Looking beyond BCeSIS: An information system that works for teachers and students

By Larry Kuehn

Every tool shapes the task.—Ursula Franklin

Tools are not neutral. An information system created to manage information about students—a "student information system," such as BCeSIS—shapes what happens in the classroom. It does that in two ways. One is in the functionality, how it works, how fast it works, how it links different parts of the system. Another way is in the values that are imbedded in the choices of what and how information is structured.

If a tool is developed without a stake in its design and then imposed on the users, then it will shape the way in which the user has to carry out their functions. This is the case with BCeSIS. It was designed from the top down—designed in the interests of the provincial ministry, and not of the key users, the teachers in their relationship with their students.

Many of the complaints from teachers (and administrators) about BCeSIS have been related to the functionality of the system. It is slow, it is outdated in the design and tools for interface with users, it is rigid in structure, it drops information. The list could go on and on, but would at least have to include that it is not designed to meet the cycle of needs of teachers. The experience has confirmed that neither the bandwidth nor the central server capacity are adequate for the organization of the work of teachers—significant peaks in demand because of the structure of the school day and the school year.

Because BCeSIS is a centralized system that requires all information to go into a central server, it requires enough capacity to meet the needs of peak times—the opening of the school year, report card time, the beginning of class periods, the end of the day.

A centralized system has a requirement that is similar to that of a shopping mall. A mall must have sufficient parking for the number of shoppers in the Christmas season, even though part of its lot will be empty during most of the year. An adequate student information system must have the capacity to meet peak demand and BCeSIS has shown time after time that it fails this test.

A chance to start over

Usually you don't get a chance to start over with a huge information technology system. The high expenditures already made confine future choices to fixing the worst problems and living with the rest. That may not be true with BCeSIS.

The company that developed the software (aal) went out of business. A giant, transnational corporation, Pearson, took over aal's customer base. Its interest, as often happens in this industry, is not in further developing the software taken over. Rather, it supports the software for a limited time and hopes to move customers over to its own software of a similar type.

In addition, the student information needs of the system are changing. The ministry of education has been told to make changes in the education system toward "21st century skills" and "personalization." BCeSIS was built with a different set of assumptions about the way that

education is organized. The lack of future for BCeSIS provides an opening for a new start for creating a student information system that supports teaching and learning for the 21st century.

The most important part of this process is not the programming to create the new SIS, but properly defining the shape of education it is supposed to support. BCeSIS was developed without the input of classroom teachers and not focused on the way that the tasks of teaching and learning take place—or should take place.

This time teachers must be involved directly, so that, to paraphrase Ursula Franklin, the task shapes the tool, which, in turn, shapes the task in an appropriate way. This must be both in the functionality of the SIS and in the educational values that are built into the software.

Ministry of Education calls for help

The collapse of BCeSIS at the beginning of the 2010–11 school year finally forced the ministry to acknowledge that BCeSIS is not up to the task it was supposed to achieve. With Surrey and a few other districts joining for the first time, demand was greater than capacity—even before some other high demand uses were introduced to the system.

The response of the ministry was to call for a consultant to tell them what to do. They eventually contracted with Gartner Consulting, a large transnational corporation, with a quarter-million-dollar contract. When the Request for Proposals (RFP) was issued, the ministry hoped they would have a report by April. The contract was let later than initially called for and it is unlikely that the report will be finished much before the end of this school year.

The project objective, as defined in the RFP,

> is to provide an impartial and substantiated understanding of:
>
> - The gap between needs and expectations and the current BCeSIS system.
> - The prospects for successfully meeting needs and expectations through the implementation of competing commercial software or development of custom software in alignment with 21st century learning.

The RFP further defined future directions as "a personalized learning model." The requirement, it said, is that

> This strategy will feature personalized student learning plans, irregular periods of registration and completion, and intensive collaboration and communication among teachers, students, and parents. Assessment of alternatives should include consideration of the long term ministry strategy.

All the options are scary

The planning and development of BCeSIS started nearly a decade ago. It got up and running with the first use by a few "early adopter" districts in 2005. Despite warning signs that it was not up to the task (meltdowns at key times, full capacity, and deleting some key information at the end of the school year), more and more users were added to the system until it was beyond capacity. So what are the options now?

Option 1: Stick with BCeSIS

Stumble along, optimizing what capacity it does have and add no new elements. Try to get access to the code and hire programmers to fix and add things over the next several years.

What are advantages of sticking with BCeSIS?

The one thing often quoted as a positive of a centralized database of all students is that when a student moves to another school or district, their information is immediately available to the new school. It is no longer necessary to wait to have someone send the information in the mail or fax it. But is this a powerful enough need to trump all the other needs of education? In fact, industry people say that this can and has been accomplished with decentralized systems—there is an alternative to achieve the same thing.

Another advantage is avoiding the disruption of another change. Many teachers have been cajoled and forced to adopt BCeSIS for report cards. It has been a painful experience for some; for others it was the tipping point for leaving the profession. A demand to change just as they have finally gotten somewhat comfortable with the BCeSIS reporting function, as inadequate as it is, creates a fear from having to learn yet another system.

It may well be that this isn't really an advantage, either. If they have a well-designed and user-friendly program, they will adapt quickly. The level of pain from adopting a new system will be dependent on how well it is designed.

What are problems relating to sticking with BCeSIS?

BC may not be able to get access and the right to modify and develop BCeSIS. Pearson has already said that it will only support it for a limited time. Pearson's reason for taking over from aal is to get some new customers for their products. Why would they have an interest in letting BC continue to develop BCeSIS, instead of buying a different program? And if a BC-developed BCeSIS actually became a successful system, it might well be in competition with Pearson for the big market for this type of service in the US.

The cost of the BC Ministry of Education continuing on its own in developing this program that is only for BC would be high. A developer with several customers can spread the cost of development, unlike one that has only a single possible market.

An improved BCeSIS would not be adequate anyway. The ministry has rightly sought to have a future system be consistent with its plans for the future. Central to the plan is "personalized learning," which it describes in the RFP as being characterized as "intensive collaboration and communication among teachers, students, and parents."

BCeSIS is designed to batch extracting or uploading data. It produces reports as pdfs, which intentionally makes it difficult to extract data in a usable form. For example, it is aimed at stopping a person developing a school timetable from downloading the data into a scheduling program that works more efficiently than the BCeSIS programming module. Similarly, there are barriers to easily uploading report card data from another program the teacher uses to maintain their student marks on a daily basis.

BCeSIS is based on a model of education that the ministry says is "last century" and not living in the 21st century. For example, BCeSIS is hardwired to assessment of learning, but not assessment for learning. It is based on standardized provincial data needs, not on a flexible system of keeping track, at the school level, of each objective set by the students, teachers, and parents in consultation. The objectives and how the student reaches them are not standardized in the vision of "personalized learning." The tool and the task—BCeSIS and personalized learning—to use Ursula Franklin's concept, are not compatible.

Option 2: Move to another centralized system, such as Pearson will want to sell to the ministry

This will probably be the recommendation of the Gartner consultants. They mostly work for corporations that want "enterprise" solutions. This is the model of information systems that provide to the people at the top of the hierarchy of a business the details that let them make strategic decisions about multi-centred operations.

That is the vision from business that is being brought into education. You can see it, for example, from the Gates Foundation in the US that is promoting technological approaches to improving education. That is the vision that was brought to BC education in the last decade, as well, and is the basis for the "accountability" system. In this system, the ministry sets the objectives and the information system is aimed at providing the data. The ministry requires an accountability contract from the district, reported to the "superintendents of achievement." The principals have the responsibility for the development of a school plan that feeds the accountability contract. Information about the classroom feeds to the whole system through testing and through data put into the centralized student information system.

That is the kind of system that consultants for big corporations understand.

What are the advantages of switching to another centralized data system?
It might be more user-friendly than BCeSIS. As many have pointed out, the BCeSIS front end is based on technology that is 15 years old. Lots of new tools can produce a friendlier and more intuitive system. We might get lucky and get something easier to use by the front-line workers—teachers and support staff in the schools.

Pearson will probably make a pitch that the other program it wants to sell us will be much better than BCeSIS and solve all our problems.

What are the problems with moving to another centralized system?
It is another centralized system. Some of both the functional and the framing problems come directly from the nature of a centralized system.

At the functional level, holding all the information in a central database requires huge resources, both in server space and in bandwidth that connects the 40,000 users to the database. We don't have enough of either of these for BCeSIS, nor would we for another centralized system. Pay still more would be the result.

As well, the more information you put into a central database, the more it has to be standardized. A field has to be defined in a standard way or you won't get anything meaningful out of it anyway, if everyone has their own definition of what is supposed to be put in that field.

Besides, most of the information in BCeSIS—or another centralized system—is not of interest (or shouldn't be) at the central level. Someone in the Ministry of Education should not be going into a database to see what Johnny got for the fourth assignment in the Science 10 class. If the information is not needed centrally, why would you purchase and implement another system that does the same thing, just a little better than BCeSIS?

One of the concerns about any centralized system is how the data will be used, not just within education, but as a part of the "e-government" strategy that is already under way in BC and many other jurisdictions. In this e-government plan, databases from a number of different areas would be matched in ways that allow for "data-mining," linking data to design policies and control actions.

It appears that no one has yet designed a web-based system that has been successful in a public-education system with as many students as we have in BC. Nova Scotia, with a much smaller student population than BC, has created separate systems for each one of its districts. The claim of one observer is that no school principal has yet seen a working scheduling system. They have, however, seen many PowerPoint presentations from the vendor of what it should look like.

Option 3: Create a distributed, decentralized system

The information needs for "personalized learning" are very different from those for standardized learning. You want to have rich data at the level of those who are directly involved in determining the objectives and activities and ongoing assessment of the learning process. That data should not have to be structured in a standard way. Very little of it needs to be reported beyond the direct users of the information.

Any data that does need to be reported from the classroom to the school, from the school to the district, from the district to the ministry can be defined and transmitted in a standard way. Education is an incredibly data-rich environment, but much of that richness is specific to the direct relationships between student and teachers and students and students. Much of the data never needs to be recorded and only a small amount of it needs to be transmitted beyond the classroom. Much of what is transmitted beyond the school should be aggregate information, not tied to individuals.

What are the advantages of a distributed system?

As indicated above, a distributed system allows for more ways of documenting the learning process, many of which do not need to be recorded in any database. However, it does allow for appropriate data to be collected and transmitted for purposes of a general overview of what is happening in the system.

Some standard pieces of software could be made available that provide the combination of flexibility yet also standardization of limited amounts of what is collected and can be transmitted.

The functionality can be improved from many perspectives. A distributed system eliminates the need for a massive server space to have all the data of the school system held in one place. It reduces the demand for bandwidth because most of the data is held on a local computer at the site of the educational work, not transmitted to the central server.

It also provides protection from the creation of a huge database to be linked to other databases and data-mined, a very real concern of those rightfully concerned about civil liberties.

A distributed system is also likely to be less costly from a dollar amount as well as from the perspective of limits on attention. Having a centralized system already requires that every teacher has access to a computer, but that computer is not being fully utilized for information storage if all data is going on to a centralized server. Further, a centralized system not only takes teacher time, it also determines when it is fed, rather than the teacher being able to structure work on data to fit the teaching needs.

What are disadvantages of a distributed system?

A major disadvantage of a distributed system is that control is moved from the centre to the margins. Of course, that can be seen as an advantage if one believes that the autonomy of the teacher and the relationship of the teacher to the student is the central relationship in education.

The most-frequently cited advantage of a centralized system is the ability to have information at a new school when a student moves. There is no doubt that access to records can occur quickly. On the other hand, too much information may remain permanently on the record that may be damaging to a student's future, unfairly.

An argument can be made that security is more of a problem in a distributed system. In a centralized system it is feasible to build in security requirements and enforce them.

On the other hand, any security system is vulnerable from social practice as much as from the technology: the teacher who leaves the room when signed in—centrally or locally; the system administrator at any level of the system who has access to all data entered in the level for which he/she is administrator. Dozens of ex-employees of aal had access to every byte of data from 500,000 students in BC.

The ministry currently has the authority to access all the information in BCeSIS and can give itself authority to share the information with others, including for the use of data-mining across government departments such as health, social services, and children and families. Not having central access would be seen as a problem for those who want to data-mine, but not by those concerned about civil liberties.

Successfully breaking into a system with lots of data gives access to lots more than breaking into a system with just local data at a classroom or school level.

Most of the unintended access to confidential data comes not from the technology itself, but from a person who has access to the data. Wikileaks, for example, did not get the mass of information it is releasing by breaking into the system, but by being given access by someone who had authorization for access.

These are all issues that have to be addressed—the specifics of the problem differ, but the issues of security and appropriate use of data exist whether a system is centralized or distributed.

Who will make the decision, and how?

The Ministry of Education has hired Gartner Consulting to develop recommendations.

The RFP describes the governance system for BCeSIS:

> Software and service management agreements are managed by the Province on behalf of the education system. All school districts as well as numbers of independent and aboriginal schools have signed a memorandum of understanding to voluntarily adopt BCeSIS. The service is governed by the Ministry in consultation with a council of representatives from each party to the memorandum of understanding.

The RFP also says that there will be a steering committee on behalf of all school districts that will select nine districts for the consultant to identify "detailed key business requirements." In many ways, this will be the most important part of the process because "business requirements" (education philosophy and practice) should drive the decisions about design.

If the technology people consulted in each of the nine districts define business requirements as the system holding all the information, then it would produce a recommendation for a centralized system. If those folks, on the other hand, say that most of the information only needs to be held

at the classroom and school levels, with only a limited amount at the district or provincial level, quite a different design should be the recommendation.

If past ministry practice is a guide, teachers will not be seriously consulted. Most of those consulted will be the technology people in the district, not those who use the system in the classroom.

The experience of teachers in the first years of implementation of BCeSIS was that their complaints were dismissed by the ministry's "council of representatives," with assurances that all was well. The ministry staff pushed the blame onto the backs of districts and teachers with claims that the problem was lack of adequate technology in the districts and teachers who did not have enough technical knowledge.

It was only when the system broke down under the weight of more demand that pointing the finger of blame at teachers ended and the ministry finally acknowledged that the problem was with the system, not the users. In only a matter of weeks from the BCeSIS crash, the software company aal itself crashed and was taken over by Pearson.

Having a say in the directions for the future must be open for many more than those who brought us to the inadequate and inappropriate system that we now have.

To get teacher voices into the discussions of the future of the information system, the BCTF organized a "think tank" with teacher users from a range of aspects of the school system: classroom, distributed learning, special education, specialist association, local president, tech ed.

The group produced a framework for thinking about the technology needs. This will be distributed widely to encourage and assist in the discussion of future directions of development of the technology that actually supports the kind of education that we should be providing, rather than being inappropriately designed and implemented.

LK:cep/af:tfeu