Databases in the primary classroom

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SOFTWARE developers have flooded the market with educational databases from convicts and bushrangers to footballers and politicians but what is their real potential in the primary classroom?

This paper attempts to outline a rationale for the use of databases in the primary classroom. Topics discussed include the integrated curriculum, establishing an authentic purpose, a sequence for introducing databases for the first time and the type of learning environment that teachers can create with database activity.

INTRODUCTION

One of the first steps for teachers considering the use of databases in the classroom is to locate a place in the curriculum for the potential use of a particular database. This involves the investigation of how the school's curriculum is organised.

A school's curriculum can be organised in a number of different ways. A traditional organisation would divide the curriculum into subjects. In a subject-based curriculum there may be potential for database use in social studies, science, reading and perhaps even mathematics.

Some schools use a thematic approach. A theme such as 'Footy Fever' could exploit Footyworks, First Fleet, Explorers and Explorers Journals could be used for a theme on 'Australian Discovery and Exploration'; a Solar System database would lend itself nicely to a 'Space' theme; and Endangered Species may work well with 'Animals'.

A far more innovative and dynamic way of organising the curriculum is to use an integrated curriculum. The integrated curriculum, as detailed in Learning Through an Integrated Curriculum: Approaches and Guidelines, (Minister for Education, Vic. 1985), is divided into topics. Each topic becomes the basis for a classroom investigation or inquiry. Advocates of this method believe the children should have a considerable say in the selection of the topic, the focus of the investigation and in determining some, if not all, of the classroom activities. This, plus a process of brainstorming and question formation (focus and contributing questions) is designed to develop an authentic purpose for the classroom investigation and allows the children to feel they have some control over the investigation and the direction it will take.

These two concepts — ownership and authentic purpose — are very powerful ideas and are central to the workings of the integrated curriculum. Establishing both in the classroom is a difficult and challenging task, but the rewards can be great. Supporters of the integrated curriculum believe that once ownership and authentic purpose have been established teachers can expect an increase in motivation and interest, an improved student attitude, behaviour and classroom control will become less of a chore, a rekindling of curiosity will occur, there will be a return to the natural desire to learn that schooling so often seems to extinguish, and a rich, powerful learning environment will be established. (Minister for Education, Vic 1985)

Also central to the integrated curriculum is the blurring of lines between subject areas. Instead of dividing the classroom activities into subjects, the teacher divides them into three types. Firstly, central activities, which are directly related to the topic under investigation and have a creative problem solving focus. Secondly, related activities, which relate to the topic and the central activity and pertain to all areas of the curriculum catering for a range of abilities and interests. Finally, revision and consolidation activities, which are not strictly related to the topic but concentrate on specific skills and are more subject based.

In selecting activities the teacher tries to place the students in a whole language environment where they are continually challenged to use, for productive ends, the four modes of language — reading, writing, speaking and listening. The teacher designs the activities so cognitive and affective learning processes can be developed (Ministry of Education, Vic. 1985). The assumption is made that all learning is underpinned by language and that children acquire language by using it.
for an authentic purpose. The rationale behind each topic can be represented diagrammatically. Figure 1 is an attempt to illustrate the curriculum considerations behind an integrated curriculum topic.

Some schools such as Mountain Park Primary School have refined the integrated curriculum process and use a curriculum plan called the 'Integrated Curriculum Matrix' (see Figure 2). The themes — 'Power and Control', 'Relationships', 'Environment', 'Communication and Media', 'Technology and Literacies' come directly from the 'Social Education Framework'. Across the top of the matrix consideration is given to the maturation level of the children on the topic is at a level at which the child can cope. The topics, which are written in each cell of the matrix, are chosen with input from the children, staff and parents. The topics are designed to convey the broad understandings and issues of each theme in a rational and logical sequence and to ensure a body of knowledge, skills, attitudes and concepts can be built upon. The Ministry of Education has an integrated curriculum matrix generated from an action research project carried out at the school in 1982. Hence with the early research, the matrix was put into practice. The matrix is experimental and at the time of writing, had not been fully implemented.

Ownership can be enhanced if you display the focus and contributing questions in the room and list the children's names next to the questions they contributed. (Be sure every child is involved and has his or her name on the list at least once).

You have now located a place for the potential use of two databases. Both databases are excellent tools for helping the children with their investigation of this topic and will go along way to answering the focus and contributing questions. They can also be used to create related activities and for extension work. It is important to remember however that the software is an aid to the investigation along with numerous other resources. It is important to not let the software be the only resource driving the curriculum.

Of course when children are confronted with a database for the very first time they are going to need to be taught the basic skills of using it and be given some understanding of how it will aid their investigation. What is required here is some forward planning. Things will come unstuck if you arrive on Monday morning and decide to do 'Bushrangers' at nine o'clock. Below is a suggested sequence for introducing databases.

(1) Have used The Bushrangers' Database as an example but the sequence could apply to other databases. The
A SUGGESTED SEQUENCE FOR INTRODUCING DATABASES

There are some prerequisites that teachers should observe before using the database in the classroom. Firstly, familiarity; make sure you are familiar with databases in general and the particular database you wish to use. Know its potential, its limitations and what it is capable of giving you. You may be able to get away with not knowing some software packages intimately, not so databases.

Secondly, confidence; in order to successfully introduce databases you must feel confident about the concept of databases, their potential use and be happy with the prospect of using them in the classroom.

Finally, aims and objectives; you must have it clear in your mind why you are using the database in the classroom. Yes it will help you with your investigation but later on I hope to show you that database activity is more than just presenting information.

PRELIMINARY WORK

In my example you know that you will need The Bushrangers’ Database in week 3. So you need to start well before week 3. A good place to start is to introduce the concept of a database before you introduce a particular database package. Use your creativity plus work sheets from various databases packages to introduce the children to the concept of databases in general and how they can help with your research. Perhaps some work with a less sophisticated package such as ‘First Fleet’ may be desirable.

INTRODUCING BUSHRANGERS FOR THE FIRST TIME

Assuming you have done the preliminary work the first place to start is to introduce the children to the database by showing them a printout of some of the data, say the records of a few bushrangers. It can then be examined, the material can be discussed and the children can get an idea of the field names and the type of information each field contains. A further printout could be shown of calculator data. An analysis showing the age of bushrangers when they began their career would lead to discussion and stimulate interest as well as demonstrating another function of the database (i.e. the calculator).

The next step would be to get the children to do some simple searches using various printouts. Perhaps a worksheet could be created by the teacher to help. It is important at this stage to keep it relatively simple. For example, using the printout showing ‘Age Bushranging Began’ (e.g. from above) children could be asked to find out: ‘How many bushrangers were younger than 20 when they started bushranging?’ or, ‘How many were older than 50 and so on.’

Using printout material again, say the individual files of six bushrangers, you can increase the complexity of the searches. Start with two fields with questions such as: ‘How old was the youngest bushranger and who was his name?’ ‘How many had black hair and blue eyes?’ ‘How many bushrangers were born in England and operated in Victoria?’ and, so on.

Depending on the ability of the children you may then move them onto even more complicated searches: ‘Were any of the bushrangers under 20 convicted of murder and executed?’

If the children have not had much experience with databases then go slowly and structure the experience so it is a pleasant one and most importantly a successful one.

So far the children have not touched the computer, it has all been ‘hands-off’

<table>
<thead>
<tr>
<th>Power and Control</th>
<th>My Example</th>
<th>My Neighbourhood</th>
<th>How other people live</th>
<th>The Area in which I Live</th>
<th>My Country</th>
<th>The World in which I Live</th>
</tr>
</thead>
<tbody>
<tr>
<td>Me/Myself</td>
<td>Me/Me</td>
<td>TWO</td>
<td>THREE</td>
<td>FOUR</td>
<td>FIVE</td>
<td>SIX</td>
</tr>
<tr>
<td>PREP</td>
<td>Step into My Shoes</td>
<td>Decision Makers</td>
<td>Rights, Rules and Responsibilities</td>
<td>Working Together Occupations</td>
<td>Famous Australians</td>
<td>The Aborigines</td>
</tr>
<tr>
<td>Relationships</td>
<td>Family Portraits</td>
<td>Sharing and Caring</td>
<td>Celebrations</td>
<td>My Home My School My Community</td>
<td>My City</td>
<td>I’m an Aussie</td>
</tr>
<tr>
<td>Environment</td>
<td>Our Surroundings</td>
<td>The Weather</td>
<td>Water</td>
<td>Australian Animals</td>
<td>The Sea</td>
<td>A Harsh Land Natural Resources</td>
</tr>
<tr>
<td>Communication and Media</td>
<td>Sending Messages</td>
<td>Communication</td>
<td>Newspapers</td>
<td>The News</td>
<td>The Media</td>
<td>Myths and Legends</td>
</tr>
<tr>
<td>Technology</td>
<td>Toys and Tools</td>
<td>On the Road</td>
<td>Travel in Australia</td>
<td>Our Changing Technology</td>
<td>The Computer Revolution</td>
<td>Energy</td>
</tr>
<tr>
<td>Lifestyles</td>
<td>Healthy Me</td>
<td>Healthy Eating</td>
<td>Rural and City Links</td>
<td>Childhood Now and Then</td>
<td>Early Victoria</td>
<td>Australian Discovery and Exploration</td>
</tr>
</tbody>
</table>

Figure 2 The integrated curriculum matrix developed at Mossgiel Park Primary School in Victoria as part of an action research project in 1991.
work. When you think the children are ready you can introduce the database on the computer. You could do this by asking them to check some of the answers to the 'hands-off' work. Now is the time to introduce them to some of the basic workings of the package.

Again moving slowly provide worksheets of gradually increasing difficulty making sure the children have plenty of time to explore on their own. Structure the worksheets and activities to reflect the questions the children will eventually be asking.

As their confidence grows you can get the children to retrieve data for an authentic purpose. This is the stage where they can start to answer some of their contributing questions — Who? What? When? Where? Of course, after using the database the children will probably have many more questions than they want answered. These can be added to the chart on the wall at any time.

The final stage is to encourage the children to look at the database as more than just a collection of facts about bushrangers. The information can be analysed and interpreted in a variety of ways leading to a number of different conclusions. At this stage of understanding the children can begin to answer their focus questions — Why? How? (Bell & Scott 1986).

The introductory work will be time consuming and frustrating. You will need to be aware of individual differences and it may be that some children or even the whole class will not get to the level of understanding that is required for the latter stages. But the groundwork you do will be the foundation that future teachers can build on and you are not relying solely on the package to answer all your questions, it is just one resource among many.

Some forward planning will be necessary and so will some experimentation. Learning is a risk taking adventure not only for the children but for the teacher as well. Don’t be frightened to experiment and develop your own sequence of lessons that suits your own group of children.

**SO IS IT JUST SOCIAL STUDIES?**

The connection between databases and social studies and science has been well documented and well supported by software developers (e.g. Sunburst, Knoware, Dataworks). Many authors have acclaimed the virtues of databases for inquiry learning, for hypothesis testing and for information gathering (Kerr 1986; Education Department of South Australia 1986; Hancock 1989; Bell & Scott 1985; Wills et al. 1986); software developers have produced an array of database management systems and data files to match. There seems to be little doubt that databases have much to offer the social sciences and science environments but there is much more to it than that.

Thinking of the activities that the children will be involved in while working on databases as just social studies, or just science, is a very narrow view. When you introduce database activities you are creating a learning environment where a number of very desirable learning processes are at work.

If you have the children using the database in small cooperative learning groups you give them the opportunity to share information critically, to question, argue, persuade, and so on — they must read, listen, talk and write — for all an authentic purpose — to get information that will help to answer their focus and contributing questions. Database activities in small groups places the children in a whole language environment. They use the four modes of language for productive ends.

Mastering all aspects of language is a thinking process. It is imperative to teach children to think. They cannot learn to read successfully if they are not taught to think about and interpret what they have read or what someone has said, or what a classmate has written. A successful learning environment will challenge children intellectually.

Database work is an intellectual challenge. By using databases in your classroom you can provide opportunities for children to exercise a number of important cognitive processes such as: observing, questioning, hypothesising, generalising, reflecting, inferring, predicting, analysing, synthesising, problem solving, planning, decision making and so on.

Developing thinking skills is so important yet is overlooked by many teachers. The database environment is an excellent avenue through which the cognitive domain can be brought back onto the agenda.

A successful learning environment fosters certain personal qualities such as: open-mindedness, creativity, persistence and determination, curiosity, cooperation, independence, self-esteem, group discussion, self-control, risk taking and so on. Children will not develop these personal qualities if they are not put into situations where they are necessary to achieve the desired goal. If we don’t all cooperate we won’t be able to get the information we need.’

They must be given the opportunity to strive, persist and succeed and to experience how cooperation can achieve the group’s goal. As the teacher you must encourage these personal qualities and reward children for displaying them. Rewards do not always have to be stickers, sweets or bookmarks. The best rewards are intrinsic — the joy of striving for and reaching your goal; the sense of pride in a job well done; genuine praise from people who care.

Cooperative groups working on the computer can be an excellent environment for fostering and developing these personal qualities.

Not well documented is the connection between mathematics and databases. As your familiarity and confidence grows you will begin to understand the mathematics of database systems. Many teachers struggle to integrate mathematics into other areas of the curriculum; to develop authenticity and relevancy. The database environment is loaded with mathematical concepts: graphs, pattern and order, equality and inequality, percentages, logic, problem solving, sequencing, order of operations, visual representation, statistics and so on. It provides many opportunities for the creative teacher to demonstrate how the skills of mathematics can be relevant to an investigation.

An added advantage of using databases in the primary classroom is that you are introducing children to a software application that has widespread use in the business world and the community at large. You are enhancing their computer literacy and awareness. By using the computer as a tool to aid their investigation the children see the machine in its correct context and they receive practical computer experience as part of their normal teaching—learning experience. (Newhouse & Oliver 1990)

Learning is a natural process. Children are naturally curious and inquisitive; it is human nature to want to know. As teachers you need to capture that curiosity and use it to your and the children’s advantage. A powerful way of doing so is to organise the curriculum so it is integrated and to introduce database work to your students as a tool in aiding their investigations. Using databases in your classroom in this way is a legitimate and rewarding educational process.
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SOFTWARE

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continued from page 26

who enjoy carefully sequenced and finite ways of learning. The in-built flexibility of the program allows other students to explore their own ideas laterally and use the task sheets as a spring board for their own creativity, demonstrating the power of this media to be a wonderful tool for whole-brain learning. The left-brain assimilation of the technical and sequential processes is a necessary part of the creative process leaving the right brain free to fly with ideas once there is technical automaticity.

Howard Gardner (1983) proposes what we see as ‘intelligence’ in mathematics is seen in the artist as a ‘gift or talent’, one of our other forms of intelligence. He maintains that we are truly complex beings made up of multiple intelligences and those of the arts are some of these intelligences. In that case there is a talent in all of us and it is the role of the teacher to find a road that each student can journey down to explore and mobilise his or her creativity.

Image generating computers and their associated technology are a truly open-ended tool for every student’s journey to creativity and whole-brain learning.

BIBLIOGRAPHY


continued from page 31

computer and non-computer games can then be designed to meet teacher and student expectations and requirements. According to Myers (1984), the best computer game designers are the best artists, those who examine broadly whatever is learned from games played in their natural environment and apply the same general qualities to computer games. Similarly the same general qualities should apply for non–computer games. These qualities should include how to feel or empathise, how to understand, and not in the strictest sense, how to know.

REFERENCES


