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An investigation into the extent to which Year 6 students transfer information literacy across subjects

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Abstract
This study took place in an independent junior girls’ school in Mosman, Sydney. The aim of the study was to examine the extent to which Year 6 students transferred a range of information literacy skills across curricular subjects. The students were given active and extensive information literacy support in a Term 3 English project on Greek myths and legends but were given only passive support for a Term 4 Science project on Human activity and its impact on the environment. The methodology used took the form of a student-completed diary during Term 3 and a post project presentation questionnaire in Term 4. The results were analysed using textual analysis but also included some quantitative data which was analysed using Excel. The findings of the study indicate that students did transfer a number of information literacy skills across the two subjects but mainly in a mental manifestation. Students tended not to transfer the physical manifestation of information literacy skills such as concept mapping. Students stated that they did not use the PLUS information literacy model in the Term 4 assignment but acknowledged the value of elements of the model. Interviews were completed with the teacher librarian and two class teachers. The class teachers indicated that the students’ work improved with the active information literacy scaffolding provided in Term 3 and also that students did demonstrate improved capability in planning, organisation and presentation of information and ideas in the Term 4 project. The implications for teachers and teacher librarians are discussed.

Keywords: information literacy; information literacy models; student assignments; information skills across the curriculum; skills transfer; affective domain; diary method; semi-structured questionnaires

Introduction
The study took place in Queenwood Junior School, Mosman, Sydney. The school is an independent girl’s school in a middle to upper socio-economic area. The school has 300 students from K-6 and 15 staff. In 2004, there were two classes per grade K-5 and three Year 6 classes. There were 66 students in Year 6. In Year 6, one teacher takes all the Human Society and its Environment and English classes and another teacher takes all the Science classes. The library staff includes one full-time teacher librarian and one teacher librarian two days per week and there is no clerical assistance. At the time of the study, library lessons were for one hour every six-day cycle and were used as RFF (Relief from Face-to-Face
Teaching) for classroom teachers. There is no formal time allocation for cooperative programme planning and teaching.

The context of the study was the school’s wish to evaluate the incorporation of information literacy skills across the curriculum and to examine ways in which students can be encouraged to transfer these skills across the curriculum. The teacher librarians sought to take a leadership role in relation to the development of information literacy in the school and sought the aid of an academic mentor, who then joined the study as a co-investigator in the action research. It was decided to use the PLUS model to develop information literacy skills in Year 6. This model has been used in schools in the UK and has been viewed as a motivational scaffold for students undertaking project work. Students were introduced to the model in Term 3 and used the steps in the model during their English project on Greek myths and legends. The students were supported in their use of information literacy skills by the class teacher and the teacher librarian. The teacher librarian gave scaffolds to the students on each stage of the PLUS process and extensive teaching was given for each stage with the students playing an interactive role in each library lesson, responding on the Smartboard and verbally to model skills such as keyword identification, note taking skills, evaluation of Internet sites, plagiarism, and so on. Supervision of their work was extensive and highly focused during this project. The students were asked to keep a diary for each stage of the assignment, reflecting on the use of the PLUS model. In Term 4, the students undertook a new assignment for Science, with a different teacher. At the start of this assignment, students were not given any particular advice on using information literacy skills and were not formally reminded of their use of the PLUS model. At the end of the second assignment, students completed a questionnaire which asked them to reflect on how they had completed the project and how they had used information literacy skills.

This paper presents a review of the literature, an outline of the methodology used, an analysis of the findings, a discussion of the study, including tentative conclusions, suggestions for future research and an outline of implications for teachers and teacher librarians.

**Literature review**

While there is a vast literature on information literacy in schools, there are a limited number of studies which are based on actual research and even fewer studies which actively seek the views of the students being studied. This review of the literature will examine definitions of information literacy, research in information literacy, information literacy models and previous research on the PLUS model. The literature review will also focus on the transfer of skills in schools although there appears to have been few studies in this area.
Definitions of information literacy

Langford (2000) argues that Doyle’s (1994) definition of information literacy can be viewed as a benchmark. Doyle (1994, p.40) defines information literacy as ‘the ability to access, evaluate, and use information from a variety of sources, to recognize when information is needed, and to know how to learn’. Abilock (2004, p.1) argues that ‘Information literacy is a transformational process in which the learner needs to find, understand, evaluate, and use information in various forms to create for personal, social or global purposes’. The Tasmanian Department of Education (2003, p.1) states that ‘By being information literate, students understand how to effectively access, interpret, transform, create, communicate, evaluate and manage information in ethical ways using a range of sources’. Herring (2004, p.74) defines information skills as ‘the skills which pupils [students] use to identify the purpose of, locate, process and communicate information concepts and ideas and then reflect upon the effective application of these skills’. These selected definitions encompass the range of knowledge, skills and attitudes expected of information literate students and similar definitions can be found elsewhere (e.g. Kuhlthau 2004; Loertscher and Woolls 2002; La Marca and Manning 2004). The emphasis is on the range of skills within information literacy which goes well beyond the traditional library skills of finding information. There are subtle differences of emphasis in the definitions above such as Herring’s (2004) highlighting of definition of purpose, Doyle’s (1994) ‘know how to learn’, the Tasmanian Department of Education’s (2003) stress on ethical use of information and Abilock’s (2004) ‘personal, social or global purposes’. Thus while there may be no agreed definition of information literacy, there is general agreement about its scope.

Research in information literacy

The most visible and most cited research in information literacy in schools is that of Kuhlthau (2004) who conducted studies with high school students and followed up the research with individual profiles as some students progressed through higher education into the workplace. Kuhlthau’s (1991, 2004) main findings relate not only to what skills students have related to information literacy but also to the affective aspects of information literacy, i.e. how students felt whilst completing the processes of doing an assignment or completing a task. Kuhlthau’s (1991, 2004) work has influenced the development of information literacy application in schools and also information literacy research. Loertscher and Woolls’ (2002) review of information literacy research is a valuable source as it covers a wide range of aspects of information literacy such as stages of the research process, controversial issues in information literacy, constructivist approaches to teaching information literacy and a review of information literacy models. Henri and Bonnano (1998) and Henri and Asselin (2005) present a range of views on the information literate school community.
Other aspects of information literacy which have been the subject of research studies include Lewis (1999) on science teaching and information literacy; Moore and Poulaooulos (1999) on teachers and information literacy; Gordon (2000) on learners and information literacy; Maxwell (2000) on information literacy and a Year 7 science program; Ryan and Hudson (2003) on secondary school students’ understanding of information literacy; Barronoik (2001, p.45) on high school students’ views on “meaningful assignments”; Wolf et al (2003) on the Big 6 as a scaffold for students; Harada (2002) on journal writing and information literacy; Gordon (2000; 2002) on concept mapping; Brown (2001) on students’ location skills; Branch (2001) on students’ information seeking processes; Murray (2001) on information literacy and students with disabilities; Fitzgerald (2000; 2002) on concept mapping; Branch (2001) on students’ information seeking processes; Murray (2001) on information literacy and students with disabilities; Fitzgerald (2004) on information literacy of students going from high school to higher education; Callison (2003) and Fisher, Frey and Williams (2002) on note taking; Snow (2002) on reading for information; and McGregor and Streitenberger (1998) on plagiarism. Harada’s (2002, Abstract) article sought to investigate ‘journal writing as a means of deepening students’ cognitive and affective awareness of the information-search process’ and is particularly pertinent here. As with this study, many of these research studies have included surveys of the views of students as part of their research method and the present authors view this as a key element in information literacy research. The literature cited above has informed this study by identifying key issues in information literacy research across a number of areas. These issues include the need to understand not only how students carry out research using different information sources but also whether students are able to benefit from taking a metacognitive view of the process in which they are involved, the need to address the question of whether information literacy models can be of benefit to students whilst appreciating that no one model can meet the needs of students with different learning styles, the need to investigate the effectiveness of information literacy teaching by teacher librarians and teachers by seeking students’ views on this teaching and the need to examine the implications for teacher librarians and teachers as a result of this study.

Critical reviews of information literacy teaching

Recently, there has been criticism of what has become the standard view of information literacy in schools. Boyce (2004, p.22) sets out to challenge existing views on and practices of information literacy and argues that ‘the process approach to information literacy must seem restrictive’ to digital age students. Boyce (2004) also states that information literacy emerged from a print based culture and that most current pedagogical practices relating to information literacy are not suitable for today’s digital environment in education. Kapitzke (2005, pp.28-29) also challenges contemporary views on information literacy, stating that information literacy should be seen as ‘a social construction, a discourse that both enables library work and learning outcomes’ and not as a ‘single, neutral pedagogical approach or “framework”, the application of which will produce predetermined, universal learning outcomes’. Langford (2001, p.21) argues that teacher librarians and teachers should move on from traditional views of information literacy and states:
Let us acknowledge a paradigm shift from information skills thinking to lifelong learning thinking, complete with the metacognitive skills of critical literacy: critical and creative thinking.

Green (2004, p.70) is also critical of existing approaches to information literacy and urges teacher librarians to reflect ‘the move to a more learner centred, thinking curriculum’ in their approach to teaching information literacy. Limberg (2005, p.47) argues that there is now a need for ‘information literacy curricula to formulate goals in terms of students developing a repertoire [Limberg’s italics] of understandings of information seeking and use’ and that existing approaches and models do not necessarily cater for this approach.

**Information literacy models**

A number of information literacy models for schools have been developed including Kuhlthau’s ISP (Kuhlthau 2004), Eisenberg and Berkowitz’s the Big Six (2001); Capra and Ryan’s ILPO (2000), and Herring’s PLUS (Herring, Tarter and Naylor 2002). Reviews of models by Branch and Oberg (2003), Loertscher and Woolls (2002), Callison (2002a, 2002b, 2002c, 2002d) and Shannon (2002) provide an overview of a range of models used in schools or recommended by their authors for use. Despite the large number of models in existence, there have been few actual research studies completed in relation to the models. Kuhlthau (2004) reviews a number of studies completed in relation to the ISP model over a number of years. Herring, Tarter and Naylor (2000, 2002) examine the use of the PLUS model in a UK school. Wolf (2003, p.70) carried out a research study of the Big Six model. Green (2004, p.70) takes a critical view of information literacy models, stating that ‘many of the existing information skills models don’t meet the needs of the learner as well as they should’.

**Research on the PLUS model**

To date, two studies of research done in schools in relation to the PLUS model have been published and a further three studies have been completed but as yet unpublished. The papers by Herring, Tarter and Naylor (2000, 2002) were action research studies carried out in a UK secondary school. The PLUS model contains the broad elements of Purpose, Location, Use and Self Evaluation which students can use as a support or scaffold. The model is not meant to be a linear one but an iterative model in which students may revisit elements such as Purpose. A diagrammatic view of the model is provided at <http://athene.riv.csu.edu.au/~jherring/PLUS%20model.htm>. Each element represents a number of interrelated skills (e.g. critical literacy skills in Use) which students will use. The focus of the research (Herring, Tarter and Naylor 2000, 2002) was to evaluate the views of students who were using the model. The methodology in both studies involved student questionnaires and semi-structured interviews with teachers and
the teacher librarian. The key findings of both the studies were that most students identified clear benefits in using the model as a scaffold. Students stated that the model assisted them with brainstorming as it helped them to share ideas, collect more information and work as a team. Students completed a concept map in both studies and stated that completing a concept map helped them to form questions, identify and organize information. Students’ overall comments on the model, in both studies, were that it helped them with planning, identifying different stages in doing an assignment, being organized, and being reflective during the assignment process. A majority of students stated that they would use the model in other curricular areas but this was not tested in the studies. Both studies also found that a number of more able students did not necessarily find the model useful. These students commented that they already knew the best way to complete their assignments and had little need for a scaffold. The comments from teachers and the teacher librarian in both studies indicated that while the more able students were confident in demonstrating information literacy skills, most students lacked this confidence and needed guidance.

Transfer of skills

Despite anecdotal evidence that the question of whether students transfer skills from one curricular subject to another is seriously considered in schools across the world, there is little evidence of research studies carried out in this area although some educational psychologists have examined certain aspects of transfer. In relation to the information literacy literature, there is little or no attention paid to this aspect. Burden and Nichols (2000) sought to evaluate a cognitive skills programme which was introduced across the curriculum in a secondary school and the issues in relation to the transfer of skills and found some evidence of transfer. Phye (2001) indicates that research demonstrated in relation to problem-solving strategies used by school students, there was no automatic transfer of skills but that certain instructional methods did encourage transfer. Two studies in vocational education by Misko (1998) and Down (2001) also indicate that students who are taught a particular skill in one educational setting will not repeat that skill in another setting without prompting by the teacher.

Implications of the literature

The review of the literature demonstrates that while much research has been done in areas relating to information literacy and that some research into the transfer of skills exists, the present study will add to the knowledge of researchers and practitioners by focusing on information literacy and the question of transfer. This study will also raise questions about future research in the areas in terms of focus, methodologies and practice.
Methodology

This study used a mainly qualitative approach to data collection and analysis. Patton (2002, p.145) argues that qualitative methods are ‘ways of finding out what people do, know, think and feel by observing, interviewing and analyzing documents’. In the educational context, Burns (2000, p.242) states that ‘qualitative methods attempt to capture and understand individual definitions, descriptions and meanings of events’. Bouma and Ling (2004, p.165) neatly encapsulate the spirit of qualitative research, stating that:

Qualitative research sets out to provide an impression: to tell what kinds of ‘something’ there are; to tell what it is like to be, do or think something. Qualitative researchers exercise great discipline to find out ‘What is going on here?’ from the perspective of those who are in the situation of being researched.

The focus of this research was to examine the views of Year 6 students who were engaged in using information literacy skills while completing curricular assignments. Thus, a qualitative approach was seen as suitable and reflects Bouma and Ling’s (2004, p.165) emphasis on looking at the study ‘from the perspective of those who are in the situation of being researched’. The study can also be viewed as action research in that the issue of whether students transferred information literacy skills across the curriculum was seen as important within the school and there was a desire to investigate the extent of transfer and to possibly identify ways of improving students’ transfer of skills. Burns (2000, p.443) defines action research as ‘the application of fact-finding to practical problem-solving in a social situation with a view to improving the quality of action within it’.

The research approach employed two different methods. In Term 3, students were asked to complete a diary which reflected their thoughts on the processes and actions they engaged in while researching for and completing a project on Greek myths and legends. Burns (2000, p.440) states that using a diary method can be advantageous in terms of gathering regular data about research subjects but counsels that ‘subjects may modify their behaviour so that the diary record reveals a different range of activities than normal to create a favourable impression’. In this study, observations by the teacher librarian of student activities and subsequent analysis of the completed diaries make it clear that Burns’ (2000) concerns did not appear to apply in this case. The aim of using the diary method was to allow students to express their thoughts and views during the time period of the assignment and not only at the end. There was also an attempt to gather students’ view on affective aspects, reflecting Kuhlthau’s (2004) emphasis on examining thoughts and feelings of students as well as their actions during the assignment process. The diary was not open ended but structured in a way that guided students to recording their thoughts on particular aspects of their own research processes. Students, for example, were asked to record their thoughts on their introduction to the PLUS model, concept mapping, question formulation,
finding resources, reading for information, note taking and writing their assignment.

In Term 4, students were given a semi-structured questionnaire when they had completed their assignment on Industry and the environment. Best and Kahn (2003) argue that the advantages of questionnaires include gaining the trust of the respondents in a personally administered questionnaire and the availability of respondents but they warn that there are disadvantages of questionnaires such as poorly completed responses from those completing the questionnaires. The questionnaire asked students to reflect on similar topics which were in the diary. The main difference between the two assignments done by the students was that in Term 3, the assignment was an individual one and students submitted a written project. In Term 3, the assignment was a group one and students did a group presentation. Despite this difference in the form of the two assignments, there were strong similarities in that students initially brainstormed in groups in both assignments and did individual research in both assignments, with the individual research in the second assignment contributing to the group presentation. The authors do not consider that this difference invalidates their findings and conclusions.

Findings and discussion

The findings of this study have been organized into a number of themes which reflect the focus of the study and the main elements of the diaries and questionnaires completed by the students, as well as the interviews with teachers. The themes are:

- students’ views on brainstorming
- students’ views on concept mapping
- students’ views on reading for information
- students’ views on note taking
- students’ views on the use of the PLUS model
- teachers’ views on students’ application of information literacy skills.

Students’ views on brainstorming

Students commented on brainstorming in both the diary and the questionnaire. When asked what they liked about brainstorming, students were consistent across both terms. In the diary, which was completed by 66 students, 91% of students commented that they enjoyed the brainstorming and that it had helped them with their project. The most common element commented upon by students was in relation to researching and finding information (59% of students commented on this) and comments included:

*I like brainstorming with my group because it helps when you start researching.*
We learned a lot and we didn’t even have to read a book or search the net.

The second most common aspect from the diary was teamwork and sharing of information (41%) and comments included:

*I did not know a lot of things that my group and I discussed.*
*I liked it because if they had something down that was interesting, they shared it with you. You helped each other as well.*

The questionnaire responses (from 66 students) on the positive aspects of brainstorming reflected similar themes. The most common response (81%) was that brainstorming provided students with more ideas and understanding of the topic. Comments on this aspect included:

*Gave me lots of new ideas …3 heads are better than one…and we learned more about our topic.*
*It helped to understand the topic…sharing my ideas …hearing other’s ideas.*

The second most common response was in relation to teamwork which the students praised. Comments included:

*Teamwork, working in a group…our group worked together and we all cooperated.*
*It’s good to be in a group…we worked well as a group…everyone did their part.*

Thus it is clear that students not only enjoyed the process of brainstorming in a group but found the activity useful in relation to the assignments which they were completing. The responses indicate that students focused on aspects of learning, sharing ideas and that there was a conscious link between the brainstorming activity and the task on which the students were focused.

Students were also asked to comment on the negative aspects of brainstorming in both the diary and the questionnaire. In the diary responses, students predominantly identified behavioural aspects (68%) and comments included:

*There was a lot of shouting…everyone wanted to speak at once.*
*We argued a lot, so didn’t get much (sic) work done… it was annoying having so many people talking.*

Some of the student comments related to the ideas being discussed (18%) and comments included:

*I like working by myself because it’s all my own ideas. My idea was unic (sic).*
*We all had different notes which I find very confusing.*

The questionnaire responses were similar in that 36% commented on behavioural aspects and comments included:
People not listening... there was confusion... it got a bit noisy and messy. It was hard to concentrate... people weren’t paying attention.

There were also comments on thinking skills (13%) and comments included:

Trying to think of little topics inside the big topic... putting it together.

One notable difference between the diary and the questionnaire was that in the questionnaire, 27% of students noted that they had no negative thoughts on brainstorming whereas only 4% did so in the diary.

Thus students clearly focused on behavioural aspects of brainstorming in their comments when asked about what they did not like about brainstorming. The finding of this study reflect those cited by Herring, Tarter and Naylor (2002) in which students’ positive comments related to teamwork and sharing ideas and students’ negative comments related mainly to behavioural aspects. The authors found a dearth of research literature on brainstorming in school education as a whole and an absence of studies of brainstorming in teacher librarianship research.

**Students’ views on concept mapping**

The student responses to concept mapping in the diary (66 students) and the questionnaire (66 students) differed dramatically as will be seen from the results. In the diary responses students were overwhelmingly positive about the usefulness of a concept map. The main response was that it would help students to plan and be organized (68%) and comments included:

It helped me because I could plan what I wanted to do. It also helped me so I knew what I could search. It helps to organize information...it will help to remember notes and ideas. Since I am a visual person, it will make it easier to understand.

The concept map was also seen as useful as a tool to keep them on track with their research (30%) and comments included:

When you forget some notes you remembered earlier that you put on your concept map, you can look back on it. If I ever get stuck without knowing or remembering what it is I was planning, I can always look back at my concept map.

It was clear that students, in their diary responses expected the concept map to be useful for their project work and it is also clear that almost all students completed a concept map. Only 1 student stated that s/he did not need a concept map.
In the questionnaire responses, students stated that they did not draw up a concept map after their group brainstorming. When asked if they thought that a concept map would have been useful, 72% of students responded negatively and comments included:

*No, because we didn’t do a plan and still got good marks.*
*No, because it would have wasted time that we would have needed.*

There was a positive response from 28% of students who stated that a concept map could have been useful and comments included:

*A concept map might have been a good idea to get a better idea of what the topic is.*
*It would be quicker because you would know what you were doing.*

Students were also asked if they completed a concept map for their individual topic which they researched as part of the group topic. Most students (91%) did not draw up a concept map. Students (9%) who did draw up a concept map indicated that it helped them to find information resources and to plan their presentation. When asked if it might have been a good idea to draw up a concept map, most students (63%) replied negatively and comments included:

*No, I knew my keywords and all the things a concept map would cover.*
*No, because I got a really good mark.*

Some students (18%) thought that it would have been helpful, on reflection and comments included:

*Yes, because we could show where deforestation is happening.*
*Yes, because it would have been easier.*

The results show clearly that most students did not physically draw up a concept map either for group or individual purposes. It might appear that students did not transfer the concept mapping skills from one term to the other. However, there is some evidence here and more will be presented later, that students mentally transferred the skills from one project to another, in that although they did not draw up a concept map on paper or electronically, they incorporated the concept mapping idea into their project planning. Gordon (2000, Conclusions, para.5) indicates that students using concept mapping techniques in information retrieval were ‘more thorough and efficient’ and had a ‘stronger focus formulation’ than students who did not use concept mapping techniques. While this study did not compare students as Gordon (2000) did, this research indicates that students saw the advantages of concept mapping in terms of being organized and keeping on track and thus there is a similarity to Gordon’s (2000) findings.
Students’ views on reading for information

Students were asked to comment on reading for information in both the diary (66 students) and the questionnaire (66 students). Students were introduced to skills in skimming and scanning print materials and websites in the library. Students were asked about how they selected relevant material from information resources including books and websites. In the diary, students indicated that skimming skills were employed as a main method when searching for relevant material (50%) and comments included:

*I would look through the website and decide if it had good information.
I just read quickly through the information and if I thought it would be helpful, I’d read it more thoroughly.*

Some students read more thoroughly (27%) and some showed ability to adapt the information to their individual needs. Comments included:

*I read the books and websites thoroughly and found what I needed.
I read through the information many times and I was able to understand it and change the questions [student generated] to suit the information given.*

The responses from the questionnaire were almost identical. Students were asked to indicate how they selected relevant information and ideas in relation to reading the whole text, skimming the text, scanning the text, looking for graphics and photographs and other methods. Figure 1 shows that 50% of students favoured skimming, 30% favoured reading the whole text and 20% scanned for keywords.

![Figure 1. Students’ views on selecting relevant information](image)

Students were also asked to comment on the strategies they would employ if they found information in a resource that they did not understand. In the diary entries,
most students stated that they would ask for help (41%), while others indicated that they would use a dictionary (27%), look at another resource (13%) or spend more time trying to understand it (8%). Comments included:

*If I don’t understand it, I ask for some help and find out what it is that I don’t understand.*
*If it’s a sentence or more, I usually skip it and go on to another website so I don’t waste time.*

In the questionnaire, students’ responses were similar but differed in relation to seeking help. Figure 2 shows that 27% would use a dictionary or encyclopedia, 22% would use another resource, 18% would read on, 18% would ignore it and 16% would ask someone else.

It can be seen from the findings that students’ approaches to coping with information that they do not understand differed to some extent between projects but only in relation to whether they would ask someone else.

![Figure 2. Students’ views on coping with information that they did not understand](image)

**Students’ views on note taking**

Students were given advice on note taking and avoiding plagiarism in the library and in the classroom. Students were asked to comment on deciding what they took notes on, the methods they employed to take notes and how they organized their notes. In the diary responses (66 students), 60% of students stated that they
selected material to take notes on which they found interesting and comments included:

*If the information is good and interesting for my topic.*
*I choose anything that sounds interesting or something I want to know.*

In relation to the methods used for taking notes, most students (54%) stated that they used headings and wrote notes under these headings, mainly using Word, and comments included:

*I have a heading and put notes underneath.*
*I use headings and then write with bullet points.*

Only 8% of students stated that they used copying and pasting and one student commented:

*I copy and paste and then write them in my own words.*

The results from the questionnaire (66 students) were very similar, and Figure 3 shows that most students (59%) took notes in Word, with 23% taking notes on paper and 18% cutting and pasting.

![Figure 3. Students’ note taking preferences](image)

Students were asked why they preferred to take notes in their chosen manner and students who took their own notes in Word stressed that using their own words helped them to avoid plagiarism and comments included:

*Because I am quicker to write notes on Word and I did not want to copy and paste because I didn’t want to cheat.*
*I prefer to take notes this way because you can make sure that you haven’t copied from the resource.*

Students who wrote their notes on paper also stressed the importance of using their own words and not copying and comments included:
Because otherwise your (sic) using somebody else’s words.
So you don’t forget to put it into your own words.

It is very clear from these responses that in the area of note taking and avoiding plagiarism, students had transferred the skills from one project to another and were conscious of the need to ensure that effective note taking implied the use of their own words. The findings on note taking to some extent reflect the views of Callison (2003) and the findings of Fisher, Frey and Williams (2002). Student awareness of plagiarism reflects some of the findings of McGregor and Streitenberger (1998).

Students’ views on the PLUS model

Students were given an introduction to the PLUS model in the library. In the diary, students were initially asked to predict whether the PLUS model might be helpful to them in completing their Myths and Legends project. Students’ responses mainly (78%) focused on structure and organization and comments included:

I think it might help to organize yourself while you are doing your project.
It could help you start and finish your project step by step. It would be easier than just jumping into the project without a clue of what to do.

Other students (22%) stated that using the model would help with ‘understanding’ although it was not clear exactly what students implied by the use of the word ‘understanding’. Comments included:

Evaluating with the PLUS method will help me understand my project better.
It can help me organize and understand my work. It can help me work thoroughly through my work.

When the project was completed, the students commented on the extent to which the PLUS model had been useful and most students (74%) found it useful in relation to planning and finding information and comments included:

It was very useful because it helps to plan and structure.
The PLUS was helpful because I knew what to find.

In the questionnaire, students were asked whether they had used parts of the PLUS model when completing their project. In contrast to the previous project, most students (82%) stated that they did not use the PLUS model elements while 18% stated that they used some elements. It would appear from this that students did not transfer the skills which the PLUS model encompasses from one project to the next one. Other evidence, however, may negate this conclusion.

Students were asked in the questionnaire to state what advice they would give the following year’s Year 6 students who might be doing a similar project. The
students’ responses stressed planning (45%), locating information (25%), avoiding plagiarism (27%), presenting work (45%), being organized (22%) and working hard (18%). Figure 4 shows the students’ responses.

In relation to planning, comments included:

*Always plan your project before you start it.*
*Always brainstorm and use a concept map. It does help although it gets extremely tedious.*
*Use neat mind maps to organize. Listen to your group and what they have to say.*

![Bar chart showing student responses](chart.png)

**Figure 4. Students’ advice to next year’s students**

In relation to locating, comments included:

*Don’t go for the first [resource], look at others and see if they are better.*
*Look at a few websites and books and choose good information. Use books as well as the internet.*
*Always record the website as soon as you use it or you might not find it again.*

Students’ comments on avoiding plagiarism included:

*Never copy and paste. Never copy from the net.*
*Always only use the information off (sic) websites that you DO (sic) understand.*
*Always put it in your own words. Don’t plagiarize.*

Students’ comments on presenting work included:

*Put it together in an appropriate way. Use a bibliography.*
*Organize it well. Present it with lots of pictures.*
In relation to being organized and working hard, comments included:

*Get all your research done first. Don’t waste your research time.*

*Don’t leave it to the last minute.*

*Don’t slacken when it’s nearly finished. Do it well.*

From the student responses to the question of what advice they would pass on, it would appear that students did in fact transfer many of the information skills to which they were introduced and which they clearly used in the first project. While students did not use the PLUS model in a physical manner e.g. in using a concept map, it is clear that students did use many of the skills encompassed in the model mentally. In relation to the literature, the findings on the use of the PLUS model are similar to those of Herring, Tarter and Naylor (2000, 2002) and also reinforce the findings of Wolf (2003, Implications, para.3) who states that a model such as the Big 6 ‘may also provide an overarching process that students can employ in a variety of learning situations’ The findings on students’ use of and recommendations for information literacy skills also reflect aspects of the findings by Gordon (2000), Maxwell (2000) and Brown (2001).

**Teachers’ views on students’ application of information literacy skills**

Interviews were conducted with the two teachers who taught the students in Term 3 and Term 4. The teachers were asked what information skills they might assume that Year 6 students had when they started the project in Term 3. The teachers indicated that while most students had high ability in writing and presenting projects, many students had low ability in effectively using information literacy skills. One teacher commented:

*The girls had limited information skills. They felt they were good at this but 75% would locate a site and copy without reading or using the bits they needed.*

The teachers agreed that when they were assessing students, the assessment included not just final content of a project but the extent to which the project was well researched and well structured. The teachers also agreed that providing students with a scaffold such as PLUS could benefit students and one teacher commented:

*There are great benefits from using a scaffold like this although the students found it tedious as they felt they knew it all but clearly did not.*

Asked whether the use of scaffold would improve student grades, the teachers stressed the need for any scaffold to be reinforced by the teacher and the teacher librarian. One teacher commented:

*I feel that it can but would need to be used consistently over several years, where the teacher is really monitoring it.*
The teachers also stressed the key role of the teacher librarian in collaborating with the teacher and reinforcing information literacy skills. Comments included:

*Crucial role, to support what should be done in the classroom, as well as emphasising the importance of great research skills. The TL is an essential support and working with her can only complement the skills being taught and used in the classroom.*

The teachers’ views can be seen as reinforcing the views of Herring, Tarter and Naylor (2000, 2002) and Wolf (2003) that a scaffold can benefit students.

**Tentative conclusions**

This paper has examined the extent to which one Year 6 class in an Australian school transferred information literacy skills across curricular subjects and across a time span of one term. The findings provide mixed messages for researchers, teachers and teacher librarians interested in the topics of information literacy and skills transfer. Given that this is a single study of one school and one class within that school, it is clearly not possible to generalize to the whole school population in Australia or elsewhere. What is possible is that certain tentative conclusions may be reached and some areas for future research can be highlighted.

The teachers confirmed that information literacy skills were important aspects of student learning and were a factor in the assessment of student work. The students’ use of information literacy skills is clear in the diary entries which demonstrate that students at this age are clearly able to reflect on their use of information literacy skills *during* a curricular project. This reflects Kuhlthau’s (2004) emphasis on examining aspects of information literacy while students are actively researching and not only in a self-reflective manner at the end of the project. It can be concluded that asking students to complete a diary or journal during the project period may be beneficial to students as it encourages them to reflect on their own learning. Harada’s (2002) study is also of relevance to the use of a diary or journal.

In Term 3, students were provided with guidance on information literacy skills and encouraged to use the PLUS scaffold and the findings show the students’ reflection on this. One way to view this support given to students is that, in Term 3, students were *recipients* of information literacy guidance from the teacher and the teacher librarian and that this support was provided in an active manner. In Term 4, students were given a brief reminder in Week 1 of the information literacy guidance provided in Term 3 but thereafter, students were provided with support in a *passive* manner, e.g. the teacher librarian responded to normal reference enquiries from students. It can be argued that in Term 4, students had the option of using or not using the guidance provided to them in Term 3 and that the students may be seen in Term 4 as *consumers* of information literacy guidance. This raises the question of whether students at different levels in primary and secondary schools should be treated as *recipients* or *consumers.*
Previous research by Herring, Tarter and Naylor (2000, 2002) provided some evidence that teachers viewed more able students as consumers but less able students as recipients and there is some evidence of this in a recent study by Herring (2005). This also raises questions about reinforcement of information literacy skills across curricular subjects and year levels. It can be concluded that, in this study, these students appeared to view themselves as consumers in Term 4 and selected certain aspects of the information literacy guidance they were provided with in Term 3.

Did students transfer the skills from Term 3 to Term 4? The findings of the study indicate that some skills were transferred but perhaps not directly and certainly not in the same format as the students used in Term 3. The findings show that while students in Term 4 were conscious users of skills in defining purpose/planning, locating relevant resources, evaluating resources, avoiding plagiarism, note taking and organizing information and ideas for presentation in an appropriate medium, they did not view themselves as users or consumers of the PLUS model, nor did they adopt the physical format of concept mapping which they used in term 3. It is suggested that these students transferred a range of skills mentally and selectively but that they did not transfer the physical aspects of skills such as drawing up a concept map on paper or electronically. What this study does not investigate is whether students benefit more from having a physical or mental concept map when engaged in the research process.

**Future research**

There are a number of areas in which future research could be conducted to examine aspects of information literacy skills acquisition, consumption and use in schools. The following are suggested by the authors as being relevant:

- to follow a group of students, either in primary or secondary school, from one year to another to examine their retention of information literacy skills and the need for reinforcement
- to conduct a study of student use of a diary when completing a curricular assignment with a focus on how students use critical literacy skills when using web resources
- to use alternative research methods, such as focus groups or individual interviews, with students to assess the students’ views on their attitudes to and use of information literacy skills
- to repeat the present study across a number of schools in one state or country or internationally
- to further explore the concept of students as consumers of information literacy (and possibly other) skills in primary and secondary schools
- to review the findings of Boyce (2004) and Kapitzke (2005) in order to investigate alternative means of researching students’ information literacy attitudes and practices.
Implications for teacher librarians and teachers

This study is limited in that it provides evidence from only one class in one school over two terms and the results cannot necessarily be seen as repeatable in other schools or other year levels. Despite this caution, the authors suggest that teacher librarians and teachers can benefit from this study by examining, in their own schools, the following questions:

- Would students be more reflective about information literacy if a diary was incorporated as part of an assignment specification?
- Is the use of a model an appropriate way to introduce and/or reinforce students’ information literacy skills?
- How can evidence be gathered about students’ views on and use of information literacy skills in schools?
- Is there a need to focus more on students’ use of digital resources and the critical literacies students need to acquire?
- To what extent are information literacy skills recognized as key learning skills in the school as a whole?

It is hoped that these suggestions will encourage more teacher and teacher librarian practitioners to conduct action research in their own school and apply this research within the school.

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