

Developing literacy skills with graphic organisers

Margaret Strickland

Teacher librarian, Endeavour College, Mawson Lakes, SA

“An information literate person is able to manage the increasingly complex information environment”

Introduction

As teachers we are constantly looking for ways to improve student learning. In Australia, educational theory and practice have predominantly moved from the behaviourist school of thought to the cognitive school of thought. From this position, a constructivist theory of learning has developed. Within this model, students are actively involved in the learning process. Practices in education have also been informed by information scientists who understand that information is important and is processed and adapted by learners in relation to what they already know.

Howard Gardner's multiple intelligences (Gardner, 1993) also influenced the development of new methodologies in school curricula during the 1990s. Teachers became more aware of students who preferred a visual and / or spatial style of learning, which responded to visual and spatial learning techniques like graphic organisers.

Within these learning models, the users' needs are central to information retrieval practices. Over the last twenty years bibliographic, programmed instruction in school libraries has given way to our current concept of information literacy education, which looks at information literacy as a process to be learnt within the mainstream curriculum of the school (Gordon, 2002). In Australian schools, we are now teaching a variety of literacies and literacy now has a much broader meaning. We talk about information literacy, visual literacy, ICT literacy, media literacy, thinking literacy and multicultural literacy, amongst others, and the interplay between them. New literacies must change what teachers do and how they weave literacies together at all levels of school education. The South Australian Certificate of Education Literacy Policy (2006) says there is a need to "improve student proficiency across a full range of literate practices appropriate to changing social and technological times".

The term 'information literacy', first coined by Zurkowski (1974), assumes "information problem-solving skills that enable independent and effective

learning" (Capra & Ryan, 2002). Combes (2005) describes an information literate person as one who is able to use technology, is also ICT literate, is able to use a range of information resources, has a range of well-developed literacy skills, and is able to use information. This is a useful way of conceptualising information literacy because it allows a focus on the skills that students will need to acquire to attain this status. According to Combes (2005), an information literate person is able to manage the increasingly complex information environment.

While many writers have debated the nature of information literacy itself, educational institutions have proceeded to implement curriculum, which teaches students to become information literate. For example, Eisenberg & Berkowitz (1998) developed the Big6®, which is the most widely used approach to teaching information skills. The Big6® is an information literacy model and curriculum guide implemented in thousands of schools across the world from pre-school to higher education. Given a research task students are asked to work through a 6 step process:

1. task definition
2. information seeking strategies
3. location and access
4. use of information
5. synthesis
6. evaluation.

Sometimes the Big6® is called an information problem-solving strategy, because with the Big6® students are able to handle any problem, assignment, decision or task.

A new level of awareness of the effectiveness of using graphic organisers to assist people to become information literate came in the late 1990s through the work of American educator, Jamie McKenzie. During his visit to Australia, he addressed curriculum development in an Information Age. Among other things, he discussed the need to develop "free range students" (McKenzie, 1999, p.40) with effective navigation skills in an Information Age and the use of graphic organisers, like the Inspiration® software, to assist thinking and research skills in the twenty-first century.

Ausubel (1960) first described graphic organisers as a type of advance organiser presented prior to learning, so that the learner could organise and interpret new, incoming information. He developed the concept as a cognitive instructional strategy to promote the learning of new information—to bridge and link old information with new.

In the mid 1990s, Tony Buzan was a major player in developing the practice of using a particular type of graphic organiser, the mind map, to assist learning. He believes that “a mind map is the easiest way to put information into your brain and to take information out of your brain” (2002, p. 6). Buzan and Buzan (2003) define a mind map in terms of four characteristics: (a) a subject or a central image, (b) several main themes which radiate from the central image, (c) branches which display key images and words, and (d) a connected modal structure formed through these branches. As such, the mind map is structured for radiant thinking. Novak and Gowin (1984) also believed that concept maps have the capacity to enable meaningful learning and to clarify the key ideas to be focussed on in a specific task.

The Inspiration® program has developed and computerised graphic organisers for an educational setting. It is a visual thinking and learning program used for concept mapping, webbing, outlining, planning and presenting work. It has the capacity to integrate visual learning and technology into the literacy curriculum. Anderson-Inman and Zeitz (1993) compared the use of the Inspiration® program with the paper-and-pencil approach to concept mapping. They found that using Inspiration® encourages students to revise their concept maps

because deletions, additions and changes can be achieved quickly and easily. Figure 1 shows a sample template for the development of a concept map for story / novel analysis using Inspiration®.

It is not difficult to use graphic organisers in the classroom; however, it often requires a supportive, co-operative, risk-taking culture within schools (Nettelbeck, 2005). A movement towards the use of graphic organisers does not mean that writing is abandoned; rather, it gives teachers the option to diversify learning tasks and make learning more creative, open-ended and exciting. Nettelbeck (2005) believes that concept mapping is one way to create a high capacity educational system, in which “highly skilled teachers are able to generate creativity and ingenuity among their pupils”.

Carol Gordon’s (1995) research in which she combined her interests in education, information literacy and graphic organisers illuminates the current discussion. She created a student research assignment that integrated information literacy instruction with Biology curriculum. She comprehensively investigated the effect of graphic organiser training on the subsequent searching practices of Grade 10 Biology students in a Genetics unit. Gordon believes that concept mapping is a well-accepted method for clarifying concepts and discovering meaning “by graphically displaying the concepts and plotting relationships among them” (p. 115). Gordon used graphic organisers as the intervention with an experimental group, while a control group undertook the research assignment without using concept mapping but experiencing the same teacher. She was ultimately interested in whether the development of this skill in a specific unit of work would affect searching behaviour in a subsequent, related topic. She found that concept mappers showed a preference for print rather than electronic search tools, spent more time in print indexes, did more in their searching—they were more thorough and / or efficient searchers, were more inclined to concept-driven searching, and were more likely to make metacognitive judgments. Gordon also found that when concept mappers were searching electronically, they spent less time searching, worked in fewer and shorter sessions, used fewer search words, preferred subject heading rather than keyword searching, and performed more depth rather than breadth searches. Gordon concluded that mappers were more sensitive to the electronic environment, more efficient in the way that they used their time to perform more search operations per minute, more thorough in consistently applying a more concise repertoire of search terms and more thorough in engaging in more depth searching.

“**Concept mapping is one way to create a high capacity educational system**”

Figure 1: Screen shot of Inspiration® template suitable for reception–year 10



Table 1: Literacies addressed through the use of graphic organisers

Literacy type	Number of respondents / 40
Information literacy ^(a)	39
Information technology (ICT) literacy	26
Visual literacy	24
Traditional literacy (children's and / or adolescent literature) ^(b)	20
Thinking literacy ^(c)	9
Social literacy ^(d)	2

^(a) Information literacy includes specific mention of information literacy Step 1

^(b) Traditional literacy includes creative writing

^(c) Thinking literacy includes higher order thinking and metacognition

^(d) Social literacy includes teamwork, negotiation and peer mediation

Research questions

The present study attempts to draw together literacy programs and graphic organisers and to look at how teacher librarians are using graphic organisers including mind-mapping software to address the literacy needs of their students. The current research literature fuelled further questions about the Australian experience of teacher librarians:

1. In which topics are teacher librarians using graphic organisers?
2. What type of literacies are they addressing?
3. What do teacher librarians perceive to be the benefits of using graphic organisers?
4. What methods do they use to create graphic organisers?

Research method

In the current study, participants were recruited from teacher librarians in South Australia through the listserv SLASANET and Australia-wide through the listserv OZTL_NET. Both quantitative and qualitative data collection techniques were adopted. Survey questionnaires, in email format, along with interviews were used to collect data on the behaviours, understandings, attitudes and practices of teacher librarians.

The respondents came from all states of Australia, all the major school education systems and all levels of schooling. The responses from the questionnaires were used to construct the themes and questions for the Interview stage. Interviewees were selected based on experience as teacher librarians; wide experience in various roles within the school setting; mobility within the education system;

and participation in key professional networks. For purely practical reasons, those selected were all from South Australia.

Research findings

Using graphic organisers in a range of topics

Teacher librarians listed a wide range of topics in which they had used graphic organisers. The most common topics were the human body, the environment, animals and Australia. The most common Key Learning Areas (KLAs) involved were Studies of Society and Environment (SOSE), including History and Geography, and Science. Eighty percent of respondents had used graphic organisers in SOSE. The main reasons given for the use of graphic organisers in SOSE were that the content was appropriate for inquiry learning and that teachers in this KLA set research assignments. Sixty five percent of respondents had used graphic organisers in Science. Some teacher librarians noted that Science teachers like the organised, structured format of graphic organisers.

Using graphic organisers to address literacy needs

Graphic organisers were seen to be of benefit to students operating in a range of literacy types. Teacher librarians listed the following literacies as being ones that could be addressed through the use of graphic organisers: information literacy (Step 1—Planning), traditional literacy (including creative writing), ICT literacy, visual literacy, thinking literacy (including higher order thinking and metacognition) (refer to Table 1). Information literacy was the literacy type most often addressed by teacher librarians.

The benefits of using graphic organisers

Teacher librarians worked most frequently with students from Reception–Grade 10. Within this age range, they reported that both girls and boys responded positively to curriculum incorporating graphic organisers. Teacher librarians also indicated they felt that students from a wide range of ability levels, including students with learning difficulties, students with behavioural problems, gifted students, and second language learners, benefited from the incorporation of graphic organisers. Many teacher librarians felt that graphic organisers gave students with learning difficulties and gifted students the opportunity to work at their own pace with a satisfying and productive learning experience. Goldberg (2004) supports this finding that mind mapping cuts across ability levels.

Concept maps have a high degree of flexibility, which makes them a useful planning tool, having a capacity to clarify the key ideas for a specific task

“Graphic organisers give students the opportunity to work at their own pace with a satisfying and productive learning experience”

(Novak & Gowin, 1984), and brainstorm headings (Valenza, 2005). Graphic organisers have great value in compressing and focussing the student's attention on the topic better than any other means (McKenzie, 1997), in fact, the act of creating graphic organisers to illustrate the organisation of ideas and information aids comprehension and learning (Flood & Lapp, 1988). The teacher librarians in this study identified 39 educational benefits of using graphic organisers. As can be seen from Table 2, there was considerable consensus amongst the interviewees about the relevance of this list, seventy five percent of the interviewees each listed the top twenty-four benefits. All interviewees identified the important benefits of graphic organisers for planning research and organising information under main headings. Undoubtedly, these two benefits are not mutually exclusive, although the former implies a broader and more complex part of the information literacy process.

Graphic organisers are able to provide a scaffold for younger students by helping them know what to look for and what to do with it when they found it (Braxton, 2003; Jones, 2001). The interviewees identified assistance with scaffolding as a main benefit of graphic organisers for younger students. They also agreed that through graphic organisers, younger students can be introduced to information in a manageable form and better think through concepts and issues (refer to Table 2).

The creation of graphic organisers

When it came to creating a mind map, computer-based graphic organiser programs were widely used. Thirty-four of the forty respondents had used electronic graphic organiser programs, with sixteen different programs listed as having been utilised by the group. However, Inspiration® was the most popular with 94% of respondents having used this program. Table 3 shows those programs that have

Table 2: The thirty-nine benefits of using graphic organisers

Students can...	Number of responses / 12
1. plan their research	12
2. order and organise information under main headings	12
3. see their thought processes	11
4. extend thinking and establish connections	11
5. define the task	11
6. map existing knowledge ie What do I know?	11
7. focus on questions for research	11
8. use problem-based learning	11
9. view a visual representation of the process	11
10. engage in visual brainstorming	11
11. link ideas and concepts	10
12. sift and sort information	10
13. engage in collaborative learning	10
14. work on group thoughts and ideas	10
15. be motivated through the visual appeal of the program	10
16. move from the implicit to the explicit	9
17. use as a presentation tool including hyperlinking	9
18. work through all stages of information literacy cycle	9
19. exercise creativity	9
20. enjoy using graphics	9
21. relate to digital tools	9
22. think more clearly	8
23. see the links	8
24. exercise lateral thinking	8
25. judge the usefulness of the information	8
26. enjoy the open-ended nature of such tasks	8
27. retain information more efficiently	8
28. think more explicitly	7
29. use computers productively	7
30. have restricted opportunity to engage in plagiarism	7
31. produce quality work	6
32. use integrated tools	6
33. be less likely to lose work	6
34. compare before and after recording	5
35. work faster	5

Table 3: Computer programs used in the creation of graphic organisers*

Computer program	Number of respondents / 40
Inspiration	32
Kidspiration	7
Word	6
Powerpoint	2
Publisher	2

* Only those programs listed by at least two respondents have been included

Younger students can...	Number of responses / 12
1. be introduced to a manageable form for information	11
2. better think through concepts and issues	11
3. be assisted in scaffolding	10
4. be challenged to work at a higher level	6

“Graphic organisers facilitated the development of a range of literacy types”

been used by at least two respondents. (For an overview of graphic organiser websites of use to schools, go to the Shambles website.)

In general, teacher librarians liked the simple, user-friendly structure of Inspiration® and the focus on process. The strength of Inspiration® is in the process, in the idea that constructing the mind maps can lead to creative thinking (Bell, 2004). The teacher librarians in this study initially chose Inspiration® because, in many cases, it was already networked in the school, or inexpensive to buy, and it is Mac compatible. The program appeals to users because (a) it is easy to use, (b) it uses colour-coding to aid visualisation of the relationships between ideas, (c) it allows students to record a lot of information and view a broad topic more easily, (d) it minimises giving up, and (e) it is flexible enough to allow students to easily move between the graphic organiser and traditional note-taking formats.

Conclusion

This research study revealed an impressive commitment from teacher librarians to their profession. They thought deeply about pedagogical issues, showed initiative in developing curriculum appropriate to their student populations and were involved in a wide range of curriculum initiatives. Their curriculum role gave them freedom to work with information literacy and graphic organisers,

which are more about methodology and process; in addition, they are able to operate outside the usual KLA content constraints. Teacher librarians reported that a wide range of students in terms of age, gender and ability level responded positively to curriculum incorporating graphic organisers, and that graphic organisers facilitated the development of a range of literacy types. **TEACH**

References

- Anderson-Inman, L., & Zeitz, L. (1993). Computer-based concept-mapping: Active studying for active learners. *Computing Teacher*, August / September, 21(1).
- Ausubel, D. P. (1960). The use of advance organisers in the learning and retention of meaningful verbal material. *Journal of Educational Psychology*, 51: 267–272.
- Bell, M. A. (2004). Uses for Inspiration. *School Library Media & Network Communications (LM_NET listserv)*, <lm_net@listserv.syr.edu.>
- Braxton, B. (2003). Elem: Planning inquiry project for First Grade. *School Library Media & Network Communications (LM_NET listserv)*, <lm_net@listserv.syr.edu.>
- Buzan, T. (2002). *How to mind map*. London: Thorsons.
- Buzan, T., & Buzan, B. (2003). *The mind map book*. (2nd ed.). London: BBC Books.
- Capra, S., & Ryan, J. (eds.) (2002). *Problems are the solution: Keys to lifelong learning*. Brisbane Qld: Capra, Ryan & Associates.
- Combes, B. (2005). Starting at the beginning: A conversation about information literacy. *Connections*, vol. 54. Retrieved from <http://www.curriculum.edu.au/scis/connections/cnetw05/54starting.htm>.
- Eisenberg, M. B., & Berkowitz, R. E. (1998). The Big6 skills information problem-solving approach to library and information skills instruction. Retrieved July 2007, from <http://big6.com>
- Flood, J., & Lapp, D. (1988). Conceptual mapping strategies for understanding information texts. *Reading Teacher*, 41(8).
- Gardner, Howard (1993). *Multiple intelligences: The theory in practice*. New York: Basic Books.
- Goldberg, C. (2004). Brain friendly techniques: Mind mapping. *School Library Media Activities Monthly*, 21(3).
- Gordon, C. A. (1995). Concept mapping as a pre-search activity in the research process. Chapters 2 & 3, Unpublished doctoral dissertation from Boston University, Boston Massachusetts.
- Gordon, C. A. (2002). Methods for measuring the influence of concept mapping on student information literacy. *School Library Media Research Journal*, vol. 5.
- Jones, C. (2001). Infusing information literacy and technology into your school library media program. *Knowledge Quest*, 30(1), September–October.
- McKenzie, J. (1999). *How teachers learn technology best*. Bellingham Washington: FNO Press.
- McKenzie, J. (1997). A picture is worth a thousand words: Graphical organisers as thinking technology. *From Now On: The Educational Technology Journal*, 7(2) Retrieved from www.fno.org.
- Nettelbeck, D. (2005). *The learning and thinking context*. Camberwell Vic: ACER.
- Novak, J. D. & Gowin, D. B. (1984). *Learning how to learn*. New York: Cambridge University Press.
- SACE Literacy Policy (2006). Adelaide SA: Senior Secondary Assessment Board of South Australia.
- Shambles Website, (2009). <http://www.shambles.net/pages/school/mindmaps/>.
- Valenza, J. K. (2005). *Super searchers go to school: Sharing online strategies with K–12 students, teachers, and librarian*. Medford, New Jersey: Information Today (CyberAge Books).
- Zurkowski, P. (1974). *The information service environment relationships and priorities*. Washington D.C: National Commission on Libraries and Information Services. Abstract available from ERIC.

TEACH JOURNAL

Call for papers

Papers are now being sought for inclusion in the next volume of TEACH.

Submissions may include:

- research and scholarship
- critical reflections
- innovative practice
- case studies
- educational administration
- reflections, impressions and experiences of teachers

The editor is happy to receive queries or submissions at:
TEACH.editor@avondale.edu.au

For guidelines, go to: www.ministryofteaching.edu.au/journal/call_for_papers.html

MinistryOfTeaching