One-to-one laptop program: Effect on boys' education

Steven Males
CHAPTER 4.
Findings: Teacher Experiences

4.1 Introduction

Chapters Four, Five, Six and Seven of the thesis present the findings of the research. The organising schema for the research findings is shown as Figure 4.1.

Figure 4.1. Organising schema for the research findings.

The research adopted the five organising elements of the ICT capability learning continuum (ACARA, 2010a) – Investigating with ICT, Creating with ICT, Communicating with ICT, Managing and operating with ICT, and applying social and ethical protocols and practices when using ICT. These organising elements provided a foundation for understanding how teachers used ICT for teaching and students used ICT for learning. The research was also interested in the broader socio-cultural context of the school and frames its findings on outcomes within a holistic framework. This included students, teachers, parents and school leaders from the School. Figure 4.1 presents an organising schema for the research findings.
This chapter provides longitudinal data collected over a three year time frame enabling the researcher to discuss the teacher participants’ use of ICT along with their viewpoints of the implementation of the 1:1 laptop program. Discussion focuses on results from the analysis of quantitative data and is further supported by analysis of qualitative data. Chapter Five lays out how and what the student participants used their laptops for in their learning and also considers their own personal views about the 1:1 laptop program. Chapter Six includes the parent perceptions of the 1:1 laptop program as these findings particularly inform research questions one and four. Chapter Seven articulates the possible impacts on literacy and numeracy outcomes.

### 4.2 Teacher Background

Data were collected annually for the three years of the study to establish the teachers’ years of experience at the School (see Table 4.1). A weighted mean of 4.6 years was recorded for participants who completed the questionnaire. This weighted mean indicates a higher proportion of experienced staff in the upper bands of experience across both the junior and middle school. At the conclusion of the study in the third (2012), the School had 106 Full Time Equivalent (FTE) teaching staff, with an average age of 42.8 years. The average age for the teachers involved in the study was 46.2 years as shown in Figure 4.2.

<table>
<thead>
<tr>
<th>Year (2010 – 2012)</th>
<th>Number of Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>First Year (n = 39)</td>
<td>2.6</td>
</tr>
<tr>
<td>Second Year (n = 47)</td>
<td>4.3</td>
</tr>
<tr>
<td>Third Year (n = 52)</td>
<td>1.9</td>
</tr>
</tbody>
</table>
Figure 4.2. Percentage of teacher participant age range (Third Year).

A higher proportion of male rather than female teachers took part in the research, in both the annual interviews and questionnaire surveys. The School has a higher proportion of male staff, with a gender ratio of two male: one female. The proportion of male to female participants who took part in the study, in interviews and questionnaires are compared to the total teaching staff population in Figure 4.3.

Figure 4.3. Gender distribution of teacher participants.

The inception teacher questionnaire (see Appendix G) was analysed to determine computer use by teachers prior to the commencement of the 1:1 laptop program. At that time, the School on average had five desktop computers per
classroom, with computer laboratories located across the School campus, and individual laptops for staff provided since 2000. Teaching staff were expected to use their laptops for a range of purposes, such as maintaining attendance records and reporting, communication, and teaching. The inception teacher questionnaire (n = 39) consisted of 50 items seeking to gain an understanding of the teachers’ use of ICT prior to the 1:1 laptop implementation. Item Six asked teachers to: ‘Indicate how often you have used each of the following strategies over the last 12 months?’ These were in the form of 10 Likert items, part of a Likert-type scale: Often, sometimes, rarely and never. The following statistics provide an interesting insight into the ICT habits of teachers before the 1:1 laptop implementation. Items two (b) revealed 59.0% of students used a computer in the classroom either often or sometimes, (e) nearly two thirds of students (64.1%) were either rarely or never rostered onto a computer and (i) most students rarely or never have a computer in the classroom (69.2%).

In response to Item Nine, 92.3% of teachers responded that they would like to make more use of computers with their students. When asked in Item Eleven: ‘How often have you used computers with students?’ 35.9% of teachers indicated using computers daily. In response to Item 12: ‘How often have you used computers to support group work?’ 53.8% of teachers indicated they used computers rarely to support group work. According to Item 15, 53.8% of teachers thought that, computers provide a set of technologies to support learning processes. Item 17 required teachers’ to respond to a Likert-type scale about ‘students engaging in a set of learning activities that involve the use of a computer’ (see Table 4.2). Teachers either strongly agreed or agreed that computers could, ‘help students think in different and more interesting ways’ (92.3%) and ‘motivate students to enjoy learning’ (92.3%).
Table 4.2
**Teacher Participants Responses to Views About Students Engaging in Learning With a Computer**

<table>
<thead>
<tr>
<th>Views about learning with computer</th>
<th>Strongly agree %</th>
<th>Agree %</th>
<th>Disagree %</th>
<th>Strongly disagree %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead to a better understanding of curriculum content</td>
<td>23.1</td>
<td>61.5</td>
<td>15.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Help students think in different and more interesting ways</td>
<td>35.9</td>
<td>56.4</td>
<td>7.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Be a faster way of learning</td>
<td>20.5</td>
<td>56.4</td>
<td>23.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Lead to students helping each other</td>
<td>17.9</td>
<td>61.5</td>
<td>20.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Lead to a better use of teacher's time</td>
<td>15.4</td>
<td>56.4</td>
<td>28.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Lead to students completing more work</td>
<td>15.4</td>
<td>53.8</td>
<td>30.8</td>
<td>0.0</td>
</tr>
<tr>
<td>Motivate students to enjoy learning</td>
<td>64.1</td>
<td>28.2</td>
<td>7.7</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Item 20 asked teachers: ‘What types of learning activities have you used computers for with students over the previous 12 months?’ The types of computer use which were used often were: word processing (64.1%), present information (66.7%), access information (82.1%) and to store information (64.1%) as shown in Table 4.3.

Table 4.3
**Types of Learning Activities Teacher Participants had Used Computers for With Students**

<table>
<thead>
<tr>
<th>Types of computer use</th>
<th>Often %</th>
<th>Sometimes %</th>
<th>Rarely %</th>
<th>Never %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Show a concept</td>
<td>35.9</td>
<td>41.0</td>
<td>7.7</td>
<td>15.4</td>
</tr>
<tr>
<td>Make a product</td>
<td>25.6</td>
<td>33.3</td>
<td>23.2</td>
<td>17.9</td>
</tr>
<tr>
<td>Provide a problem</td>
<td>20.5</td>
<td>41.1</td>
<td>20.5</td>
<td>17.9</td>
</tr>
<tr>
<td>Store information</td>
<td>64.1</td>
<td>28.2</td>
<td>2.6</td>
<td>5.1</td>
</tr>
<tr>
<td>Access information (e.g. Internet)</td>
<td>82.1</td>
<td>15.4</td>
<td>0.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Simulate an environment or an action</td>
<td>25.6</td>
<td>41.0</td>
<td>23.1</td>
<td>10.3</td>
</tr>
<tr>
<td>Analyse information (e.g. statistics, graphs)</td>
<td>25.6</td>
<td>41.0</td>
<td>23.1</td>
<td>10.3</td>
</tr>
<tr>
<td>Develop a skill (e.g. typing tables)</td>
<td>35.9</td>
<td>35.9</td>
<td>20.5</td>
<td>7.7</td>
</tr>
<tr>
<td>Present information (e.g. publishing, PowerPoint)</td>
<td>66.7</td>
<td>28.2</td>
<td>2.5</td>
<td>2.6</td>
</tr>
<tr>
<td>Word processing</td>
<td>64.1</td>
<td>28.2</td>
<td>2.6</td>
<td>5.1</td>
</tr>
</tbody>
</table>
Item 22 asked: “Do you think that computers can be used to improve student learning with your classes?” Teachers (92.3%) believed that computers could improve student learning. Item 35 questioned teachers’ own skills, knowledge and use of computers. A higher percentage of teachers believed they were intermediate users (61.5%), one third (33.3%) experienced users and the remaining minority (5.1%) novice users. Item 36 asked: ‘How do you feel when you support your students in using computers?’ Using a Likert-type scale: comfortable, confident, excited, proud, unsure or nervous, the majority (76.9%) of teachers could be said to feel comfortable in supporting students with the use of computers.

In summary teachers had an intermediate level of knowledge and use of computers, sought greater access to computers and believed that computers could be used to improve student learning. Teachers wanted to make more use of computers for learning and were predominately using ICT for word processing and accessing the Internet.

4.2.1 Qualitative aspects of the questionnaire

The annual questionnaire encouraged teachers to provide open-ended responses to Items One to Nine, 13 to 15, 17, 19, 26, and a final overall comment about the laptop program. These open ended questions enabled the participants to provide written responses about their own understanding(s) of the laptop program, and at the same time articulate their pedagogical knowledge, beliefs and understandings. Quotations use the letter A or B to indicate Cohort A or Cohort B, whereas the letter C refers to a class teacher. A number that identifies the student or teacher participant follows these letters. The last four digits indicate the year of the interview.

With reference to teacher experiences, the question was asked: (1) “How do you use laptops to support student learning?” Fourteen teacher participants expressed a view similar to Teacher Participant 60:

Mainly I try and use it as a support in terms of their learning. I try not to have it as the main focus and as something to supplement, to help with their learning. (C602012)

This quotation indicates that this classroom teacher in 2012 (Third year of the study) felt that when using technology in the classroom, it needed to be teacher
guided and have a clear purpose. This comment raises questions around the teacher’s role in terms of direction and guidance within the learning process. The importance of guidance by the teacher in both primary and secondary schools is paramount when considering the educational impact a lesson or experience may have on a student (Hattie, 2009).

4.2.2 Teacher support: Professional development

Teaching and learning communities do not form without guidance and support required to sustain the community (Burns, 2008; Dewey, 1943; Voulalas & Sharpe, 2005). The setting of the community that is the subject of research encompasses students, teachers, school leaders and parents who coexist for a shared common goal: improved education. A holistic approach to professional development is integral to the development of teacher participants, with the focus on pedagogy (Cardno, 2005). The literature also suggested (Fullan, 2001, 2008; Hargreaves, 1999; Rablin, 2006) that the provision of adequate and specific professional development is important.

Data were collected in quantitative and qualitative formats to determine teacher participants’ views about support in professional development. As discussed in Chapter Three, Item 27 was added to the annual questionnaire in the second year to allow further input into the area of professional development. Teacher participants responded to the Likert-type options: strongly agree, agree, don’t know, disagree, strongly disagree, for Item 27 (e): ‘The amount of ICT professional development has been adequate.’ Figure 4.4 shows the annual percentages for these five options. Data displayed an increase of 21.8 percentage points from the second year (34.0%) to the third year (55.8%) in the amount of professional development considered adequate. The options of disagree decreased by 11.6 percentage points in the second year (40.4%) to the third year (28.8%). It appeared that professional development began to improve gradually for teachers.
Similarly with the qualitative data, eight teachers expressed the view that professional development had continued to improve over time. The following examples also include a response from a leader at the School:

Yes, I think it is getting better, yes, I do. I think it is definitely better from 12 months ago. (CL472010) [Case study school leader]

No, I think it has been very positive. I think there is a lot of PD. It is good to get a grounding on things like the portal and other ICT areas. (C552012)

Yes, we have had a lot of PD from Charles [pseudonym] on development of specific programs such as, you know, the portal, ways of monitoring students in class. I think that has been ongoing, I think that has been very strong at the school for the last few years. (C552012)

There was a reference by a teacher and a leader about the importance of formalising the professional development program at the School. Both of these participants proposed that an accreditation method or linking to the performance management of teachers would encourage, or rather direct, the staff to essential components of learning for professional development:

I think what you hear is a lot of scuttlebutt about not being supported but then when you offer it without some sort of formal schedule, people will not turn up. You can always invent an excuse not to turn up, but if you are required to be there that is a different matter. So I think it should be formal. People will say, ‘Look, what we need is to have a pupil free day and just do that,’ but I think research shows that it does not
work. People will forget it very quickly. What you need is a regular thing, so yes, you are required to be at school at 7:30 am or whatever and just get it done. (C542012)

The strategic direction of the school, the infrastructure that we put in place, the PD that we do for staff. I think the PD we do for staff is really important, and the way in which we can continue to link that to the performance management, so staff are aware that, they have to, you know, whether it is walk around the classroom, whether it is constantly looking at students, whether it is having those conversations with kids about what they are doing, where they are going and what is expected of them. And I think that is again a whole school approach, which must be filtered down to each one of the classrooms. (CL462012)

A whole school approach for professional development emerged as a theme for improving teaching and learning with the use of ICT. The notion of professional development being targeted and relative to the needs of all teachers was viewed by the School leadership team as crucial.

4.3 Teacher Attitudes and Beliefs

This section presents the attitudes and beliefs of teachers in a range of areas: engaging students, physical and learning difficulties, tailoring learning, scaffolding learning, the promotion of active and authentic learning, learner independence and the role of a teacher.

4.3.1 Engaging students by motivation and challenge

Item three required teacher participants to indicate how often laptops were used to engage students by motivation and challenge. A shift towards lower scores over time was noted, although it was not statistically significant. It seems that, towards the end of the research, teachers no longer had a strong reliance on the laptop, and the students no longer saw the laptop as vital in terms of keeping them engaged. In Figure 4.5, and in the many figures of similar format that follow this study, the mean value is generally presented as a coloured symbol, and its corresponding 95% Confidence Interval (CI) is denoted as uncertainty bars.
Figure 4.5. Mean responses of teachers estimating the percentage of time laptops were used to engage students by motivation and challenge.

These results could indicate that the laptops had become embedded into the fabric of the school, and could also imply that the novelty factor of the device had waned over time. Teachers expressed this sentiment over the course of the study, as the laptop program had become the ‘norm’ of the day-to-day teaching and learning experience:

I think they have gone down. Not to ... they have not bottomed out. There was all this excitement about having this laptop. Well, now it is just this thing they carry around. So they like having it, they want to have it, but it is like any kid with a new toy – they love it and then the shine disappears and it is this thing. They would be lost without it, so the motivation has not gone back to normal but it is certainly not as high as it used to be. (C622012)

This decrease in the use of the laptop to motivate and challenge students does offer a different perspective to the literature, which suggests that laptops or mobile devices increase learner engagement (Keengwe et al., 2012; Mouza, 2008; Swan, Van 't Hooft, Kratcoski, & Unger, 2005). Chapter Seven discusses learner engagement in further detail.

4.3.2 Overcoming physical or learning difficulties

Item Nine required the teachers to indicate how often laptops were used to overcome physical disabilities or other (e.g. learning difficulties). The three year mean of 1.8, shown in Figure 4.6 suggests that the laptops were rarely used for this
purpose, and the change from first year to third year was statistically significant (One-Way ANOVA, p < 0.05).

![Graph showing mean responses of teachers estimating the percentage of time laptops were used to overcome physical disabilities or other (e.g., learning disabilities).]

Figure 4.6. Mean responses of teachers estimating the percentage of time laptops were used to overcome physical disabilities or other (e.g., learning disabilities).

While the quantitative data indicated that the laptops were not used for this item, the qualitative data suggests otherwise. Question One of the annual interviews asked: “How do you use laptops to support student learning?” Eleven teachers made reference to underutilised laptops at times in the area of learning disabilities; however, they were finding ways to use laptops for learning support:

Text edit help used by boys with dyslexia or dyspraxia on occasion. This is a choice they have. Two boys are now ‘typing up’ in class tasks and examinations in Year Ten. (C952012)

I have got two year seven classes, one class is really quite strong but the other one is full of IEP [Individual Education Plan] students so for them, they are very engaged on the laptop level, for them writing projects are very hard but when there is something that’s correcting their spelling they feel like they’ve achieved something. Whilst it is not the highest marks they will ever get, you know, compared to others, they do get it in on time. And it’s usually to some relatively good standard. Sometimes you have got to take it back and say, ‘tweak it a little bit.’ (C342012)

There was no mention in the qualitative data of laptops being used to help students with physical disabilities at the School.
4.3.3 Tailor learning or develop individualised learning pathways

Item Eight required teachers to respond how often teacher participants were using laptops to tailor learning or develop individualised learning pathways. When examining Figure 4.7 it suggests the use of the laptop to ‘tailor learning or develop individualised learning pathways’ was concentrated between the 5-10% and 10-25% percentile options, with an overall three year mean score of 2.4. These results would suggest teachers were using the laptops in a minimal capacity to tailor or differentiate learning.

![Figure 4.7. Mean responses of teachers estimating the percentage of teaching time laptops were used to tailor learning to the learner or develop individualised learning pathways.](image)

However, a different view emerged when teachers at the annual interviews were asked about their use of laptops to support learning. Twenty-eight teachers mentioned how they had used the laptops to tailor learning or provide a differentiated curriculum with the use of the laptops. For example:

I think that’s part of the best thing about the laptops is that it allows, especially top end kids, to go off in different directions with their own learning and follow their own interests in an area. Going off in many different directions amongst different students, and that's the sort of thing, which I think makes the laptops brilliant. (C612011)

This again is dependent on how well the teacher has differentiated his or her class. The laptop is merely a tool that both the teacher and the students can use. (C312012)
This is an important use. By tailoring the task to suit individual learning styles and abilities, the computer has a lot of apps and programs that can be tapped into. (C762012)

It means that the kids can work at their own pace and focus on challenging and extending themselves. Laptops are integral to doing that because if you use something like My Maths Online it’s got a support built in there and then anything that they still do not get, they have got me to float around the help them with. (C652012)

These comments suggest that the teachers showed an understanding of the importance of differentiating and tailoring learning for their students. It also appeared that with the use of the laptops, teachers were inventive in providing a range of opportunities for differentiation.

### 4.3.4 Scaffolding to support higher order thinking

Item Five required teachers to indicate how often laptops were used for scaffolding to support higher order thinking. Figure 4.8 shows a steady decline, although not statistically significant, it could suggest that teachers did not value the laptop or ICT as a tool for scaffolding to support higher order thinking. Teachers may have the view they have a better capacity to cater for student needs in this area and be the bridge that extends their students’ thinking.

![Figure 4.8. Mean responses of teachers estimating the percentage of teaching time laptops were used to provide scaffolding to support higher order thinking.](image)

Teachers mentioned that in providing support for the higher order tasks with the laptop there was an effort required to guide students. The effort was dependent
on the structure of the planned lesson and their level of confidence in the use of the laptops. Ertmer (2005) suggested that if teachers are more confident in using ICT, higher level use is more probable. There was a recognition that more of a focus on higher order thinking needed to be incorporated into their lesson structure:

Yes, it requires more teacher effort as well to guide them through. So, unless I guess the teacher is willing to try and push that element, yeah, you know, it can be a difficult process, but I, you know, try and do it at all times. (C502010)

I think when you are leading the higher order thinking, it generally comes down to how you structure it, lead them through the basic ideas and then get them to actually create something new out of what they have learnt. (C702011)

I look at the end result in, say, Year 12, and in my area where a lot of that higher order thinking is required in history. For example, with the need to sort of ... that analysing and evaluating that is really a core part of it, and I find it is a weakness of the boys coming through so therefore I think we have ... With the laptops I think it is something we can use to try and implement that a little bit earlier, and I think we have actually started to do that. (C622012)

These beliefs are similar to the view of Reid (2002) on the merit of ICT use, as it has the potential to change the traditional way of teaching, but at the same time requires teachers to become more creative and readjust their teaching approaches and strategies. Teacher participant C37 [English Teacher] expressed the view that the ‘multi-modal’ nature of delivering information digitally to supplement and enhance discussion was important:

With more multi-modal experiences for them to move away from writing or reading being just very one dimensional to being more realistic to the way they experience it outside of school. (C372011)

This multi-modal experience commonly resulted in more diverse and deeper questioning, which in turn made the lesson more appealing for students. Students responded to the wide-ranging nature of information, and showed evidence of thinking more independently and critically.

### 4.3.5 Promoting active learning and authentic assessment

The principle of active learning and authentic learning assessment involves challenging students with a range of real world scenarios (Carter, 2013). Item Two required teachers to indicate how often laptops were used to promote active learning and authentic assessment. Figure 4.9 shows an overall three year mean of 3.0 ± 0.2, indicating teachers tended towards the 10-25% percentile option.
During interviews, seven teachers mentioned examples of challenging their students with real world problems. The laptop was referred to as a ‘powerful tool’ enabling students to connect to a range of real world scenarios:

I like to look at it in terms of their transformational learning, and also the engagement. I’ve found because, in the United Nations, I will use it again next year, it’s a really powerful tool, because it taps into the emotional intelligence for the kids. I’ve included things like Caritas videos and those sorts of things as well, to get them to really look at what people are doing to try and make a difference in the world with all of those particular things, like poverty and infant mortality and HIV and those things. So we’ve taken a real world problem, and the Caritas videos which ties in with World Vision and the project compassion and those things that we do in service learning, has been quite powerful for them as well. (C382010)

This form of learning and assessment is well described by the word ‘active’ and could promote the view of Petrass (2008) who suggested that, the learner takes a dynamic and energetic role in his or her own education.

4.3.6 Increasing learner independence

Item Six of the questionnaire asked teachers to indicate how often laptops were used to increase learner independence. The results showed a three year mean score of 3.3 ± 0.2, placing teachers mainly between the 10% - 50% percentile options (see Figure 4.10).
Teachers shared a view of the value of independent learning in response to Question Five of the annual interviews: “How do you use ICT in the broader context of education?” Teachers considered that it was important for them to prepare and provide their students with opportunities to develop as independent learners:

Well, I guess they become, obviously, they become better independent learners, that’s for sure. I certainly find that as a teacher it’s certainly my role to introduce students, whether it’s to a website or to a piece of software and demonstrate the basics to them and then within 48 hours they’re showing me how to do things and I think that’s fantastic. (C522010)

I think really what we’re doing, and even this is before the use of the ICT, I think it’s just one of the important roles we have is preparing them for life after school, and their ability to become self-learners, independent learners. See, one of the wonderful things I think about the laptops and the use of the computers is that what it does enable us to do now is to very clearly give them the skills to be able to find out just about anything they want to once they left school and they’re not being directed by anyone, they’re not being supervised and they can actually go and find out whatever they need to. (C602012)

Teachers discerned less peer-to-peer communicative interaction in the classroom. The following comments indicate that laptops had created an environment where students were focussed on independent learning, rather than discussion:

The social aspect of boys now, of the students has definitely changed. I don’t want to say they’re hiding behind the machines but their ability to socialise has definitely decreased. I have found. Their ability to actually be, you know, to verbalise stuff, it
has definitely come down. I’ve seen it over the last three years myself, and I think that’s somewhere they need, that’s why we do a lot of public speaking, we do a lot of presentations and we do a lot of group work, well, I do anyway because, you know, I still want them to get that talking amongst themselves rather than just sitting behind a laptop. (C692011)

I think the interaction is less, yeah, I think the discussion, conversation between them is perhaps less, unless it is encouraged and explicitly said, ‘Look, make sure you’re talking and discussing things.’ (C432012)

These comments would suggest that possibly at the expense of more cooperative social behaviour in the classroom, teachers were using laptops to increase learner independence.

### 4.3.7 Teacher communication as a facilitator

Question eight of the annual interviews asked: “What do you see as your main role(s) when using laptops with your classes?” A total of 37 teachers responded with 46 types of responses over the three years. Using the coding considerations as identified by Lofland and Lofland (1995, p. 186), and described further in the Methodology chapter, the responses were narrowed to five categories. These being: facilitating, teaching skills, guiding/mentoring, engaging, and trouble shooting. Figure 4.11 presents the distribution of the teacher participant role responses.

![Figure 4.11. Teacher participants’ responses describing their roles as a teacher.](image)
Of the 37 teachers, most (16) described their role could be best described as a facilitator. Another eight felt that they were there to teach skills, with the remaining 13 stating that they were there to guide/mentor, engage, and trouble shoot for the students:

I think a facilitator. I think it’s more being there and making sure that they’re on track, like a facilitator would mainly in a meeting, make sure that everyone’s on track and that it runs on time. But, I think also just making sure everyone’s okay. (C352010)

I generally do a brief overview to start with and then I’m more a facilitator to them engaging themselves and I just go around one by one and assist the students. (C642011)

Mainly as a ... what can I say? As a facilitator. More in terms of trying to answer questions about how they go about the process and clearing up if there’s any misunderstandings about what the task is or what they have to do, that sort of thing. (C642011)

Teachers views remained consistent over the period of the study. They recognised that, with the introduction of a laptop program, their roles focused on making sure that they could guide their students and provide support to perform their desired lesson outcomes. This view is shared by Cheng (2001) who reports that the role of teaching is to facilitate support for students’ learning.

The next five sections of the chapter will report on how teachers used laptops for learning within the ICT capability learning continuum. Each section is classified into the following five interrelated organising elements of the continuum: managing and operating with ICT, investigating with ICT, creating with ICT, communicating with ICT, and applying social and ethical protocols and practices when using ICT (ACARA, 2010a).

4.4 Managing and Operating ICT

The managing and operating requirements of using ICT within the 1:1 laptop School are now presented with examples of laptop use. The School could be defined as a highly ICT-resourced school from a hardware, technical and support perspective, in wake of the ‘Digital Education Revolution’ (DEEWR, 2009). However, this level of resourcing does not infer that the staff at this school are more inclined to work at a higher level in terms of their capacity to integrate ICT. Item 10 required teachers to choose descriptors that best described the way in which they
used ICT (see Table 4.4). There were no reported cases of teachers responding to: ‘I am aware that ICT can be used to support student learning but have not used it – perhaps avoiding it’. There was an increase of 15.6 percentage points between the first year (22.9%) and third year (38.5%) in teachers responses for: ‘I think about the laptop as a tool to help me and am no longer concerned about it as a technology. I can use it in many applications and as an instructional aid.’

Table 4.4
Teacher Participants’ Selection of Descriptions of the Way in Which they Use ICT

<table>
<thead>
<tr>
<th>ICT descriptors</th>
<th>First Year (n = 35)</th>
<th>Second Year (n = 47)</th>
<th>Third Year (n = 52)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am aware that ICT can be used to support student learning but have not used it - perhaps avoiding it</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>I am currently trying to learn the basics. I am often frustrated using laptops. I lack confidence using laptops</td>
<td>2.9</td>
<td>2.1</td>
<td>0.0</td>
</tr>
<tr>
<td>I am beginning to understand the process of using ICT and can think of specific tasks in which it might be useful</td>
<td>5.7</td>
<td>10.6</td>
<td>5.8</td>
</tr>
<tr>
<td>I am gaining a sense of confidence in using the laptop for specific tasks. I am starting to feel comfortable using the laptop.</td>
<td>17.1</td>
<td>10.6</td>
<td>11.5</td>
</tr>
<tr>
<td>I think about the laptop as a tool to help me and am no longer concerned about it as a technology. I can use it in many applications and as an instructional aid.</td>
<td>22.9</td>
<td>34.0</td>
<td>38.5</td>
</tr>
<tr>
<td>I can apply what I know about ICT in the classroom. I am able to facilitate its use as a learning tool and integrate it into the curriculum</td>
<td>37.1</td>
<td>36.2</td>
<td>32.7</td>
</tr>
<tr>
<td>ICT has transformed the way in which I facilitate student learning</td>
<td>14.3</td>
<td>6.4</td>
<td>11.5</td>
</tr>
</tbody>
</table>

In summary, the data gathered indicates that the teachers were comfortable in using ICT and were making slight adjustments in the way they go about teaching each day with their developing skillset. The laptop environment and teacher skillsets are captured by the following comments made by teachers who take into account the use of ICT as a part of their pedagogical knowledge (Mishra & Koehler, 2006):

Teachers need to be accepting that their role in the classroom has changed. Although, you know, there is some basic management skills that need to be adhered to regarding whatever activity you are doing in the classroom. I think teachers need to sort of let go a little bit of being that keeper of all knowledge, you do not necessarily need to do that, and the learning process can still be a success. (C522010)
Our role and I think that does subtly start to change because now it becomes much more a question of okay, how do we facilitate them to be able to discern between what is truth and what is fiction, what is relevant, what is not relevant. (C602011)

I think as a teacher it’s very important to know, okay, what ... our job is to keep them engaged. If we teach in the way how we were taught back then that would never get the boys ... the students to be ... they will never engage and we will never get their attention. (C312012)

Teachers’ managing and operating use of ICT, and specifically of laptops, need to be viewed realistically in terms of their own ICT skill set. This is similar to the view shared by Jordan (2011, p. 427):

While learners are commonly represented as tech-savvy, and as expectant of using ICT in their learning, this is not the way teachers are usually represented. In the main, teachers are depicted as ‘lagging behind’, both in acquiring ICT skills and in using them in the classroom practice.

Teachers supported the view that they needed to develop their required knowledge and skills in ICT to enable a smooth integration of the laptop program in their teaching. The view was also noted in the literature of Wastiau et al. (2013). At the same time, there was also an understanding that it was hard for some teachers to change and embrace the use of the 1:1 laptop program:

I think there are always people that are reluctant to change, because why change, we’ve done this for X amount of years. I tend to swing the other way and say, ‘Well, is it the most effective way to do it, or is it just the fact that it’s easier to do it this way?’ And pretty much from the staff, you get some resistance, but I think they are going to be left behind, and actually they are going to put themselves behind the eight ball, because if they do not, it is either well, we would like you to come, but if you do not, you are going to be back here, the kids are going to be expecting here, and you are going to be delivering back where you are... (C352010)

Kennewell and Beauchamp (2003) suggested the pace of change for some teachers can vary depending on their degree of confidence and ability with the use of laptops for learning.

### 4.4.1 Personal use of laptops

Item 18 required teachers to best represent their laptop use from a selection of eight types of laptop uses as seen in Table 4.5. Results for Item 18 in the annual questionnaire indicated that the teachers engaged in the following activities on an everyday basis: email 99.0%, surfing the web 76.3%, and word processing and PowerPoint 81.4% (three year mean).
Table 4.5
*Teacher Participants Three Year Mean Representing Laptop Use for the Eight Activities in Item 18*

<table>
<thead>
<tr>
<th>Types of laptop use</th>
<th>Everyday</th>
<th>Two - three times a week</th>
<th>Every two weeks</th>
<th>Once a month</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surfing the web</td>
<td>76.3</td>
<td>19.7</td>
<td>1.4</td>
<td>1.0</td>
<td>1.6</td>
</tr>
<tr>
<td>Email</td>
<td>99.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Instant messaging/MSN</td>
<td>4.8</td>
<td>4.7</td>
<td>2.0</td>
<td>29.8</td>
<td>83.6</td>
</tr>
<tr>
<td>Webcam chatting</td>
<td>0.0</td>
<td>5.6</td>
<td>9.9</td>
<td>32.2</td>
<td>74.3</td>
</tr>
<tr>
<td>Social media</td>
<td>10.2</td>
<td>16.7</td>
<td>8.1</td>
<td>13.0</td>
<td>51.9</td>
</tr>
<tr>
<td>Watching/sharing information (e.g. YouTube)</td>
<td>8.2</td>
<td>40.7</td>
<td>25.3</td>
<td>15.7</td>
<td>10.1</td>
</tr>
<tr>
<td>Word processing/PowerPoint</td>
<td>81.4</td>
<td>14.0</td>
<td>1.6</td>
<td>1.3</td>
<td>1.7</td>
</tr>
<tr>
<td>Playing games</td>
<td>2.7</td>
<td>3.6</td>
<td>7.0</td>
<td>12.9</td>
<td>73.8</td>
</tr>
</tbody>
</table>

These activities can be best described as professional productivity (Johnson, 2012). However, of interest was the steady increase in the use of YouTube by teacher participants in the *everyday* option over the three year study (see Figure 4.12).

*Figure 4.12. Teacher participants reported use of YouTube from the first year to third year.*

In the first year for the *everyday* option, 2.9% of teachers indicated that they used YouTube; in the second year 6.4% did so, and in the third year 15.4%. Teachers
indicated they saw a place for YouTube in education, and it was something they were more than comfortable in using to enhance their lesson:

I feel more comfortable in using YouTube within my lesson. I spend some time prior to a lesson viewing the video and then use when it is required. An example of this for my English lesson is we watched the Sir Ken Robinson TED talks about education. This really helped in providing a starting point for our discussion about education. (C372012)

With the notion of 24/7 classrooms, the study was also interested in the detailed changes in the teachers’ teaching capacity post-school hours. Teacher participant C59 indicated that the contact between the teacher and student had become more apparent. The use of a smartphone was an example of how technology had opened up the lines of communication between teacher and student. This view is consistent with Young’s (2011) beliefs about teacher use of smartphones as part of learning.

Absolutely. I get e-mails from children late at night that I can check on my iPhone, and like that little Kobe [Pseudonym] when he was having difficulties at home, the e-mail was a lifeline. (C592012)

This example of email interaction between student and teacher could be viewed as problematic. It asks the question why a student would be up late at night having to ask for help, and subsequently, is such late night interaction appropriate for both teachers and students. Notably, it highlights the ramifications for a contemporary 21st century teacher having to manage their workload. When to check and respond to emails due to the convenience of having multiple devices that are portable and easy to access becomes an issue for teachers. Therefore, finding a balance becomes important for teachers when they are away from the rigours of a school environment.

Item 20 required teachers to select the type of smartphone they owned. By the third year, the proportion of teachers who owned smartphones had grown from 44.7% to 57.7%, with only 25.0% of teachers (n = 52: total number in the third year) reporting not having a smartphone. Apple’s iPhone was the most popular type of smartphone (with 57.5% of all respondents owning one), with the remaining 17.5% of smartphones shared by five other brands (HTC, LG, Nokia, Samsung and Sony Ericsson).
4.4.2 Tools to increase student productivity

Item Four required teachers to indicate how often laptops were used as tools to increase productivity. With a three year mean score of 3.2 ± 0.2 recorded, the data would suggest laptops were predominately used by teachers in the 10-25% percentile option (see Figure 4.13).

![Figure 4.13](image)

**Figure 4.13.** Mean responses of teachers estimating the percentage of time laptops were used to provide tools to increase student productivity.

A theme that emerged in response to this item was the type of tools that enhanced student productivity. Seventeen teachers believed the laptop provided the students a range of tools to increase productivity with improved access to online content and programs, word processing, using spreadsheets for mathematics and helping to improve organisational skills. For example:

They have much more access to things like dictionaries and thesaurus and programs that teach them grammar and spelling and all of those things. Where as previously they may have been reluctant to check. (C372010)

Instead of the two or three pictures that typically may have been in a textbook, they are able to go into a lot deeper information by accessing online content available to them on the laptop. (C352010)

So even things like collecting data, you can have a spreadsheet which has got, let’s say it’s got a formula in it which says ran between 1 and 6, so it’s just generating the numbers on a die, and you do that in two columns and then you just simply drag it down, let’s say, 200 times and then draw a graph. Now that process takes a minute. Now compare that to having two die in your hands and one kid rolling it and another kid recording it and then transcribing it to a table and then drawing up the histogram.
That’s two or three lessons work and it used to be, and at the end of it, the distribution looks the same, the educational value of that is the same but it’s just that you’re able to focus on then, okay, what happens if we extend that to three dice or four dice. You can not do that manually but you can do it very easily on a spreadsheet. (C542011)

I also find it a very good way of organising boys in particular, so setting up folder systems where they can store documents easily. I find that having their textbooks in PDF on the laptops means they don’t lose them, it doesn’t get damaged, so there’s two streams: one for enhancing learning but the other hand also keep them organised so that they spend more being productive on the learning task rather than trying to find things. (C622012)

These responses indicate that between the first year and the third year of the study teachers held the view laptops assisted students to increase productivity. Using laptops for learning provided options other than having to rely on visiting the library, using a calculator or pen and paper. Additionally, laptops enabled students to access electronic texts, which were more convenient than a textbook, possibly cheaper, included a search facility, and included interactive questions and exercises.

### 4.4.3 Teacher ICT skills and competencies

Item 16 of the annual questionnaire ascertained the teachers’ skills and competencies in the use of ICT. It is known that knowledge of ICT is an important skill for teachers to have in the digital age (Krumsvik, 2008; Perrotta, 2013; Voogt et al., 2013). With this understanding it is vital for teachers to have a range of skills that help them be a part of this digital landscape (Wikan & Molster, 2011). For example, in the case of the item word processing, the instrument comprised multiple categories to display their abilities: cannot do much (Limited), and can format a document, change fonts, spell check, insert text, add footer and page numbers (Basic). Two further categories included: can insert images, create tables, change page setup, change margins (Competent), and use columns and sections, set up styles, use mail merge (Advanced). The purpose for using this scale was to help the teachers to consider their personal ability or range of capabilities in the limited to advanced options. The information provided by the teachers summarises their skillsets.

Figure 4.14 shows the percentage of teacher participants rating themselves in each of the 11 ICT use applications over the three years of the study. The most frequently reported uses of computers by students in published studies (Penuel, 2006) included: word processing, spreadsheets, PowerPoint/Keynote/presentations, email, computer file management, Internet, Web page authoring, digital
photography, image editing, blogs and wikis, and video editing/podcasting/movie making.

Figure 4.14. Teacher participants self assessment of operational skills across 11 ICT applications.

These 11 commonly used applications of ICT link to teaching and learning in schools. They were used at the School to gauge the skills that are required by a teacher. There is a view held that the lack of ICT-related knowledge of teachers can be an obstacle to the use of technology or the application of ICT skills (Pelgrum, 2002).

Teachers generally made a positive gradual progression over time, advancing across the options of: limited, basic, competent and advanced competency. Ten of the 11 applications experienced positive growth, especially the advanced option in the areas of word processing (23.4%), email (19.8%), Internet (13.9%) and spreadsheets (10.6%). Areas that experienced lower growth in the advanced category were: web page authoring (5.7%), image editing (4.1%), and digital photography (2.4%). Web 2.0 tools (blogs and wikis) were the only application that registered a negative movement at -1.8%.
Teachers, therefore, over the course of the research demonstrated an upward trend in most of the 11 applications and could be summarised as having:

- an advanced to competent understanding of the use of word processing (creating with ICT), email and the Internet (investigating with ICT);
- a basic understanding of the use of Web 2.0 tools (blogs and wikis) (communicating with ICT, and video editing/web page authoring/podcasting/movie making (creating with ICT); and
- improved their own level of ICT competency in the 11 applications since the start of the laptop program (managing and operating with ICT).

The following excerpt with CL47, a member of the School leadership team, shared a view of the gradual and steady improvement in general teacher operational use of the laptops for teaching and learning:

I think it is becoming better. I mean, we have the ability now to relate to more data, more quickly, and we do that through a whole range of new mechanisms like the portal, our e-reporting, our keystroke reporting, the ability to monitor what students are doing by Casper [Endpoint management system for managing Apple devices]. So all those aspects have allowed teachers to dig a lot deeper and see what students are doing and how they are going about their business with the ICT. So it is almost like the students have forced the teachers to develop their own skill set. So I think that we are certainly ahead of where we were. I think if you were to take a snapshot of the teachers’ skill-set now and say has it developed exponentially over three years, I would say no. It has been a fairly moderate lineal increase but it certainly is increasing. (CL472012)

Another area of change that was noticed since the implementation of the 1:1 laptop program was teacher use of the School portal. The School portal was developed by an external IT solutions company using SharePoint, as a platform for information provision to students and parents. Teachers were using this as a platform to distribute course content and also upload assessment results. Between the first year and third year of the study, 18 teachers had mentioned the use of the portal when operating with ICT:

I have got easy access, I can either put it onto the portal for student downloads and that whole delivery of instruction from my perspective as a teacher, works a lot easier. The portal enables me to put information up regularly, and I also use it for the online reporting. (C532012)
The School portal served as another medium for teachers to operate with ICT regularly. The section Communicating with ICT discusses the use of the portal in further detail.

4.5 Investigating with ICT

The following section uses the following three LEA: investigating reality and building knowledge, laptops as a research tool, and for assessment as a focus for investigating with ICT.

4.5.1 Investigating reality and building knowledge

Six teachers offered comments during interviews that laptops were useful as a tool for helping students to investigate and carry out independent or assisted research. Examples include:

They can learn so much more and they get so much more out of laptops. They get more interested in it and they get to express themselves in individual ways. Also, it builds on what you’re teaching and where you finish off the children can take over, and also the boys can, they can learn from each other and learn new things to apply to their projects. (C442010)

Laptops are a good investigation tool. They allow students to research and find answers to questions ranging from inferential to evaluative questions. (C572012)

Item One of the annual questionnaire required the teachers to indicate how often laptops were used to investigate reality and build knowledge. Figure 4.15 shows a three year mean score of 3.1 ± 0.2. The results suggest that the 10-25% percentile option remained stable between the first year and third year.
Figure 4.15. Mean responses of teachers estimating the percentage of time laptops were used to investigate reality and build knowledge.

Investigate reality and build knowledge were terms used by teachers to describe how the laptops were used as a research tool to search and uncover information for learning – i.e. investigating with ICT.

4.5.2 Laptops as a research tool

Question one of the annual interviews asked: “How do you use laptops to support student learning?” Teachers indicated that they used the laptops predominantly as a research tool and to help students to produce work. The term “research” was mentioned 35 times by 31 of the teachers. For example:

I guess the main purpose is always try to use it to engage the boys. For research would be a main purpose. (C672011)

We use the laptops primarily in my classes, use them as a research device and as a viewing tool. So that is for students to research some of the concepts that we are studying in class, to try extra bits of information and to view some of the other extra sort of materials like YouTube they might be using. They might be researching posters, film posters, news photography, those types of things. (C552012)

These responses imply that from the first year to the third year of the study the teachers held the stable view that the laptop was a powerful research tool enabling students to access and acquire knowledge quickly and when required. Accessing the Internet was also a common theme that emerged as 25 teachers indicated they used it regularly:
Again research based. I use it mainly for the Internet because at the tip of your hands you’ll have a wealth of resources and information. Personally when I’m teaching I will use it for documentary purposes. You can pick things off YouTube, you can show things, images, which before I could only just speak about and describe.  
(C322010)

The notion of the laptop being used as a tool for inquiry, in particular research, resonated with teachers. Accessing the Internet was widely used for teaching and learning.

**4.5.3 Laptops for assessment**

Over the three year period of the study, views about assessment were prominent in the annual interviews. Two specific questions in annual interviews draw responses about assessment. Question Six asked teachers: “Have you assessed work that students have done with laptops and how has this been included with your overall assessment process?” The majority of teachers (31) indicated that they had assessed work that students had made using their laptops. Question Seven required teachers to respond to: “How important is the use of laptops to your assessment process?” Most teachers (28) felt that it was important and a part of their assessment process:

> It’s an integral part of it; it is part and parcel of how we assess now. (C372012)

> Eight teachers shared the view that assessment was not a major focus nor critically important. However, teachers felt that there would be a greater number of possibilities for using laptops for assessment in the future:

> It’s not of primary importance at the moment, but I think that will change. (C392010)

> I guess it’s going to be more important as I get better at assessing with laptops. (C422010)

In response to Question Six and Seven, teachers generally referred to five types of assessment. These assessments were: written (word-processed) pieces of work (23), presentations (14), online (10), assignments (9), and investigations (9), Figure 4.16 shows the coded responses for the five assessment types.
It was evident that teachers were using written documents, presentations, online assessments and assignments regularly for assessment with laptops.
Assignments and homework tasks were classified as take-home and complete projects:

[Written documents] I think the majority of assessments are still written in the in-class assessments, but I mean, I do require most ... Sorry, most assessments in class are written, however, most assignments I ask to be typed up and an electronic copy of it emailed or typed up. So it’s vital, I would say. Although the in-class component is still written. (C572012)

[Presentations] Most assessments that we do bar probably two a year, particularly in English and Religion are done using the ICT. And not just word processing but, you know multimodal PowerPoint presentation. (C432012)

[Online] Mathematics, for example. That’s the beauty with this one is we have this book that we use from Jacaranda Plus and then with it comes with this assessment called Assess On. With Assess On I can set a test for the boys and then ... multiple choice of course, and then send it out to the boys, assign it at a certain time, and assess at a certain time as well. It’s amazing because at the end of that session, let’s say if a boy fails to submit a test, it will auto-submit, and then at the end of that session, the boys can then check what they got and they can also ... it’s immediate like that, it’s really, really fast, and they can check where they went wrong and what the correct answer is and it explains to them why their answer was wrong. (C312012)

[Assignments] The other thing that we did was we’ve done a few different assignments where they were typed up and submitted to the portal pages. (C652012)
There appeared to be an interest with teachers using online assessments. Ten teachers were using online sites such as Maths Online to set up homework modules. These provided quick summative assessments and at the same time gave formative information about where the students were at that point in time:

First in terms of immediate feedback to their students but also the scaffolding that surrounds it. So students using things like, My Maths Online where the teacher can set a homework module, where that homework module has a set amount of time to work, to do that homework in and then when the reports are generated are quite diagnostic and go back to the student and to the teacher. They are very good. And, you know, we’ve had a year of transition onto that and I would expect that that would be even bigger news next year. (C542012)

By the third year of the study, teachers had shown an incremental change in how they were using laptops for online assessment. Previously in the first year and second year, feedback had indicated that laptop use for assessment had focused on lower order tasks. These being tasks such as investigating a research topic or responding to a particular subject area covered at the School. Teachers over time had become open to using laptops as an online assessment tool:

I have used Socrative [student response system] as an assessment tool. That is more likely at the end of the unit thing to test their understanding. A couple of times I have used it as an informal thing as well, just for them to be aware what Socrative is all about and how to use it. (C562012)

Despite this, there was still a mention of the difficulty associated with online assessment and feedback. This example demonstrates how this teacher participant provided feedback for students:

It works well, it’s worked well, it’s the first year we’ve done it this year so we assess their style, their contribution and their effort in keeping the blogs going and starting their own threads. Students still use Dropbox to give us assessments and to put them online. I find it very hard as a teacher of 20 years, I find it hard to actually.... I like writing prolific comments on the students’ writing so that the page is covered in red and I find that far more difficult to do when they’re submitting electronic versions of their work than hard copies. So I tend to lean towards students giving me hard copies so I can give them better feedback. (C552012)

Four teachers saw a contradiction between online assessment at school with a perceived culture in higher education that supported written examinations. These teachers shared a view of the importance of pen-in-hand to practice for those assessments that did not need a laptop, referring to examinations where the use of a pen was non-negotiable:
When it comes to assessment I still believe that pen in hand time is important so do not use a laptop, more pen and paper tests. The laptop is great, however let’s face it most of if not all of university assessments [examinations] are all hand written - and here we are asking them to do assessments on the laptops. It is a bit of a concern or should I say contradiction. (C582012)

Teachers do find themselves in quite a dilemma when having to use laptops for learning. On the one hand, there is a big push by the Australian Government and its relevant education agencies to send out the message to use ICT effectively and incorporated with other learning competencies (DEEWR, 2009). On the other hand, schools have to be cognisant of the required curriculum and the traditional nature of the end of unit, semester or year testing, where examinations are all hand written (Hennessy et al., 2005).

### 4.6 Creating with ICT

Question two of the annual interviews asked teachers: “What are the main purposes for you to use ICT with your students?” Teachers interviewed, responded with the following eight types of activities:

- word processing documents;
- mind maps;
- movies and podcasts;
- music;
- portal pages;
- presentations;
- images, animations and multimedia; and,
- spreadsheets, graphs, charts and tables.

Responses were coded into these eight areas between the first year and the third year, and are shown in the radar graph in Figure 4.17.
A total of 25 teachers indicated that they created documents using word processing packages such as Word or Pages. These documents were specific to learning areas for students to complete or use as references for learning:

I regularly use a word processing program to create documents for my classes. If it is a rubric for a learning task or information that I require them to read, I find myself regularly creating these documents. (C442010)

Creating presentations was another frequently used method, with 17 teachers responding to the creating with ICT skill. Teacher participants reported that they created Keynote or PowerPoint presentations for the delivery of lessons regularly:

I do use a lot of Keynote presentations to start a lesson or introduce a theme. This helps to focus the students and also engage them, instead of me just talking. (C312012)

So term four, this term, I used a lot of PowerPoint presentation compared to semester one, and that’s for Year Nine’s. (C562012)

For specific ICT-based learning, laptops were used to demonstrate student creativity at a higher level with 13 teachers’ citing examples of creating animations, images and multimedia. The following excerpt is from an Integrated Computing teacher from the second year of the study, who extensively used Adobe packages:

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**Figure 4.17.** Teacher participants coded responses between the first year and third year for creating with ICT.
For Year Eight’s [Cohort B], definitely to create and explore, obviously we have a range of programs in the Adobe packages that we use extensively and also we’ve tried to explore building apps down that path. (C502011)

Seven teachers indicated they created portal pages for students to access for learning. The School portal was used reasonably well by teachers for uploading these documents for students to access:

I’ve got easy access, I can either put it onto the portal that I created for student downloads and that whole delivery of instruction from my perspective as a teacher, works a lot easier. The portal enables me to put information up regularly and I also use it for the online reporting. (C532012)

Teachers cited an extensive set of examples of students using ICT to create work. The creation of documents and presentations were the two most common reported examples of creating with ICT. Creating movies and podcast, and images and animations also emerged as the study progressed.

### 4.7 Communicating with ICT

The structure of the following section has a focus on the use of the School portal, the utilisation of laptops for collaboration or cooperation, and the use of email as a mode of communication.

#### 4.7.1 Portal communication

Seventeen teachers indicated the use of the School portal as an important mode of communication with students. The portal enabled teachers to create content and then distribute it for student access:

Also through the portal, so if I put documents, worksheets, things like that on the portal rather than giving a printed copy or editable worksheets up on there, it is very useful as well. (C652012)

This use of the portal was more notable in the third year of the study. The School had placed a considerable focus in the development and implementation of a new and improved portal. The implementation took place at the end of the second year and was operational at the start of the third year.
4.7.2 Collaboration or cooperation

Item Seven required teacher participants to indicate how often laptops were used to increase collaboration or cooperation. The mean scores declined somewhat from the first year (2.8 ± 0.2) to the third year (2.4 ± 0.3), although it was not statistically significant. The three year mean score of 2.5 ± 0.2, indicates teacher use of laptops for collaboration and cooperation were between the 5-10% and 10-25% percentile options (see Figure 4.18).

![Figure 4.18. Mean responses of teachers estimating the percentage of time laptops were used to increase collaboration or cooperation.](image)

The utilisation of collaborative tools could be dependent upon the availability of appropriate software, suitable topics, and space within the syllabus. The qualitative data supports this assertion:

I think it has ... Harping back to that collaboration thing, I think it ... Maybe, I don’t know, it may have made them a little bit less collaborative in a sense, probably, they’re more focussed on their screen and what they're doing, and so therefore, you know, when we come for the obligatory class discussion, lids down, I find there’s not a lot of interest in doing that, you know. (C602012)

There’s sometimes perhaps a bit less engagement within groups and perhaps less partner work, you know, the cooperative learning strategies that aren’t being perhaps used but whether or not that’s a laptop issue or whether that’s a senior school mentality issue, I don’t know. (C232012)
Teachers revealed apprehension in the use of social media for communication during lessons. There was a recognition that students were communicating online, though it was not being encouraged at the School:

I mean, the interaction with other students online is not so much something I am encouraging boys to do, but they obviously have that interest and that push and I think some are in this new version of the web. That is going to be part of it with me, that I'm not a native user and I can’t feel comfortable with Twittering something or in terms of sharing it with someone else and getting it back even though I tried it in certain ways with online sort of tasks and so on. (C532012)

There were no examples of social media such as Facebook or Twitter being used for learning by teachers to communicate with students. The School did not support social communication tools being used on campus.

### 4.7.3 Email

One mode of communication that teachers did use with their laptops was email. Unrestricted email communication between students, teachers and parents was organised via the School server. Twenty-four teachers indicated that they felt comfortable with this mode of communicating with ICT and reported using it with their students:

I do not mind communicating with them and I find that somehow also it gives me the chance to encourage them. I have on occasion maybe sent back an e-mail that encourages them and congratulates them, just a small little message that maybe sometimes we do not get enough of an opportunity to do face to face because in a busy classroom it does not always happen. (C372012)

Therefore, communicating with ICT in most instances was by students accessing the school portal or via email between the teacher and student. Social media had not played a part in communicating with ICT for teacher participants.

### 4.8 Applying Social and Ethical Protocols and Practices when Using ICT

As stipulated in the Statements for learning for ICT (MCEETYA, 2006) and the ICT capability in the Australian Curriculum (ACARA, 2010a), there is a need to understand the role of ICT in society and the impact it can have on all users. Sherratt, Rogerson, and Fairweather (2005) highlighted that raising student understanding of the topic is not always clear. As the research progressed teachers became
increasingly aware of the need for students to use their laptops responsibly. There was a clear message being conveyed by teachers about being responsible online members and users of ICT:

I just see it equivalent to, like, literacy standards, like, you’ve got numeracy and literacy and now you’ve got IT standards that are sort of to be an acceptable member of an online community or a producer rather than just receiver. I mean, this whole idea of taking someone else’s work … not necessarily plagiarism aspect but certainly I couldn't do that myself and you say, ‘Why couldn't you communicate this to others? Why couldn't you put it out there?’ Whether it’s just on our portal for others to share, well, why is it just a passive device for you, you’re at the end of a very long funnel. That was basically where I see these boys having to be at their place in society in the future. (C532012)

In terms of what they’re getting associated with, in terms of knowing right from wrong, the ethical balance. That’s not necessarily a classroom issue but certainly if they’re doing that within a class at the time when they’re online doing something else then that’s just an issue of how they present themselves to the web and the community and where their footprint’s going to be, all over the place for years to come. (C632012).

These sentiments portrayed a view about how to use ICT ethically not just in the School environment, but also amongst the broader community.

4.8.1 Issue: Plagiarism

An example of an ethical issue to emerge since the implementation of the 1:1 laptop program was breach of copyright. When conducting a text search query in NVivo for the words ‘cut and paste’ and ‘plagiarism’, six of the teachers mentioned these terms in their respective interviews over the three year period of the study:

Well, it’s a problem with Year Seven because it’s so observable now they have got this laptop at their fingertips. I think the younger years, seven’s and eight’s still have this issue because we are striving for better results. How do we get the better results if I am limited in my vocabulary, just cut and paste. Or if my time is too precious, cut and paste. So that is the issue we have. And that is the problem we will have with something so at your fingertips. It is so much at your fingertips. And as distinct, like if we were little kids and we were writing, handwriting something like that, why would you handwrite a whole lot of boring gibberish, it is too hard for us to spell, but with laptops it is cut and paste. It is instantaneous. And that is the problem we face. (C322010)

My concern is that the level of plagiarism is still too high, and that is plagiarising from the Internet mainly but also the potential to plagiarise from other students (C612011).

There were two teachers who mentioned plagiarism in the third year. In terms of the research and the creation of authentic work, it became evident teachers shared
a concern about the use of the Internet and plagiarism. With greater access to the Internet, Ma, Wan, and Lu (2008) suggested that there seems to be a link to the deterioration of ethics.

### 4.8.2 Issues: Distractions

The potential for distraction was a concern to teachers, with 56 references made by 29 teachers over the course of the study. The following examples demonstrate teacher concerns:

Some are always off task unless you’re standing behind them. C512010

It was a big challenge and even the best students, the most focussed students have admitted to being very easily distracted and tempted to browse unnecessary things online or open up a program and play a game online or do things that are not really task specific. (C372011)

In the first year, the annual teacher questionnaire did not have the subject of computer games included within the questionnaire. However, after the collection of data in the first year, playing computer games and off-task behaviours appeared as a theme of the research and was therefore included as a question in the second and third years of the questionnaire. Figure 4.19 demonstrates an increase of 19.8 percentage points in Item 27 (d) from the second year to the third year, with teachers indicating that playing computer games in class was still a problem.
Of significance is that in the third year only 1.9% of teachers responded with ‘don’t know’. This reinforced the view shared by teachers during interviewing that playing computer games continued to occur in classes. It is likely over time teachers became wiser to off-task behaviour, and this could have been responsible for the increase in perceptions between the second year and third year that students played computer games in class.

With the emergence of playing games and the associated distractive behaviours that can be related to the use of a laptop (e.g. frivolous Internet searches, being side-tracked using widgets and other applications), the School introduced a revised framework for acceptable ICT use at the commencement of the second year of the research. Item 27 (c) required teachers to respond to the Likert-type scale of: strongly agree, agree, don’t know, disagree and strongly disagree, for the item: ‘Implementing a clear framework for acceptable ICT use has improved the classroom dynamic.’ A total of 57.4% of the teachers in the second year agreed that the introduction of the framework had improved the classroom dynamics as seen in Figure 4.20. This decreased in the third year by 7.4 percentage points to 50.0%. In the third year there were 13.5% of teachers who disagreed about the impact of the framework, which was an increase of 9.2 percentage points from the second year to third year.
Figure 4.20. Extent to which teacher participants’ agreed or disagreed with the statement: ‘Implementing a clear framework for acceptable ICT use has improved the classroom dynamic.’

Nine teachers recognised gaming and other non-related learning activities (e.g., social media) as a distraction initially; however, over time this interpretation diminished due to a range of initiatives by the School and also the new skill sets acquired by the teachers. Teachers had become better prepared and aware of the off-task behaviours, and applied more practical solutions in their classrooms:

Well, I’ve got, like, a U-shaped classroom with groups of desks in the middle of the U, so everybody can see the board. Whenever we’ve got laptops out I’m always moving around as well because you’re asking for trouble if you’re not, to be honest. (C492012)

The classroom dynamic had changed with the introduction of laptops for learning through the experiences shared by the teachers. Aspects such as maintaining student engagement and involvement throughout a lesson now became of greater importance as the laptop could be misused and further increased the chance of distractive patterns of behaviours, in turn minimising the potential for learning. A teacher’s solution, as impractical or irrational as it may seem, would be for them to decide not to use the laptop, or drastically reduce its use to counteract such potential for distraction. This was not witnessed in classroom observations at the School; however, such actions are possible in the light of the diverse beliefs and skillsets of teachers at the case study site.
4.9 Overall Teacher Satisfaction with the Laptop Program

The following section focuses on the overall teacher satisfaction in the areas of: teacher laptop use for learning, observed laptop use for learning, the amount of time laptops were used for learning, student role in learning, and the value of laptops.

4.9.1 Teacher laptop use for learning

Laptop use in education implies a changing teacher role and also a dynamic approach to pedagogy. As discussed in the UNESCO ICT Competency Framework (2011), the successful introduction of ICT into the classroom depends on the teacher’s ability to restructure the pedagogy used, and develop an active learning environment that is engaging and adopts innovative ways of using technology.

When using laptops for learning more often than not teachers are left to their own devices to implement a set program. Figure 4.21 provides data for Item 13 (difficulty in use of laptop), Item 14 (enjoyment) and, Item 15 (want to know more) to understand how teachers felt about using laptops in these areas.

![Bar chart](image)

**Figure 4.21.** Teacher participant responses to difficulties, enjoyment and questions about their laptop.
Item 13 recorded a three year mean of 36.2% for teachers indicating difficulties in using their laptop while 63.8% of teachers indicated they did not have any such difficulties. Teachers (90.2% - three year mean) generally enjoyed using their laptop according for response to Item 14. Approximately two-thirds of teacher participants (65.9% - three year mean) responding to Item 15, indicated they would like to know more about using a laptop. Although this dropped sharply in the third year of the study, possibly indicating that professional development was having an impact. Table 4.6 presents some comments from teachers who answered ‘no’ to Items 13, 14, or 15.

Table 4.6
Examples of Teacher Participants Answering ‘No’ for Items 13, 14 and 15 (Problems with the Laptop)

<table>
<thead>
<tr>
<th>Year</th>
<th>Teacher</th>
<th>Examples of ‘no’ responses to Items 13 to 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>C79</td>
<td>Changing to Mac’s had its inherent problems plus new programs to try and deal with the next wave of student-centred learning with all its bling and very questionable degree of substance.</td>
</tr>
<tr>
<td></td>
<td>C102</td>
<td>A world of external frustrations! Does email have to be called Entourage?</td>
</tr>
<tr>
<td>2011</td>
<td>C55</td>
<td>Other than network problems, like wireless issues, no real problems.</td>
</tr>
<tr>
<td></td>
<td>C40</td>
<td>I still find some of the programs / apps challenging to get my head around. Need time to master these, but still feel I am doing OK even though there are still challenges ahead.</td>
</tr>
<tr>
<td>2012</td>
<td>C56</td>
<td>I am comfortable using the various applications available on the laptop, such as Pages, Keynote, Word, PowerPoint. Difficulties arise when the laptop does not function properly, leading to the inability to use the applications in my classes, blackouts and shutdown.</td>
</tr>
<tr>
<td></td>
<td>C76</td>
<td>For the most part, it is reliable, although I have had problems with email at times.</td>
</tr>
</tbody>
</table>

4.9.2 Observed laptop use for learning

Over the course of the three year study 30 classroom observations took place (eight observations in the first year, 12 observations in the second year and 10 in the third year). In a form of triangulating the data as discussed in Chapter Three, the observations were scheduled to determine how teachers were using their laptops, and also whether teachers’ assertions regarding their laptop use was borne out in their classrooms. The observation instrument used, known as FITCOM, was initially developed by Judson (2006) to determine teachers’ use of ICT in the classroom. As described in Chapter Three, the instrument allows the researcher to make qualitative judgements on the extent to which the classroom experience resonates with identified
good practice in the integration of ICT. The instrument was in the form of a 25 item Likert-type scale classified into five areas: design of technology integration, class dynamics, meaning and purpose, content and knowledge, and technology as tools. The observer then rates each one of the five areas from 0=never occurred to 4=occurred frequently. From this, each individual item had a total score of 20, meaning that the instrument had a collective total of 100. It was possible for a teacher to register a score of zero to 100 (see Appendix K).

FITCOM was the foundation of the research that Bate (2010b) used in his ‘longitudinal study of beginning teachers' pedagogical identity and their use of ICT.’ Bate’s research was interested in how teachers were using ICT in their teaching and hence he adapted Judson’s instrument to an Australian school setting. Both Bate (2010b) and Judson (2006) revealed a gap between what teachers said they were doing and what was actually happening in practice. To further expand on the results of the current study, Table 4.7 displays the mean scores; standard deviation and weighted average for each of the three years the participants were observed in the current study.

Table 4.7
Mean Scores for the FIT:COM Observation Tool Used in the First Year to Third Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean (%)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year (n = 10)</td>
<td>43.2</td>
<td>10.8</td>
</tr>
<tr>
<td>Second Year (n = 8)</td>
<td>48.5</td>
<td>12.9</td>
</tr>
<tr>
<td>Third Year (n = 12)</td>
<td>53.5</td>
<td>11.2</td>
</tr>
<tr>
<td>Weighted average</td>
<td>48.8</td>
<td></td>
</tr>
</tbody>
</table>

Observations revealed that there was a mix of ways in which the teachers used technology whilst being observed by the FIT:COM observation instrument. Lessons appeared to be teacher directed when using the laptops in the three year case study. In teacher-directed lessons the teacher typically used an interactive smartboard or data projector to commence a lesson or introduce the topic to be covered. This was the case for both of the student cohorts observed in a classroom setting. Lessons demonstrated a range of teaching approaches, but were predominately well managed
and controlled with the immersion of these technologies, which is similar to the view of Beauchamp and Kennewell (2008). A total of 16 of the observations required the students primarily to use the Web to either access information or to use games or applications. Games were subject specific and in the areas of Mathematics (Mathletics, Geogebra and MyMathsOnline) and Literacy (Spellodrome and other web-based games in the area of spelling or punctuation). The games and simulations were only used for a marginal proportion of the lesson and more as a reward or extension component of the lesson – drill and practice. Overall, in most instances for both Cohort A and Cohort B, the types of lessons aligned towards operational and investigation categories of the framework as seen in Figure 4.22.

![Figure 4.22](image)

**Figure 4.22.** Lesson observation of teacher participants’ laptop use for learning.

### 4.9.3 Amount of time laptops were used for teaching and learning

Akin (2012) stated the ongoing cost of laptop programs is an issue in discussions between schools and parents around outlaying funds for such initiatives. How often and how much laptops are used is a key question. Leadership at the School did not stipulate how much students and teachers should use the laptop and, in fact, advocated a balance. For example:

Of course, you can do anything but ... no, and I think ... I was pretty gratified to hear Leadership say on Saturday at the student orientation day to the parents that if your son comes home and says, ‘I only used my laptop today for an hour,’ then that’s fine, don’t be worried about that, that it is a tool, whereas the rhetoric that we were sort of
using from the very early days was that this was somehow revolutionary and I'm not sure that ... I mean, I think probably generally voices have said, ‘Yep, it’s great, we love it, but there's also other things we need to do as well.’ (C492012)

As recognised by the teachers through the three sets of annual interviews and questionnaires, the laptop was considered to be a very powerful tool, which had become a common piece of equipment as part of the learning process. The greater focus, however, was on delineating how the laptops were being used for teaching. Item 11 and 12 of the questionnaire required teachers to estimate the amount of time they were using their laptops for teaching and learning each day, and to also estimate the amount of time their students were using their laptops for learning each day. Caution should be applied to the imprecise nature of these estimates as the use of computers can be intermittent in nature, due to the thinking activities which precede the use of keyboard or screen. Figure 4.23 presents frequencies of response, to teacher questionnaire Items 11 and 12, pooled over three years.

![Figure 4.23](image_url)

**Figure 4.23.** Teacher participants’ estimated use of laptops for teaching and learning for self and their students’ use for learning as a frequency pooled over the three years.

Teachers perceived that they used their laptop for teaching and learning for more time than their students used a laptop for learning. This is further highlighted in all three instances of the laptop use for teaching and learning categories: *one hour*, *two to three hours* and *more than three hours*.
4.9.4 Student role in learning

Fifteen teachers explicitly stated that students were inherently responsible in using ICT to support learning. This characteristic was explored in the responses to Question Nine of the annual interviews between the first year and third year: “What role(s) do the students have when using laptops for learning?”:

So their role is firstly to use it responsibly but also to ensure people next to them sort of know what’s going on and if they encounter problems that they can help them because there are 29 of them and there is only one of me. But as I said, the first thing is to use it responsibly, that’s their big role. (C412010)

I think it’s to be responsible users of it. That’s the most important role. (C552012)

Responsible users, I think. I think that that’s a big thing. I think they still have the same responsibility as if they were using pen and paper, still putting their best effort and to make sure that if they’re using images they’re appropriate and they are referenced and they’re doing all those types of things also that you would expect if they were going to be doing it with cardboard and a pen. (C432012)

Teachers held the view that students were required to use laptops to access, create and present information responsibly as part of their role in learning. Therefore, laptops were integrated into the culture of the School, with an emphasis on responsible use.

4.9.5 Value of laptops

Question Four of the annual interviews asked teachers: “Do you think there is value in having your students use a laptop for learning?” A total of 33 of 37 teachers interviewed responded that there was value in students using laptops for learning. Figure 4.24 shows the percentage of teacher participant responses to this question.
Figure 4.24. Teacher participant’s responses to Question Four: ‘Do you think there is value in your students having a laptop for learning?’

Through their experience over the three year period of the study, teachers had become aware of how to balance the use of the laptops in class for learning. By the third year of the study, teachers felt comfortable in having periods where the laptops were not used; however, there was a shared view of the need to integrate or use the laptops when needed:

Overall, I feel that the introduction of the laptop has been beneficial to student learning. Our biggest challenge is ensuring that teaching staff are equipped with the necessary skills to deliver ICT rich lessons where the students can engage in learning which encourages higher order thinking skills. The access to information provides a real opportunity for staff to develop classroom activities or tasks that challenge the boys’ analysis, synthesis and creative skills. (CQ522012).

Item 25 of the questionnaire sought teachers’ views on student use of laptops by asking: “What proportion of time would you like to see students using laptops in your classes?” Over the three year period, there was a 23.1 percentage point decrease in the 50-75% percentile option. By the completion of the study, 76.9% of the teacher participants had indicated that laptops should be used between the 10-50% percentile options of lesson time, whereas only 3.9% were of the view that the laptop should be used in the > 75% of the lesson time as shown in Table 4.8.
Table 4.8
Proportion of Time Teacher Participants Would Like to See Students Using Laptops

<table>
<thead>
<tr>
<th>Time</th>
<th>Inception</th>
<th>First Year</th>
<th>Second Year</th>
<th>Third Year</th>
<th>Inception to Third Year Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10%</td>
<td>2.56</td>
<td>14.3</td>
<td>12.8</td>
<td>11.5</td>
<td>8.9</td>
</tr>
<tr>
<td>10 - 25%</td>
<td>28.2</td>
<td>22.9</td>
<td>25.5</td>
<td>36.5</td>
<td>8.3</td>
</tr>
<tr>
<td>25 - 50%</td>
<td>30.7</td>
<td>20.0</td>
<td>40.4</td>
<td>40.4</td>
<td>9.6</td>
</tr>
<tr>
<td>50 - 75%</td>
<td>30.7</td>
<td>34.3</td>
<td>17.0</td>
<td>7.7</td>
<td>-23.1</td>
</tr>
<tr>
<td>&gt; 75%</td>
<td>7.6</td>
<td>8.6</td>
<td>4.3</td>
<td>3.9</td>
<td>-3.8</td>
</tr>
</tbody>
</table>

When teacher participants (N = 23) in the third year annual interviews were asked, “Would you keep the laptop program or remove it?”, all 23 teachers agreed with keeping the laptop program. The nature of the classroom had changed, with teachers having to have a strong understanding of how to manage and deliver a lesson within a 1:1 laptop classroom. Recognising these changes, the required skillsets in a 21st century learning environment, with additional but related areas such as learner engagement, collaboration, discussion and activity/problem-based curricula could become more of a focus for teachers. Teachers strengthened in their belief that the 1:1 laptop program was an essential aspect of the teaching and learning experience. This perception is similar to the view of Sugar (2002), who reported that teachers who are positive toward ICT use have the potential to negate the difficulties sometimes experienced when using ICT for teaching effectively:

Laptops offer a much wider world to experience beyond what is possible from textbooks, documentaries and the teacher. I also consider ICT skills to be a fundamental aspect in the work place which students need to be able to use in a disciplined manner, which needs to be learnt. My ideal is an integration of ICT into my teaching to provide at least the basic of responsible laptop use, as well as the skills needed for work and to improve student learning. However, until there is a change in the WACE examinations [Year 12 examination], they will much remain an additional tool for the classroom, and not the central tool. (CQ832012)

Further to this view, eleven teachers believed there was a need for finding a balance when using laptops for learning. It was believed that a balanced approach was necessary to minimise an overreliance on laptops for learning:

I think that it’s a powerful learning tool used correctly, used effectively. I don’t think it should be the total focus of what we’re doing. I think there needs to be a balance. It’s assisting, it’s enhancing, that’s the way I see it, and I think possible, and I’ve even
sometimes got into that situation myself where it’s become the total sort of thing in the lesson, and I think there is a sort of a problem ... I think there’s a problem with that, and I think we need to be careful of it, because it can be just ... the teacher becomes superfluous in a sense and is there real learning going there – I don’t know. (C602012)

Teachers clearly believed a balanced approach with the use of laptops was essential.

4.10 Summary

When applying the ICT capability learning continuum (ACARA, 2010a) to laptop use for teaching, teachers were predominantly using laptops for managing and operating, investigating and creating with ICT. There were examples of communicating with ICT and applying social and ethical protocols and practices when using ICT discussed in the chapter; however, not to the same extent.

This decrease could be attributed to students over time becoming more independent due to the individualised nature of each student having a laptop. Although, teachers sensed that collaboration and cooperation were important, the introduction of the laptop program had changed this attribute. It is important to note that students having laptops does not preclude using them for cooperation and collaboration. It depends how teachers structure the learning environment and activities. This may be an area of future focus for the School as Hattie’s (2009) meta-analysis indicates that a cooperative and collaborative environment compared to that of an individualistic classroom had a higher effect size on student learning.

Teachers formed a position in regards to the amount of time that the laptops should be used within a lesson. It appeared that teachers felt comfortable with its use for 10-50% of lesson time. Teachers’ own skillsets had improved in a variety of areas. Dealing with scenarios such as setting up a classroom, supervision, monitoring, gaming, off-task behaviours and the use of laptops for learning were all recognised as areas that increased opportunities for both the teachers and their students.

The aspect of laptop use in the broader context of teaching and learning will be discussed in detail in Chapter Seven. Chapter Eight discusses the ability to take ICT to a higher level and the possible need for political change to make this happen from a learning and assessment perspective.