of the expectation of the extent of technology preparation at universities, respondents often reported that "the more [graduates] have when they come, the less we have to train and the better we feel that they would be," and, furthermore, "it would save [jurisdictions] a fairly large cost in terms of professional development."

A few jurisdictions are taking advantage of student teachers and new teachers who are placed in the school, to work with existing staff. One respondent said "we have used student teachers on practicum to actually come out and act as peer

tutors with some of our teachers to upgrade their technical skills,” and another said, “of course, we expect [new teachers] to be [more skilled] and hopefully they are, so they are the ones who can turn around and help the older teachers.” Not all respondents, however, were happy with the level of knowledge student teachers had with regard to integration of technology into the curriculum. One respondent summarized this concern:

We had student teachers out here and I talked about integration of technology into the curriculum and they said – they were on their last practicum – and they said ‘we don’t know anything about that.’ I said, ‘oh, that’s interesting.’ So, then I guess my thought as superintendent is, well, now we even have to train those coming out of university.

Cost of Preparation

The issue of cost was stressed by respondents from rural school divisions, one of whom reported that “rural divisions are hampered – penalized, because the cost is astronomically higher ... money is tied up bringing bandwidth in, making it difficult to offer professional development.” These jurisdictions often must take the best candidates that they can get, regardless of their computer skills, and “then start working with those.” As one respondent indicated, “working in partnership with university will allow us to meet the technology needs of society.” This solution was echoed by many of the jurisdictions. They encouraged universities to do as much as possible to incorporate technology into their teacher training programs. One mandatory computer course was not viewed as adequate for most respondents, since “that does not mean they know how to integrate it into the classroom.” Some jurisdictions have recruited teachers with technology experience from a distant province in order to obtain teachers trained in technology. One respondent indicated that they are “going to be actively looking at whatever post secondary institution is going to say they are doing this and go there for our grads.” After all, “if we are doing this training of existing staff, we better set requirements out for newly hired staff, so we are not duplicating efforts.”

Professional Development

Teacher of Teachers

A majority of the respondents indicated that the professional development and hiring activities of the jurisdictions occur primarily at the school-level as opposed to at the central administration office. One respondent noted that “many of the inservice requirements and hiring practices have moved to school sites.” At a number of schools, there is a technology coordinator or “teacher of teachers” who works with teaching staff to determine their needs and to provide the appropriate professional development within that school. This approach was strongly recommended by many respondents. One respondent said the struggle to implement technology involved the fear factor, which could “be substantially reduced by having support ... also if we go with that mentor/protégé model –

essentially just a cascade model, there will be people on staff who can walk other teachers through and these people are going to be their colleagues.”

In order to implement this type of mentorship program, however, there must be teachers who can serve as mentors. According to another respondent, there is a “real need in our school jurisdiction to have people who have lots of skill, who can help others.” Many of the respondents of this survey viewed student teachers or new teachers to be those to fulfill this new role as technology leaders as the following statements show:

[There is] an awareness that some of the teachers who have been in the system for a real long time need some of these young mentors coming out to help along.

New teachers, of course, we expect them [to have higher skills] and hopefully they [do], so they’re the ones who can turn around and help the older teachers.

Realistically, it’s our younger teachers who are more comfortable with the whole process.

If school jurisdictions expect new teachers to take on this important role of technology mentor, then Faculties of Education face the challenge of preparing their students to be not only technology literate, but trained in technology integration. According to some respondents, many applicants do not have enough computer skills or the knowledge of how to integrate technology into the curriculum.

Hiring Standards

Written Policy vs. “De facto” Requirements

Any discussion of ICT curriculum and requirements for students must eventually lead to dialogue about the implementation of that curriculum with reference to requirements for teachers. We found that some school jurisdictions have their requirements for teachers written into policy, whereas others have ‘de facto’ requirements. In the latter case, although policy requirements were not implemented, there may still be implications for teachers who do not meet expectations. One respondent, who said computer skills are not required at this point in time, summarizes the de facto requirement:

What we’re trying to do is provide opportunities for teachers to improve their skills. We’re not forcing the teachers to do so, but with the understanding that more and more administrators are looking for those skills, so if they don’t upgrade then their opportunity for placement or advancement are becoming less and less.

Whether requirements are written as policy or not, it is important for school administrators to get “a clear sense of [their] own expectations for technology-using educators if [they] are to prepare future teachers for appropriate use of

technology in their classrooms” (Gillingham and Topper, 1999). The benefit of using written policy to communicate those expectations would be the consistency of those requirements across a school jurisdiction. Most respondents made note that the hiring process is now site-based as opposed to centralized and the implementation and/or enforcement of requirements for teachers are often at the discretion of the principal. For example, one respondent asked, “is there a sense of understanding that many of the inservice requirements and the hiring practices have moved to school sites?” Written policy would also communicate those expectations explicitly to universities offering teacher education programs, so that preservice teachers can be better prepared for their placements after graduation.

In contrast, the implementation of policy requirements may have a negative effect on the school jurisdictions seeking to recruit teachers. For example, some respondents indicated that there are qualities that are more important than technology skills, and by setting mandatory standards for teachers, school jurisdictions could be cutting off their access to good applicants.

The Need for Standards

There is much debate about whether there should be standards for computer use for students and teachers. In Alberta where this study was undertaken, the government has mandated the *ICT Program of Studies* for students. Almost universally, respondents acknowledged that this was one of the major reasons (in 21 cases, it was the only reason mentioned) for their jurisdiction introducing technology skill requirements for their teachers. No one complained that the ICT Program of Studies had been implemented. Some commented that the government had taken too long implementing these standards or had mismanaged their introduction:

I would say the implementation of technology in the classroom would be the single most bungled educational initiative in Alberta if not the world over the last 20 years, and I think it's only now we're figuring out what this is really about. This can work for us and work well with enough resources if we continue to focus on the connection between technology and learning.

The consensus seemed to be that standards for students had been mandated and their schools were complying. Questions seemed to emerge around the issue of teacher standards: Should all teachers have ICT skills? What level of skill is necessary? Should teachers learn how to integrate technology in their teaching? Should the government mandate standards for teachers? Should only new teachers be required to meet certain standards? Without a mandated standard for teachers, jurisdictions are answering each of these questions differently.

Technology standards for teachers have been created (ISTE Accreditation and Standards Committee, 1996) and in areas like California (Swofford, 1999), standards have been mandated for new teachers only. It may be that the solution to many of the questions raised above may entail the mandatory implementation of standards in the province for both new and existing teachers.

Conclusion

Collis (1996) states that the eventual success or failure of any computing initiative is shaped by the individual teacher. To preserve financial investments in technology infrastructure and to prepare students for the new economy of the 21st century, school administrators must look to teacher training and technology standards. After all, as one respondent put it, “whether they are English teachers or Phys. Ed. Teachers, all teachers are teachers of technology, information and communication technology.” Since administrators and teachers are entering new territory with respect to technology implementation, it became apparent that respondents were eager to know what other school jurisdictions were doing with respect to professional development and hiring standards. This is evidenced by the 100% response rate that was obtained. Many participants provided additional supportive comments about doing research in this area. For example, one respondent said, “Well, may I say right off the top that I’m really pleased this is being done, because this is an area of intense need, so it’s wonderful that you are taking this initiative.” Further research is recommended in this area to begin to address some of the specific themes and questions identified by this study.

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