School Libraries in New Zealand as Technology Hubs: Enablers and Barriers to School Librarians Becoming Technology Leaders

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New Zealand government initiatives have improved the bandwidth available in schools, and new technology is increasingly incorporated in the curriculum. The possibility of the school library becoming a technology hub has been suggested. A question that has not yet been asked is whether the human resources (the school librarians) are adequate for new roles as technology leader. A survey of secondary schools in New Zealand found that school librarians generally had good relationships with their principals and IT staff. The problems they identified were with financial and staff resources, and with their current place in the organisational hierarchy. School librarians who feel confident in their own ability should work in regional networks to show principals and other librarians that a school librarian can be a technology leader. The relationships between the school librarian, information technology and the school curriculum have often been discussed in the literature and there are clear signs that an active school librarian with confidence in using new technology can make a valuable contribution to the school. This focuses attention on the human resource: Are school librarians ready and willing to be technology leaders in the school?

Introduction

The rollout of broadband in New Zealand was facilitated in large part by the government’s Ultra-Fast Broadband Initiative (UFBI), a public-private partnership to create a fibre optic network delivering download speeds of up to 100Mbps (megabits per second), and in some areas up to 1000Mbps (New Zealand. Ministry of Business, Innovation and Employment, 2015). Schools were given a high priority in the UFBI, but because fast cables to the front gate are useless unless there is a way of bringing that capacity into the school itself, the government’s Schools Network Upgrade Project (SNUP), gave subsidies to upgrade schools’ internal data and cabling infrastructures to enable the use of ultra-fast broadband. By May 2015 the government had spent over NZ$165 through SNUP and over 1,500 schools had received network upgrades (New Zealand, Ministry of Business, Innovation and Employment, 2015).

The impact of the SNUP and the greater bandwidth available through the UFBI was one of several points discussed in a report on the changing landscape in schools by the 21st Century Learning Reference Group (2014). An underlying belief in this investigation is that the thoughtful application of digital technologies incorporated into teaching activities can improve learning outcomes. The report’s recommendations include some relevant to school libraries, including the development of regional networks to build local capability that would ‘leverage the knowledge and expertise of many practitioners … who are leading the way in future focussed teaching and learning’ (recommendation 15). While the emphasis is plainly upon teachers, it allows for other
staff, including librarians, to contribute. The report specifically states at one point the government should start “supporting school librarians and teachers in charge of libraries to take a stronger leadership role in using digital technology to target achievement outcomes for at-risk students” (p. 16), though it isn’t obvious why this was limited only to at-risk students when all students could benefit.

**Review of Literature**

Around the world many teenagers carry portable devices with them at all times. In parallel with the spread of devices, the use of social media has boomed. In New Zealand 71% of teenagers say they use Facebook, over 50% use Instagram, 33% say they use Twitter, the same percentage use Google+, and 24% use Vine (Miners, 2015). This high permeation of social media into the everyday lives of teenagers suggests that students must learn how to use technology to find, retrieve, evaluate and ultimately to use information (e.g. Asselin & Dorion, 2008; Burnett, 2014).

The need for schools to teach digital literacy is very clear. There are some indications that classroom use of IT is, at least to some extent, correlated with better academic performance (Jarnieson-Proctor, Watson, Finger, Grimbek & Burnett, 2007; Spieza, 2010). Students cannot be expected to benefit from new technology in schools if their teachers are not comfortable using it, and the exploratory study of Shear, Koh, Patel, Trinidad, Chen Kee and Png (2014) suggests that teachers’ understanding of IT and pedagogy has a considerable influence on students’ educational attainment.

The library has potential to be one of the most technology-rich spaces in the school. In the 21st century, authors have made the case for school librarians to take a greater role introducing new technology into schools and then facilitating its effective use for teaching and learning, commonly within an adapted curriculum (e.g. Everhart & Dresang, 2007; Hanson-Baldauf & Hughes-Hassell, 2009). One key point is that librarians can interact with the whole school (Smith, 2010, p. 621). However, some educators have a limited vision of the school library and ignore the leadership role it could play in a transformative pedagogy (Leander, 2007), and this myopia will be a barrier to developing the place of the school library until it has been replaced by a more positive attitude.

The school librarian’s confidence is closely aligned with knowledge of technology tools (Smith, 2010, p. 626) and this is a precursor for helping teachers use new technology. It is through the integration of technology into the curriculum where school librarians, with their knowledge of pedagogical principles, their interdisciplinary perspectives on the school curriculum, their training as information experts, and their experience in forging cooperative partnerships with classroom teachers where they can serve as leaders within their schools (Mardis & Everhart, 2013, p. 127). This requires the librarians to be familiar with the curriculum and with modern pedagogy, and the presence of this knowledge cannot be assumed.

Relationships as a means of garnering influence has been affirmed (e.g. Johnston, 2012; Toor & Weisburg, 2011), though relationships can be barriers as well as enablers. Collaboration ought to be beneficial, but can be difficult for school librarians to achieve (Todd, 2008). Many school librarians show low levels of actual collaboration between themselves and teachers (O’Neal, 2004, p. 292), though Clephane’s (2013) in New Zealand suggested that relationships were adequate. Yet for most principals, understanding of the school librarian’s role was learnt from the school librarian, which emphasizes he importance of creating a positive relationship between the principal and school librarian (Church, 2010; Shannon, 2012). Unfortunately school librarians present their technology leadership outside the school at minimal levels (Everhart, Mardis and Johnston, 2011, p. 15).
School librarians are willing and able, there is potential for them to become ‘technology leaders’ in the school and be major players in the changes that will see more technology used for teaching as it is integrated into the curriculum. However, the majority of school library staff in New Zealand did not see themselves as technology leaders, but instead someone that would incorporate technology within the library to make the library a useful resource (Clephane, 2013). The demand that school librarians be technology leaders has been formalised in relevant national standards (e.g. American Association of School Librarians, 2009), and the (U.S.) National Board for Professional Teaching Standards (2010) has called accomplished school librarians “visionary leaders” in their schools and in the profession (p. 14). It remains something of an open question, whether the leadership comes first or the knowledge of technology. Smith (2010, p. 628) stated that the Project LEAD programme used technology integration to help build leadership skills, whereas Dees, Amyer, Morin and Willis (2010) imply that leadership comes before the technology integration.

School librarians in New Zealand differ in that they are labeled ‘support staff.’ They are frequently paid part-time, and in the management structure they are usually lower in the hierarchy of the school and reporting upwards through a teacher-in-charge (Clephane, 2013; Walker & Calvert, 2016). They are often in a weak position to facilitate change perhaps another barrier to leadership. Organisational structures are considered to be crucial to the effective use of technology in schools, but “leadership plays a mediating role between the infrastructure and technology outcomes” (Tan, 2010, p. 901), hence the school librarian’s position and influence within the organisation can be either a barrier or an enabler. In New Zealand the current situation most likely makes it a barrier.

Methodology

Research Questions

The central question in this research evolved from the findings of the 21st Century Learning Reference Group (2014), which predicted the benefits of more technology being used in schools yet argued that more had to be done to convert the potential into reality. Many schools are acquiring new technology and there is no doubt that bandwidth in New Zealand is improving as a result of government initiatives. The school library is therefore very well placed to become a central hub for the use of new technologies that blend teaching and learning with the curriculum, but will this actually happen? The question that the Group did not answer was whether or not the human resource was capable of utilising the new technology, for unless the human resource is ready for change the school library is unlikely to become a technology hub within the school. The research question for this study was therefore:

What are the enablers and barriers to school librarians becoming technology leaders in the school?

Definitions

A key concept in this paper is ‘technology leadership’. First ‘technology’ was defined, then ‘technology leadership’. These are the definition used in the introduction to the survey:

‘Technology’ includes hardware such as computers, mobile devices, cameras, etc.; software for library management and for supporting teaching and learning (web-based platforms, websites, social networking platforms, apps, office productivity software, library managements systems,
etc.); and to some degree the network infrastructure (Wi-Fi, servers, routers, etc.). ‘New’ technology will be what you have bought or installed recently or wish to use in the future; but if you have just been given a Windows XP computer, for example, do not regard this as ‘new’.

A ‘Technology Leader’ introduces and promotes the use of technology to make teaching and learning more effective. It requires some knowledge of pedagogy and the curriculum, and a degree of comfort with using new technologies. It is the interweaving of technology and the curriculum so that all members of the school community are effective users of ideas and information that marks out technology leadership, but it also requires proactive promotion of the technology through demonstration and further encouragement.

**Online Survey**

In order to answer the research question, an online survey similar to previous research into librarians as technology leaders, (Everhart, Mardis and Johnston, 2011) was used. It is acknowledged that the survey gathered data on the self-perceptions of respondents and did not gather data on actual competencies. The literature from which this study draws is based almost entirely upon self-perception. Collecting data on actual technology competence is almost impossible unless specific tests can be run on individuals, The online survey was the only feasible way of reaching a large number of school librarians around the country. One decision made early was to limit the population to librarians in secondary schools. There are 367 secondary schools in New Zealand. Though a few barely have libraries in a recognisable form, the situation in secondaries is much better than in the primary sector. A survey including primary schools in the population could produce skewed data.

The draft survey drew upon questions and concepts used in some previous studies, particularly that of Johnston (2012). She, in turn, drew upon Zinn’s theory that there are four key domains that create enablers and barriers in schools: (1) people and interpersonal relationships, (2) institutional structures, (3) personal considerations and commitments, and (4) intellectual and psychosocial characteristics (Zinn, 1997). Drafts of the survey used in this research contained questions investigating all four domains, but on the advice of the pre-survey focus group, questions in domain 3 were dropped. Johnston (2012, p. 21) also found this domain represented a fraction of the total. Using this model ensured a broad-based survey was developed that did not focus too narrowly on any preconceived ideas of what enablers and barriers there might be for school librarians as technology leaders.

The draft was presented to the committee of the Wellington region of the School Library Association of New Zealand (SLANZA) who acted as a focus group. In a one hour session they suggested additions, deletions and changes to the draft. The final survey design was tested online with three reviewers and as a result changes were made to layout and colour to improve clarity. It was administered online, courtesy of the National Library of New Zealand, which has the only list of email addresses for school librarians. Qualtrics was the chosen web-based survey platform. One prize of NZ$50 was offered as an incentive to participation - the email addresses given by those who wished to take part in the draw were separated from the survey itself to maintain anonymity. One reminder was sent to the list to encourage responses. Once the survey was closed and the data analysed, the Wellington committee of SLANZA again kindly agreed to serve as a focus group to help the researcher comprehend the significance of the results.
Findings

A total of 162 usable responses were received (from a possible 367), though some questions were not answered by all those who started the survey. The data analysis is reported by showing a question posed in the survey, the data received and analysed for that question, and the implications of the data.

School decile level

In New Zealand schools are referred to as having a decile level: “deciles are a measure of the socio-economic position of a school’s student community relative to other schools throughout the country” (New Zealand Government, Ministry of Education, 2015), which as the name suggests uses ten divisions. As an example, decile 1 schools fall into the lowest tenth of all schools in New Zealand based upon this socio-economic measure.

It might be that the decile of the school affects the responses to other statements; thus the reason for including the question. Analysing the whole data set using decile level, however, showed almost no difference in the responses (see Table 1), thus concluding that decile level does not affect the preparedness of the teacher-librarian to be a technology leader. The post-survey focus group pointed out that low decile schools receive extra government funding, which would account for differences in financial resources.

Table 1. Decile level of schools

<table>
<thead>
<tr>
<th>Decile</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>13</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>15</td>
<td>15</td>
<td>19</td>
<td>16</td>
<td>21</td>
<td>34</td>
</tr>
</tbody>
</table>

Zinn’s Domains One and Two

Participants were directed to provide two responses to each of the statements found in Table 2. The first response focused on what participants would expect in an ideal library and the second response asked what they deemed the situation is in their own library. Statements were on a scale of 1 to 7 with 1 being the lowest and 7 being the highest score.

These statements draw on Zinn’s first two domains - (1) people and interpersonal relationships, (2) institutional structures calculate the average (mean) response to each Means were calculated for each statement for the ‘ideal’ library and again for ‘your’ library. Then, the ‘gap’ between the two shows how far apart the ‘ideal’ is from ‘your’ library.
### Table 2. Gap between ideal and “your” library

<table>
<thead>
<tr>
<th></th>
<th>Ideal library</th>
<th>Your library</th>
<th>Gap between the ideal and participants’ library</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Board of Trustees is supportive of the school library</td>
<td>6.87</td>
<td>5.02</td>
<td>1.85</td>
</tr>
<tr>
<td>The Principal is supportive of the school library</td>
<td>6.91</td>
<td>5.33</td>
<td>1.58</td>
</tr>
<tr>
<td>The majority of teachers are supportive of the school library</td>
<td>6.82</td>
<td>4.96</td>
<td>1.86</td>
</tr>
<tr>
<td>The IT support staff are supportive of the school library</td>
<td>6.86</td>
<td>5.18</td>
<td>1.68</td>
</tr>
<tr>
<td>My place in the organisational structure gives me sufficient authority to introduce new technology</td>
<td>6.58</td>
<td>3.97</td>
<td>2.61</td>
</tr>
<tr>
<td>The school’s culture supports me when I introduce new technology</td>
<td>6.71</td>
<td>4.30</td>
<td>2.41</td>
</tr>
<tr>
<td>There are enough staff hours in the library for us to introduce new technology</td>
<td>6.76</td>
<td>3.61</td>
<td>3.15</td>
</tr>
<tr>
<td>The library has adequate funding to introduce new technology in the library</td>
<td>6.79</td>
<td>3.33</td>
<td>3.46</td>
</tr>
<tr>
<td>When I need time at work to learn about new technology the school is supportive</td>
<td>6.85</td>
<td>4.63</td>
<td>2.22</td>
</tr>
<tr>
<td>The school allows me to take professional development opportunities to learn new technologies</td>
<td>6.86</td>
<td>5.20</td>
<td>1.66</td>
</tr>
<tr>
<td>The school recognises and rewards innovation in technology</td>
<td>6.68</td>
<td>4.24</td>
<td>2.44</td>
</tr>
</tbody>
</table>

Relationships fall into Zinn’s Domain One. The importance of the principal’s support, which is very clear from the responses to the ‘ideal’ part, is not a problem in most schools. Perhaps the importance of support by IT staff as shown by the ‘ideal’ responses was something of a
surprise, but again, the actual support provided seems mostly satisfactory. The biggest gap between the ‘ideal’ and ‘your’ library is the amount of funding available to introduce new technology. A similar resourcing element is the number of library staff. Funding, and most other second domain issues, did not feature so highly in Johnston’s analysis (2012), suggesting that there is a significant difference between the financial resources of school library media centres in the USA and New Zealand and that a lack of funding is perceived as a serious barrier to school librarians in New Zealand developing their leadership potential.

The statement ‘My place in the organisational structure gives me sufficient authority to introduce new technology’ had a wide range of responses to in “your library.” 92 were between 1 and 4, and only 67 between 5 and 7, suggesting that many school librarians find their position lacks authority to bring in new technology. There was a similar range of responses to the statements on the school’s culture and on whether schools reward innovation in technology. Leaders can emerge from anywhere in an organisation but having a position with authority obviously provides a good starting point.

A factor analysis (Varimax rotation, eigenvalues greater than 4) was run on responses to the eleven statements in the second part (‘your’ library). Only one factor was extracted, which gives confidence in the survey instrument. The highest loading statement was “When I need time at work to learn about new technology the school is supportive.” This can be interpreted as pointing to this statement as a ‘measure’ for the whole factor. If the response to this statement is high, then responses to the others are likely to be high. If this is correct, there is logic to it. Being a technology leader requires knowledge of new technologies, and learning about them takes time.

**Strongest enablers for school librarians**

Participants were asked to indicate which four of the statements are the strongest enablers for teacher-librarians to be technology leaders, ranking them 1, 2, 3 and 4 with 1 being the strongest enabler. The top four responses, which were vastly ahead of the others, can be seen in Table 3. The data from this question shines some light on responses to the previous question. It can be seen that the support of principals is considered by many respondents to be the strongest enabler for librarians to be technology leaders, and this can be compared to the ‘gap analysis’, which suggests it is not the biggest problem for many librarians. Funding (perhaps not surprisingly) emerges as a very important enabler and one with a large gap between the ideal and the real library. Another problem area was the librarian’s place in the organisation: it is an important enabler with a ‘gap’ between the ideal and the real.

**Table 3. Ranking of enablers for school librarians to be technology leaders**

1. The library has adequate funding to introduce new technology in the library
2. The Principal is supportive of the school library
3. The school allows me to take professional development opportunities to learn new technologies
4. The IT support staff are supportive of the school library

Zinn’s Domain FourThe statements in this part of the survey were designed to identify enablers and barriers in Zinn’s Domain Four - intellectual and psychosocial characteristics. Responses to these questions varied widely as shown in table 4. School library staff get satisfaction from introducing new technology, and they are also committed to their own development. However,
many lack confidence in their knowledge of technology and of how technology relates to the curriculum, and others have no special interest in new technology. Confidence is closely aligned with knowledge of technology tools (Smith, 2010, p. 626) so presumably those expressing a lack of confidence need training with new technologies. The large variation in responses is illustrated by the data for the statement “I am comfortable being a technology leader within the school” – there were 74 responses between 1 (the lowest) and 4, and 73 responses between 5 and 7 (the highest); this is telling us that almost exactly half the respondents feel discomfort as a technology leader. Several respondents felt comfortable with their knowledge of the curriculum, an important factor in exercising leadership in the school (Mardis & Everhart, 2013), yet there were enough saying they were not confident they know the curriculum for this to be a concern, so it is a possible topic for in-service training.

As a check, factor analysis (Varimax rotation) was conducted on responses to these seven statements. Only one factor emerged, “I am comfortable being a technology leader within the school.” Responses to an earlier question had shown that getting time for professional development is not a problem in most schools, but it should be noted that a considerable number of school librarians are reluctant to use their own time to learn about new technology, which suggests a lack of leadership potential.

Correlation (Spearman Rho) was used to analyse pairs of statements to show the strength of relationship between the data. All correlation was significant at the 0.01 level, though some of the strongest pairings were between ‘I have a personal interest in new technology’ and statements such as ‘I am confident I have sufficient knowledge of technology to introduce new technology’, emphasising the importance of being interested in new technology before going on to being a successful technology leader.

Table 4. School librarians’ feelings about technology leadership

<table>
<thead>
<tr>
<th>Statement</th>
<th>mean</th>
<th>standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am willing to use my personal time to learn about and plan for new technology</td>
<td>4.94</td>
<td>1.61</td>
</tr>
<tr>
<td>I get satisfaction from introducing new technology in the school library</td>
<td>5.95</td>
<td>1.18</td>
</tr>
<tr>
<td>I am confident I have sufficient knowledge of technology to introduce new technology</td>
<td>4.55</td>
<td>1.49</td>
</tr>
<tr>
<td>I am confident I have sufficient knowledge of the curriculum to introduce relevant technology</td>
<td>4.48</td>
<td>1.51</td>
</tr>
<tr>
<td>I am comfortable being a technology leader within the school</td>
<td>4.29</td>
<td>1.71</td>
</tr>
<tr>
<td>I have a personal interest in new technology</td>
<td>5.17</td>
<td>1.48</td>
</tr>
<tr>
<td>I am committed to my personal growth as a school librarian</td>
<td>6.34</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Work with students and teachers

Statements in table 5 were suggested by the pre-survey focus group to investigate the situation within the schools. Participants rated each statement on a scale of 1 to 7 on how they thought they
applied to their schools with 1 being the lowest score and 7 being the highest. The mode for ‘teachers seeking assistance with technology’ is strikingly low (though the standard deviation is high), yet students, it seems are asking for assistance with technology. Unless teachers seek assistance it is hard to see the library as a technology hub within the school. That is reinforced by the fairly low mode (and mean) on new technology in the library. A factor analysis was used on these seven statements and the highest loading statement was “Teaching and learning in my school are enhanced by the technology in the library.”

**Table 5. Situation in New Zealand schools regarding technology**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers often seek assistance about technology resources when designing teaching</td>
<td>3.38</td>
<td>1.60</td>
</tr>
<tr>
<td>Students often seek assistance with technology resources for projects and homework</td>
<td>4.22</td>
<td>1.60</td>
</tr>
<tr>
<td>Teaching and learning in my school are enhanced by the technology in the library</td>
<td>4.30</td>
<td>1.80</td>
</tr>
<tr>
<td>The variety of technology in the library is increasing</td>
<td>4.31</td>
<td>1.78</td>
</tr>
<tr>
<td>The technology in the library is new</td>
<td>3.70</td>
<td>1.81</td>
</tr>
<tr>
<td>Use of library technology within my school is growing</td>
<td>4.27</td>
<td>1.83</td>
</tr>
<tr>
<td>My school library has enough technology to support learning effectively</td>
<td>3.69</td>
<td>1.82</td>
</tr>
</tbody>
</table>

**Conclusions**

There are some perceived barriers to producing leaders identified in this survey that will have been expressed anecdotally in New Zealand: the low funding levels, the lack of staff in the libraries, the low place of many school librarians in the organisational structure. Yet, there is little point railing against these shortages; they are unlikely to change in the short-term. The best way to convince the funding agents is to do a good job – and to tell them what a good job is being done. This must include advocacy outside the school, which school librarians have been slow to adopt (Everhart, Mardis & Johnston, 2011, p. 15). Training and support for that activity could be beneficial.

Understanding new technology is an obvious precursor of school librarians becoming technology leaders. Responses to the statement ‘The school allows me to take professional development opportunities to learn new technologies’ were positive, suggests that is not a barrier. Teacher-librarians can be upskilled through continuing education courses, though Smith (2010) makes the point that short courses are seldom sufficient to give the participant confidence in using new technology, and confidence is crucial to being a technology leader.

It is vital for the school library’s profile that its staff maintain good relationships with others working in the school (the principal, teachers, and IT staff) and with the Board. The importance given to relationships with IT staff was perhaps a surprise, but there seemed to be few problems with that (Johnston, 2012). A number of teachers were clearly not interested in the library,
which must make cooperation on the curriculum rather difficult, a problem identified by Leander (2007). Perhaps school librarians need to remember a point made by Kimmel (2011) that a school librarian will be “creating an identity anew every time a new teacher joins the staff, the administration changes, or new families enter the school.” Passivity will result in distance, but proactivity can be an act of leadership.

Almost one half of the respondents expressed some degree of comfort as a technology leader in the school, and the other half said they were not comfortable in that role. Other data suggest that, while there are many school librarians who are interested in new technology, who feel comfortable with it, use their own time to learn about it, and think they can apply it effectively in the curriculum, there are just as many who think none of those things. Expecting each and every school librarian to aspire to be a technology leader could be unrealistic. This raises the potential of the 21st Century Learning Reference Group’s suggestion of regional networks that would “leverage the knowledge and expertise of many practitioners ... who are leading the way in future-focussed teaching and learning.” Those school librarians who can be leaders – or who are already technology leaders in the school – can pass on their knowledge to their peers: “While the specific role may vary among districts, school librarians in districts and schools that have effectively implemented digital learning tend to be viewed as part of the leadership team and participate in the vision setting and implementation of changes in teaching and learning” (Wolf, Jones & Gilbert, 2014, p. 14). Principals and senior teachers who encounter these excellent school librarians might wonder why they did not have such staff in their own libraries, and as a result might try to recruit potential technology leaders as librarians. That would be a good outcome, at the very least.

References


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