ICT platform change and its impact on organisational communication

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Abstract
In this paper we present a pilot study which examines the impact of changing a computer-mediated student management system (SMS) in a New Zealand secondary school on its communication practices. We discovered that staff involved in enacting the changes relied on internal and external informal networks to support the process. Further, we identify that the ability to return to the status quo should the change fail, paradoxically enabled the College to successfully embed the new system.

Introduction

Organisations in change are of fascination to organisational researchers because during periods of turbulence, deeply-held assumptions surface and insights can be gained that are otherwise hidden from view. In his research into organisational culture, Schein (2004) proposes that beneath surface artefacts which are often the target of change agents, organisational cultures are stable and resistant to change. Organisations only reluctantly give up the way they operate in favour of a new approach, and often personnel find ways of sabotaging new initiatives in order to – sometimes fiercely – defend the status quo. Fullan and Ballew (2004) claim that this resistance derives from 'emotions [that] frequently run high and often represent fear and differences of opinion' (p. 97).

Because of the emotional intensity surrounding change programmes, Fullan and Ballew's advice to leaders is not to attempt to work with resisters 'unless you have all your EQ [emotional intelligence] faculties intact' (p. 97). This advice implies that change programmes are often leader-driven and fail to recruit the goodwill of the staff who are going to enact the change.

How, then, can leaders enact a change programme whilst at the same time preserve the willing and creative involvement of staff? In this paper we enquire into this question by reporting on a technological platform change in a New Zealand secondary school (we use the pseudonym Philips College to protect anonymity) and suggest some tentative findings that will provide the basis for ongoing research. Our fascination with this project is based on the notion that computer platforms represent more than a surface artefact (to use Schein's cultural taxonomy). Our position is that because computer-mediated management systems are so central to the way today's schools function, they represent a core element of the institution's identity and way of functioning.

In order to discover how staff goodwill and creativity was engendered at Philips College we adopted a case study method. Our intention was to gain initial insights at one site that could then be more closely examined by extending the study to other schools, thereby deploying a multiple case study approach. We did not set out to

prove any hypotheses but took an inductive line (Eisenhardt, 1989) in order to let the data inform us.

We approached the research as naïve enquirers. This enabled us to allow our sensations and responses to what we observed to guide us in each step of the process. Hence we engaged with the process to first 'sniff the air' and then to find sufficient data to 'decode [the] human experience' (Mariampolski, 1999, pp. 78–79).

We carried this out by both observing the change occurring in situ and then conducting formal interviews with specific individuals charged with enacting the change. Driven by a constructivist epistemology we attended to the varieties of discourses whilst the change was occurring. Hence we did not set out to generalise our findings but rather attend to the polyphony of stories (Hazen, 1993) and discover through these accounts the ways in which staff constructed and made sense of the changes (Heracleous & Barrett, 2001).

We were interested how the organisation dealt with all the problems that were bound to surface once the decision had been made to undertake the system change. For instance, immediate issues that the organisation addressed, such as staff involvement in the change and the kind of training offered and by whom, in order to equip staff charged with operating the new system, were all issues that stimulated this research.

We were first attracted to this project because of our belief that information communication technology (ICT) platforms are fundamental to the ways in which we access and use data. To change such a core component, especially when many of the end users are not computer-savvy, seemed a radical and risky decision for the school's senior managers to make. We were intrigued as to how the change would play out and wondered whether the leaders would be able to persuade the large number of the school's academic and administrative staff to adapt to the new computer environment. Furthermore, we were curious as to how communication among the key stakeholders worked during the change process and ultimately whether the new system would impact positively on the school's core function as an educational provider.

We came to this research project with some pre-conditioning. Being tooled with theories and concepts around change management and the uses of ICT we considered that the platform change would be carried out in a careful, deliberate and consultative manner. Without the majority of the users agreeing to the change in advance, it would seem futile to attempt to even begin contemplating such a major move. Further, as with any new software, we held that extensive training must be given in order to familiarise staff with the new operating environment.

However, we experienced something quite different. At Philips College not all senior staff members were of the opinion that changing the platform was necessary. Added to that, members of the management team themselves were not fully committed to the new system, expressing views that if the new system failed to meet expectations, they would simply revert to the former one in spite of its irritations. And yet, as we conducted our research, we found that the change to the new system was reasonably seamless and after dealing with initial teething problems, staff generally felt they were working with a much better product. Hence in this paper we examine the change process at Philips College and adopt a tentative theoretical position around our observations. However, before discussing the system change at Philips College, we examine the literature on ICT and its place in learning institutions like secondary schools.

Information Communication Technology and School Administration

With the platform change at Philips College as a primary focus, this literature review highlights the relationship between technologically-enhanced management systems and student learning.

Reporting on the New Zealand educational environment and ICT, Bolstad and Gilbert (2006) argue that there are four different justifications (efficiency, community building, accommodating the digital generation, and entering the knowledge age) for schools to invest in ICT. They stratify the reasons that New Zealand schools have moved into the digital age and maintain that although administrative efficiency has been the primary driver, this in itself does not improve student learning. Therefore their hierarchy places institutional efficiency as the least preferred investment option, while the creation of new knowledge by students using ICT as a learning tool is

firmly at the top of their paradigm. Furthermore, Bolstad and Gilbert emphasise that ICT in itself does not successfully transform schools into knowledge-rich learning environments. They maintain that a holistic approach is needed to shift schools from a low-level administrative focus to the more erudite level of creative thinking. Hence, teachers, administrators and managers need to support each other with ongoing training and professional development. However, they do not theorise about how schools can move up the hierarchy or how a holistic approach to ICT can be achieved.

In a comparative study in Malaysia, Zain, Atan and Idrus (2004) studied the impact of ICT on school management practices. They found that the implementation of ICT brought about positive changes, such as more efficient student and teacher administration, better accessibility to information and a higher utilisation of school resources. They also encountered negative attitudes among teachers towards ICT, especially around the lack of training using new technologies.

In a study carried out in the United Kingdom, McLeod, Hare, and Johare (2004) note that diligent record keeping can impact positively on management practice. They advance the notion that administration systems and records management are mutually dependent. Furthermore, as systems administrators attend to the needs of senior managers to enable them to efficiently access records, these administrative processes can in turn inform software developers in refining the systems. In this way, ICT helps shape business operations and the work of administrators.

Taking this further, with administration processes and software development working in concert, advances towards a digital society are enhanced. This synergy is explored by (Alakeson et al., 2003) who argue that along with giving individuals access to relevant information, ICT also facilitates global conversations through a diverse range of channels. This, they maintain, supports the growth of collaborative enterprises that are not limited to national boundaries. However, in order to reap the benefits of multi-national dialogue and the internationalisation of their learning environment, cooperation of leaders in all sectors of society right up to central government is required.

At an organisational level, Steinmueller (2002) emphasises that ICT supports productivity improvement, and change programmes. This is achieved, he asserts, by spreading and re-distributing information within the organisation, resulting in changing the nature of human information processing.

Consequently, the literature suggests that the adoption of new technology must occur in situ, with training and implementation being inseparable processes (North, Strain, & Abbott, 2000). In other words, focusing on these two as distinctly separate elements leads to ineffectiveness and inefficiency. Furthermore, North et al. claim that professional self-development does not occur when training and processes are isolated from organisational development. This necessitates vendor availability to support training and development programmes (Benamati & Lederer, 2001).

However, Clarke (2007) places responsibility for up-skilling firmly in the hands of the teachers themselves. Because of the rapid escalation in technological sophistication, educators find it difficult maintaining competence with each change. Clarke argues that teachers need to be continually educated with the appropriate skills so that they can function and facilitate learning. Ultimately it is the teacher who has the responsibility for planning and providing careful organisation of activities and to improve curricula for the global context.

Once teachers have received adequate needs-based training, attitudes toward ICT tend to be more positive, and with continued exposure anxiety is reduced (Knezek & Christensen, 2002). Hence teachers' perceived needs are strongly dependent on the level of access to ICT resources and current stage of adoption of technology in education.

In summary, much of the current research focuses on training and development in order to equip educators with the necessary tools to maintain their ICT skills. Informing this position is that educators who are adept at using ICT are better able to support digitally mediated learning in the classroom. However, this research offers little in establishing the links between effective management systems and student learning. At face value, then, it is surprising that Philips College opted to change its

administration platform given there is no immediate promise of improved student performance.

The Management System Change at Philips College

Philips College is a mid-sized urban school with a student roll of 1200, and academic staff of 90 supported by 30 to 40 non-teaching staff. At any one time, the college also accommodates between 70 and 100 international students, many of whom require specialised help in raising their English language skills.

In terms of its engagement with ICT, since the 1980s Philips College has been using a computer-mediated student management system – MUSAC. This program has grown from its former DOS environment (disk operating system) to today's Windows format. Some of the program's key features are Quickfind (a program that assists administrators and senior managers to access student information such as their contact details and daily timetable), SMS (used for recording confidential information about the students' grades, any pastoral issues, and can generate one-off lists of students involved in ad hoc events), and Timetable (a tool to manage all elements of timetable construction, implementation and change). None of these applications is integrated and require a user to log out of one function and into another (for example Quickfind to SMS). This process of closing one application before opening another became the cause of much frustration to staff when they were required to toggle between functions.

Further, under this regime, student lists were not transferable. For each new event, be it an off-campus class trip, or issuing sports uniforms, new lists were continually being compiled. Hence different departments were doubling up on student information, repeating work that had been done by another part of the college.

When management systems were in their infancy, the New Zealand Ministry of Education (MoE) left it to schools to adopt the program that best suited their needs, including programs developed in-house. However, by the early 2000s schools were required to use an officially accredited platform. In doing so this would reduce the numbers of formats available and enable the MoE to carry out its distance monitoring functions more efficiently.

Because of the frustrations experienced in using MUSAC, Philips College began investigating alternatives. Their chief aim was to purchase a fully integrated system that would provide easy access to all the available data.

After some investigation by key personnel such as the senior management team and staff in charge of the timetable, Philips College chose a new program – KAMAR. This new system immediately offered solutions to the old frustrations. For instance, pastoral, administration and reporting functions will be available at the click of an icon. Student performance would be more easily monitored both horizontally within the cohort and vertically over previous years. Thus comparisons would be easily made and timely interventions put in place to ensure continual student development. Information could be gathered from all sources within the one program for reporting purposes. This would immediately benefit the end-of-year official prizegiving where lists of student achievement could easily be trawled for the most successful students in each subject at each year level, and for maintaining records of achievement available for reporting. Hence, the managers saw that reports could be generated by automatically collating student information and integrating team sport participation, and other school involvement. An added bonus was that email alerts could be sent to staff and parents from the generated data.

It was at this point, when the decision had been made to change the ICT platform, which our research began. Our interest was in how the change was carried out and the communication problems the change provoked.

The new KAMAR system was installed July 12–13, 2007 during the mid-year holiday period. Beyond investigating the immediate issues that emerged during the installation and induction period, we were curious to know whether an efficient student management system actually does influence higher-level learning outcomes.

Research Method

We began this research with several hunches. First, we considered that a radical change in management platform would be accompanied by strong resistance and angst on the part of staff members. Second, we thought that given changing platforms

represents a major shift in allegiance from a familiar to an unknown product, the ground for the change would be well considered and all stakeholders would be consulted and prepared in advance of the change.

With these instincts in mind, we gained permission from the college, and ethical approval from Massey University to investigate the process before and after the change. For this study data was collected at two points, the first through direct observations during the final week of the holiday period while the new software was uploaded, data was transferred from the old system and key staff were taught the basics of the new system. Observing the software change allowed us to retain our outsider status and with that distance, preserve our objectivity as much as possible. Furthermore, the observant role allowed us to attend to the ways in which staff approached the new system and listen to the ways in which they interacted with each other during the training. These interactions provide us with stories that we could return to during our narrative analysis. Secondly, alongside direct observation, we also interviewed senior staff – those who were directly involved in planning and promoting the change. To date we have spent three days observing and discussing the changes with senior staff and have carried out four formal interviews which were tape recorded and transcribed for analysis. The transcriptions allowed us to discover key themes that provided the resource for tentative theory building.

We also hope to carry out a paper survey before the 2008 mid-year break. This survey could offer insights into how the new program has become embedded in the college's management systems about 12 months after installation and bulk out the data that we have gathered to date.

The people we formally interviewed represented staff responsible for managing the changes and a person representing the software vendor who carried out the initial induction. In this early stage of the research, other staff members were not considered as interview subjects. Hence it would give a limited perspective on how staff received the new system. Further interviews will be carried out in conjunction with the paper survey.

This method of data collection in terms of observations and interviews allows researchers to track stages of engagement with those interacting with the technology. For instance, Alvarez (2008) argues that data collection could be analysed based on early and latter stages of implementation and are distinguished between imaginary phenomena and artefacts. While in the early stage (imaginary) technology is perceived as an idea and most users have not yet received enough information about the technology – in our study the early stage was the induction of staff into the new software procedures and interacting with each other during the training sessions. Quite notable at this stage, resistance to change is more prominent. For instance, during initial conversations timetabling staff expressed reservations about the platform change. They considered that the existing system worked well and easily performed the full range of complex tasks required to run a secondary school timetable. How then would they respond to the new situation and acquire the appropriate tools to embed the new system?

The latter stage, during interviews, technology is seen as an artefact, when the technology is 'in use' by a large number of individuals.

The findings of this study are analysed in the following section with a brief conclusion.

Creating Learning Networks

Interviews with the three senior managers and one software developer were conducted early in the change process. Our plan was to discover how the change was carried out and to ascertain how the challenges to the status quo were negotiated. In order to preserve the anonymity of the interviewees we use the following pseudonyms: Jason, Larry and Evangeline for the senior managers and Dave for the software trainer.

In spite of initial reservations about the new program, these staff expressed a determination to work through the conundrums the software presented in order to see the change successfully implemented. They decided this would be achieved by a network system, relying on the web of existing relationships, both internally and externally, in order to acquire the necessary skills to learn the unique features of the program.

In order to build training coalitions for an easy transition, firstly Deans and some key senior staff were equipped with a basic knowledge of the pastoral features the program offers. Period-by-period marking the attendance register is a mandated requirement in order for a master record of each student's presence at school to be maintained. Whereas in the past the Attendance Officer would take paper notes and convert these to the digital files and official registers, now individual teachers were encouraged to directly enter that data during quiet moments throughout the day. In response the Attendance Officer would in the first instance monitor teacher entries, follow up non-compliers, and in some cases enter data from teachers still not confident in using the technology. For many staff, this represented an elevation of their responsibility to input relevant information directly to the system.

Equipping the whole staff to carry out this function was achieved by the expert teachers who had attended the initial training. They passed on their knowledge and skills to others. The first day of Term Three was designated as a Teacher-Only Day for the trained staff to carry out this knowledge transfer to their peers. As a side note, this Teacher-Only Day was programmed at the beginning of the year before any software change was finalised. Furthermore, senior managers were not certain the software installation would be complete enough for this training to occur, even up until the few days before term commenced. Yet there appeared to be no sense of panic at this just-in-time approach to the change.

Added to this internal training network, Evangeline and Jason related their dependence on colleagues within other schools who had successfully negotiated the change to KAMAR. Jason reported that one of his regrets in making the change was losing the network of expert peers that he relied on for troubleshooting when working with the old program. However in his interview he described how he was beginning to build an alternative network of external experts and that he had begun to use KAMAR's helpdesk facility. Both these he found useful, enabling him to navigate through some of the more difficult functions the program presented.

Evangeline also noted that this idea of a training network came from another school's experience. Her goal for Philips College was that staff would adopt the same supportive attitude with each other in order to facilitate the change.

Evangeline said that the other school staff 'would be very helpful and supportive, sharing information, sharing strategy and things, so I would like to think we would be that comfortable and I do think that for Philips College, this way of changing is working – of dealing with issues as they come up rather than changing everything instantly.'

Furthermore, by staff sharing their knowledge with each other, expertise would be distributed rather than being held in the hands of several experts. Evangeline expressed her disquiet about the old system being expert-driven and her optimism about the chance that the new system gave for staff to interact more closely with each other on a professional level.

Evangeline said, 'I also think it's an opportunity for us to teach others so that we are not reliant on one or two people holding the entire body of knowledge that is necessary, and I always think it's a better thing. One of things that bothered me with the old system was that two people in the school understood Pupil Files really well … and I still think that is a dangerous thing. You can't rely on running a school based on two people's knowledge.'

Interviewees also acknowledged that to integrate all the school's records into one portal and to equip staff to use that information efficiently, they needed to take a staged approach to the change. This incremental method of change allowed the college to embed one level before taking the next step and offered a mechanism for them to move from the easiest changes to the more difficult ones. Dave advised that other schools which had successfully made the transition also split the upgrade into various steps. He considered that beginning the installation and use of the software at mid-year was a better strategy than at the start of the year, as there would be less pressure on the school to achieve a clean transition when it was in full swing. Hence it was decided that the first step was to enable the pastoral records to be upgraded and accessed. This included existing student data and the subsequent recording of student marks and performance. The more difficult issue of integrating the detention system was handled separately once the initial data became accessible. The detention system requires a multiple interface among the offending student, faculty and the parents.

Senior managers deemed the existing system, although not yet integrated, would operate parallel to KAMAR until such time as they were ready to take the next step. Maintaining current and tidy financial records was considered so crucial that, under Dave's advice, the school decided to delay this upgrade until the beginning of 2008. By this time it was considered that the other systems would be running sufficiently smoothly for them to be able to cope with this change.

Although the senior managers expressed determination to make the change successful, they also maintained an escape hatch of possible return to the status quo. One of them said, 'Well if it doesn't work, after 12 months we will go back to the old system'. Notwithstanding the assurances of a return to the known and comfortable, Jason acknowledged that it was unlikely they would in fact go back. Jason had earlier expressed his reluctance to change. He had learned ways of getting the best out of the previous system and could not initially see any advantage in changing. However, once the software was installed and he began exploring its possibilities, he came to see that there would be little advantage in going back.

Larry, too, expressed that the new system brought with it the possibility of improved academic performance on the part of the students. He considered that the ability to record and track individual performance over the years and to compare actual results against standard expectations for that year level offered the opportunity for early intervention and remedial action. Even after a few weeks of using the new system he was beginning to see the possibilities of identifying under-performers and for increased communication among faculty. He believed this would improve teaching abilities as staff members became more readily aware of learning difficulties among students. Different teaching strategies could then be applied to lift a student's performance to match that of his or her cohorts. Larry acknowledged, though, that it was still early days in which to assess this element of the program and felt that he needed to see how it worked in the long term.

Little resistance was experienced during the first stages of the program's implementation. However, its focus on academic achievement and pastoral concerns did bother some administrative staff. This could be accounted for by the apparent reluctance to learn a new system and nervousness about being able to master the new

complexities the software presented, that emerged during the training sessions. Nonetheless the Senior Managers were determined not to allow a few dissenting voices the opportunity of derailing the process of change.

Extending the Study

If, then, change programmes result in a volatile staff room, it appears that any attempt at changing something as fundamental as a management system would be accompanied by staff arousal and deep resistance. To date, though, this has not been observed at Philips College and has come as a surprise to us the researchers. What accounts for this willingness to go in a new direction?

We argue that by the college relying on its core mission as an educational institution, thereby encouraging staff to become network trainers, the new system was integrated without any attendant melt-down. While it had been reported anecdotally prior to this research that other schools had experienced difficulties making a similar change, Philips College took a different route.

In summary, we consider that the ability to build training coalitions both internally and externally provided a resource to deal with difficulties as they arose. Taking a staged approach to the change also enabled problems at one level to be ironed out before the introduction of the next piece in the software jigsaw. Similarly, by offering an escape hatch, staff had the safety of knowing they could revert to the former system if the new one failed to meet expectations. Finally, by using a management package that concentrates on student achievement, the college is able to protect its primary student-focused mission rather than becoming immersed in dealing with the politics of change.

This pilot study has revealed some unexpected and fascinating results and we are working on future directions of the research. Our first plan is to revisit Philips College some time before the end of Term Two, at which time the school would have worked with KAMAR for a full 12-month cycle. As part of that review, we plan to talk again to the people we interviewed to ascertain their opinions on the success of the software change. Further, with the college's permission we would like to survey the entire staff to gain their responses on the effectiveness of the change process.

Beyond Philips College, we are pondering undertaking a wider study, looking at secondary schools that have made a similar change. We are curious to see whether and how the same elements of coalition building, a staged approach, and offering an escape hatch that we have identified at Philips College, come into play. Further, we are interested in how school management teams communicate with staff in order to mitigate resistance and foster collegiality.

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