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Occasional Papers 2003

Teaching Smarter:

Using integrated rich tasks to enhance learning

by Irene Cooper

Integrated rich tasks in the classroom engage students and can lead to deep learning, but they require a high level of organisation, commitment and teaching skill.

The integrated teaching approach

Integrated teaching has always been a strength of the primary school teacher. Linking subjects across the curriculum recognised that knowledge could not be compartmentalized, and fitted well with the concept of "natural inquiry" or "discovery learning" long advocated by educationalists from Dewey to Piaget. During the 1970s in New Zealand "thematic" teaching, "integrated units" and "centre of interest teaching" expanded the concept of integrated teaching. In the 1980s and 1990s, learning became more child-centred. Teaching units were discussed, debated and clarified by both teachers and more recently by students and ideas for investigation were negotiated. As a result students became more engaged with their work and showed greater persistence with tasks.

The integrated teaching approach provided a better platform for cognitive development such as higher order thinking, problem solving and the acquisition of deep knowledge and understanding. Enquiry-based learning which linked problem solving with higher order thinking became defined as "rich tasks".

As part of its "New Basics" project the Queensland Education Department has developed rich task models which attempt to make learning more relevant to students and the future world they will work in. These rich tasks are based on real problems, which require students to analyse, theorise and engage intellectually with the world. In this way, tasks connect to the world outside the classroom. However, the fact that these rich tasks have been devised by curriculum "experts" in the Education Department may detract

This research was supported by a NZEI Te Riu Roa Scholarship

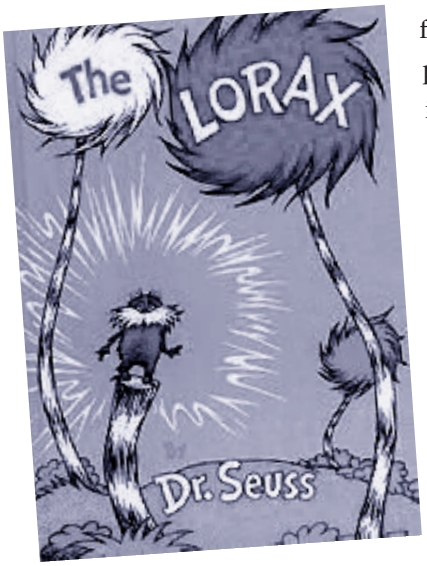
form their value. Carrying out centrally mandated tasks with no ownership by either teacher or students undermines independent learning and a sense of involvement. In addition, the teacher may not be committed to that pedagogical approach or may lack the experience to use it as an effective learning tool.

Nevertheless, integrated rich task teaching can be a powerful learning tool when constructed by an experienced teacher committed to the philosophy of integrated teaching.

How does integrated rich teaching work in practice? As principal of a city school with a strong learner centred philosophy I set up a research project to examine how an experienced teacher using an integrated rich task teaching approach organised the teaching tasks to ensure quality outcomes for students and the extent to which the intentions of the teacher were reflected in those learning outcomes.

Marianne, the teacher who elected to take part in the research, was a highly effective experienced teacher who had been teaching for more than a decade. Her class was a year two and three composite of 31 students aged between six and seven years. She selected six students who provided a mix of ability in the class. The research was divided into four phases:

- teacher pre-planning
- teaching
- assessment
- teacher feedback and discussion with peers.



Marianne identified the issue *"Is waste a problem?"* as the context for the integrated rich task study. She developed this as two distinct problems, one of which was concerned with identifying some big issues of environmental concern and protection. To introduce this she used the story of *The Lorax* by Dr Seuss. Her second focus was to identify and resolve environmental issues on the school site through a classroom and personal action plan. Each part was to be shaped through negotiation with students into a separate rich task. Each task involved understanding a complex problem or issue and taking social action, which could have a positive effect on the world beyond the classroom. The first of these tasks was the focus of this research.

The full teaching unit of both tasks was expected to take a term (ten weeks) to complete.

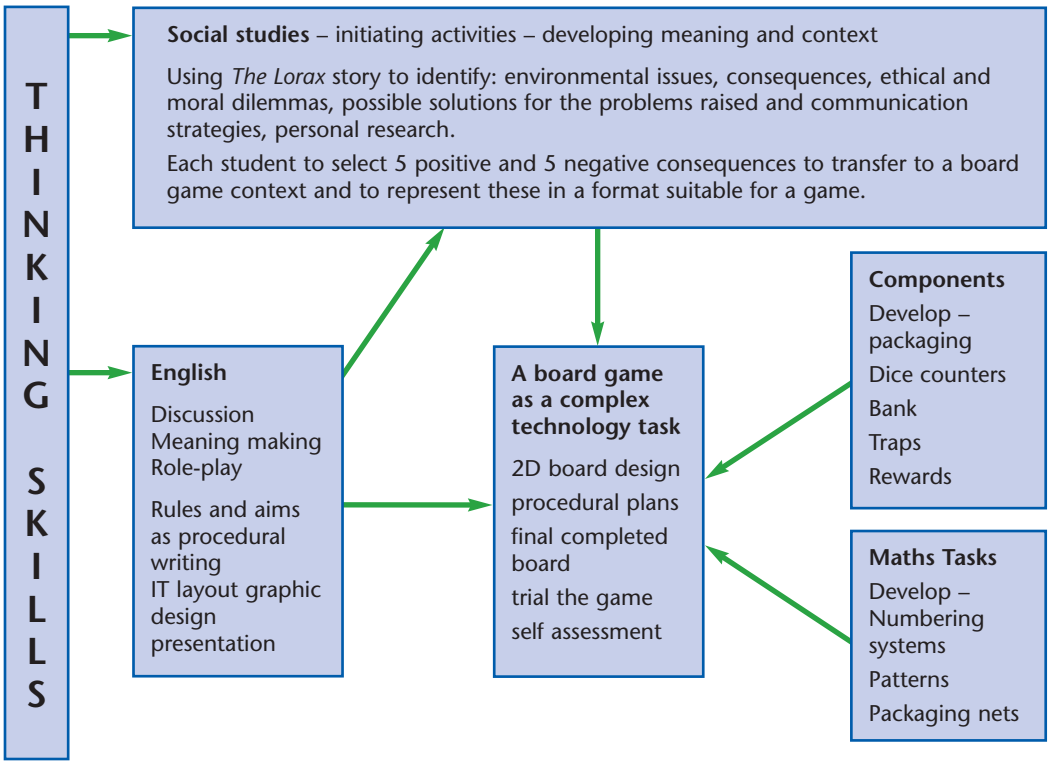
1. Planning the integrated rich task teaching unit

After discussion and negotiation with the students Marianne was able to define the rich task:

> From the story of *The Lorax* by Dr Seuss identify major issues relating to environmental protection, determine consequences and possible solutions. Develop your ideas into a children's board game, which communicates environmental messages.

The *base plan* embedded teaching within the essential teaching areas of social studies, English, mathematics and technology through the curriculum statements. The plan involved the use of information and communications technology (ICT) as tools of learning. Development of higher order thinking skills was also considered at the planning stage and permeated the teaching approach. The plan drew on the different subject disciplines to build student conceptual knowledge and develop particular procedural and technical skills that contributed to solving the problems inherent in the rich task. The task was designed so that the students could relate it to the world outside the classroom.

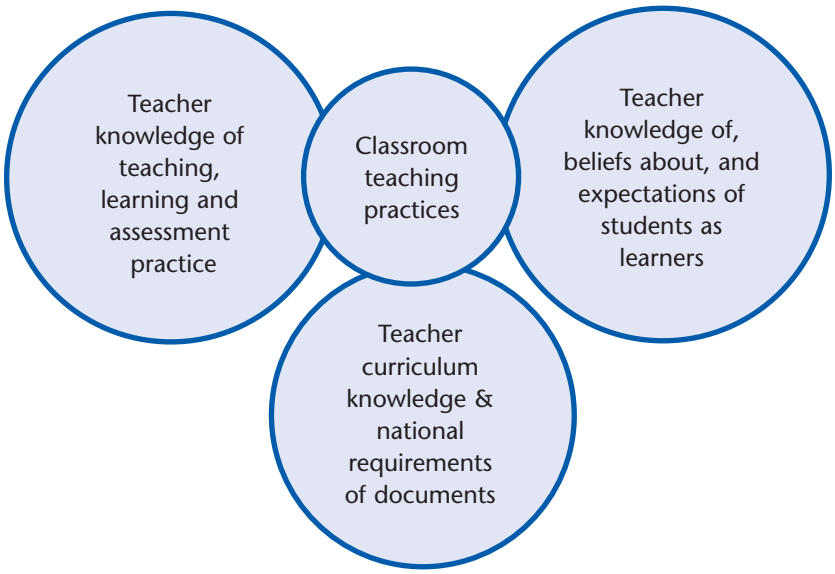
Assessment was considered in the planning phase as the development of a set of enabling outcomes that were integral to the purpose of the teaching, the teaching process and the rich task. As the diagram below shows, a key function of the task was the transfer of learning between disciplines. Opportunity for transfer of learning was an intentional part of Marianne's planning.



Elements of the Rich Task

Marianne began the project by mindmapping the topic from her perspective. In this initial plan she took account of the spiral and cyclical nature of the curriculum, considering what had already been taught and what was planned for the rest of the year. She wanted to build links between experiences and strengthen learning opportunities. Students would be expected to revisit ideas, to build on existing ideas and to apply their ideas to solve new problems, create novel solutions or contribute to an innovative independent or group task.

2. Teaching the integrated rich task



Marianne was influenced by three sets of teacher knowledge in working with her students to complete the task (see diagram above). She determined suitable pathways to follow, planned the route with the students, and gave them their own maps to guide their travel. By "reading" the classroom and using a mixture of direct teaching and careful guidance, she responded to signposts along the way, averted problems, re-engaged students, monitored, listened, questioned, clarified and intervened with strategies to ensure that different needs were met and everyone had the best chance of reaching the destination with success and a sense of independence. Every part of the lesson sequence was carefully organised for its value in developing understanding of the issues, its place and timing in the sequence and its purpose.

A lot of decisions about curriculum direction were made while Marianne was teaching. Planning for this was an ongoing process done mainly in her head, against her own notional map of options, possible pathways and solutions. Modifications to the sequence were made in response to a range of triggers within the lessons which showed her ability to identify triggers, and devise further action on the spot. Each day she made time to reflect on progress towards her goals, and consider next step learning and future pathways. Marianne had high expectations of each student and catered for their individual strengths. She used a range of specific skills and strategies to enhance student learning.

a. initiating the teaching programme

Marianne's aim was to gain student interest and "buy in" to any following work. She knew from previous experience that the Dr Seuss story *The Lorax* appealed strongly to students. As she read the story, Marianne promoted active listening, and critical reflection to engage students. She linked the word "environment" to previous learning from units on Samoa and The Rocky Shore. From the outset students were focussed on the purpose and appeared to be broadening their concept of environment through a new context.

b. Using questioning and thinking skills to build meaning and deep understanding

Marianne's use of thinking skills permeated her teaching and questioning was an important teaching strategy for this. She regularly used a sequence of questioning which moved from surface features to deep thinking in order to identify underlying issues and intentions. She used "gathering" questions, "processing" questions and encouraged "making your own questions" to ensure that deep thinking happened.

A second reading of the story involved close viewing of the pictures only, with the students providing an oral recount of events. This enabled a very detailed text to be reworked and the concepts explored further through the visual aspects. Marianne explained that she used this strategy to capture the visual learners, to give all students a second chance at owning and identifying issues previously raised, and to add more detail in their "mind's eye".

As the discussion deepened, common response starters from students were "*I think he might be...*" as they tentatively explored issues. The teacher followed up with "*Who agrees, who has a different idea? Another? Why?*" In this way she challenged students to make decisions and argue their points of view. She ensured that the majority of the talk was student talk rather teacher talk. Her role was to facilitate the discussion, shape the direction and provide challenges that were in the proximal zone of student thinking, leading them further and deeper into analysis, including ethical considerations, moral judgments and incongruence.

c. Grouping strategies that supported learning

Lessons were structured so that all the students contributed ideas. The processes for gathering information moved from whole class to individual and small group, then back again to a whole class forum where ideas developed by small groups and individuals could be shared,reviewed and discussed. Students worked in pairs, teams and individually to record and develop ideas. This was carefully planned and gave the teacher a baseline of information about each child from which to plan and provided a means of comparison against later responses. Through sharing, the pool of ideas from students was increased and each idea was considered under the careful questioning of the teacher. In turn, the students gained experience in different learning groupings. Such social inter-action and team work were important aspects of learning that could be applied in life.

d. Techniques to support differential learning and levels of challenge

Throughout her teaching, Marianne used strategies and techniques that have been associated with education programmes for gifted students. However, here they were being applied to students of varying abilities. Extended brainstorming techniques, developing semantic webs, grouping, classifying, analysing and generating solutions were used to explore issues. Directly and indirectly Marianne provided structures or organisers for tasks.

Direct feedback was provided to groups and individuals in relation to goals, priorities, quality and progress. She coached, monitored and reflected on the process and the progress, looking for the next important link and how to build success.

e. Making experiences "real"

To change the pace and build in active experience Marianne used "role on the wall" a drama process activity to get students to role-play and "feel" the issues and take ownership of them. This involved interviews with the characters in a mock television studio, asking them about the environmental effects and how they were feeling. Some students who had not been enthusiastic writers were animated actors. Most students contributed questions to the interviews. All expressed points of view through the interview process. These were relevant to the characters, their role in the story and their current predicament. There was a high level of engagement throughout the activity and everyone contributed.

f. Problem solving

The TV interviews provided the teacher with a natural next step for learning. Students moved off to complete thirty minutes of personal writing before coming together to share their ideas. Solutions and ideas for action that would create change were developed. This meant students had to take the negative environmental effects that were raised in the story and generate positive actions that would make a difference.

g. Prioritising and shaping direction to optimise learning pathways

Consequences and actions were picked up by Marianne to carry forward into the rich task. Many of the solutions the students had were beyond their ability to achieve and control. They required society to change. What they could do was to communicate the message. Possibilities to do this became the next teaching focus. Students identified, television, radio, adverts, letters, games, shows, documentaries, the news, email and the internet as possible ways of getting theft message heard. One student suggested that they establish www.lorax.com as a website. It was this range of ideas that influenced the direction of the rich task. *The Lorax* story was a fictional world and so a board game, which was another representation of a fictional world, was agreed upon as a suitable vehicle.

h. Home and class link to learning

Regular homework provided an important link with home in getting resources and support for the learning programme. There was a core expectation that the basis of homework would be routine practice activities, in reading, spelling and basic numeracy. Students were also encouraged to collect articles of interest to the class, or share with their parents literature that they had enjoyed. Parents also contributed information that would assist the current class programme. However, from time to time, Marianne also

developed creative problem-based tasks for students to work on independently. These were given as homework contracts with each student having a timeframe of a week for completion. This ensured that they had personal challenges and practiced time management skills out of school. An information sheet was provided for parents so that they were also clear about the task.

3. Assessing integrated rich task teaching

Assessment was interwoven with the teaching and became integral to the work in progress. It shaped the development of the teaching plan, the emerging lesson sequences and the structuring of task requirements. It underpinned the challenges set by the teacher for groups and individuals. Teacher information was collected through observation, discussion, careful listening and testing the boundaries with her questioning. Student work samples and agreed task requirements were negotiated as planned assessment and completion of these tasks included student self-assessment. These provided evidence of performance and were used as demonstrations of student achievement. During the rich task development, Marianne collected evidence of student achievement. This focussed on significant skills, processes, knowledge and attitudes in relation to the curriculum and to the integrative nature of the task. Throughout the teaching programme, process information was gathered so that the developing views of the students and their explanations were recorded and examined by her.

Portfolio evidence as demonstration of achievement

The board game was the culminating assessable outcome of the teaching programme. It was described as a "complex technology task". Student performance on the task was to be reviewed against specific learning objectives and criteria. By the end of the term, which marked the conclusion of task, every student had to prepare a portfolio containing:

- 2D working plans of the environmental board game
- the completed board game with its packaging
- a sheet of aims and rules for play
- the counters, dice and any cards or play money
- a completed student's task sheet and self-assessment sheet.

Together the contents of the portfolio provided evidence of student achievement, which the teacher considered when writing an evaluative statement.

The board game as an assessment task

To enable students to interpret the teacher's intentions, specific criteria for the board game were developed with students. These were written in the students' language, and expanded on the curriculum objectives. Students were encouraged to use creativity

and a novel application to the task. To help students focus thinking at the conceptual and procedural level Marianne posed three guiding questions.

- *What are the main features of a board game?*
- *What elements do a good game include?*
- *What other things need to be considered to make the game successful?*

Using expert models

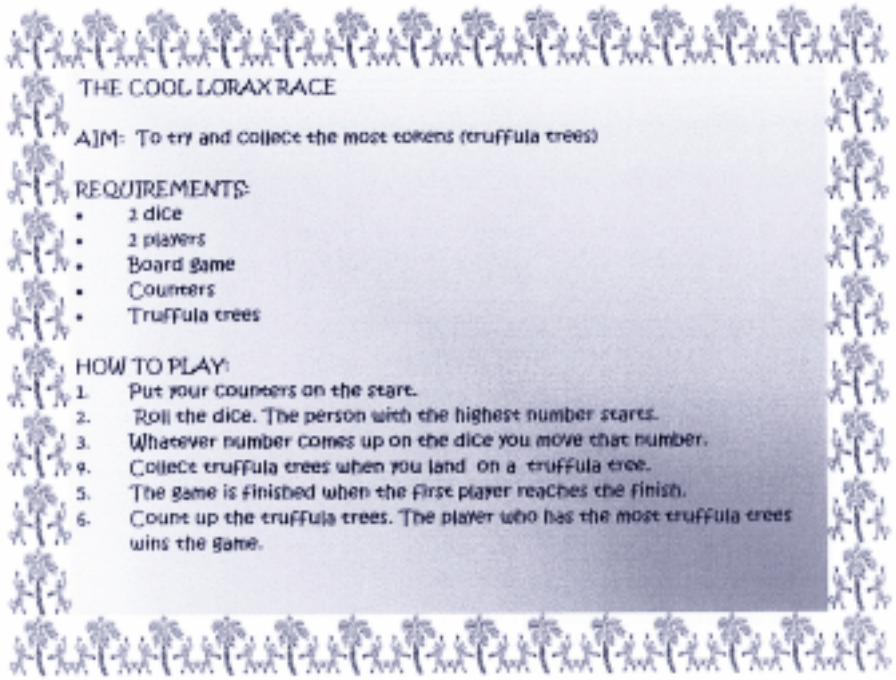
Students were encouraged to look closely at the commercial board games in their own classroom. These provided expert models and information for them. They also looked at games made by a year four class and talked with the makers of the games. They then played the games and provided evaluative feedback for that class. Discussions were held with these experienced game makers to establish the purposes, challenges and thinking behind the games. Following this, each student wrote an initial set of criteria for successful board games. The class to make a comprehensive class list shared these. From this list the parameters and sub components of their rich task emerged.

Refining the list of proposed solutions

Students identified the main features of a board game. It had to be attractively presented and fun to play. It had to have a set of rules to play and have a purpose. The consequences in their games had to relate to environmentally good or bad practices and these had to be sourced from *The Lorax* story. Construction needed to be durable, made of strong cardboard or corboard and laminated. Finally, the game needed a suitable title. The core criteria for evaluation were then agreed upon and prepared into a task checklist list. This encouraged students to monitor their own progress.

Monitoring, feedback and intervention

The teacher provided roving help and scheduled conferences as a way to monitor progress, to check thinking and to note problems that warranted group instruction rather than individual intervention. Students used their task sheets as a checklist of progress and what still needed to be done. Marianne was more directive with those who were not yet able to manage their own work responsibly. This meant she had different management and monitoring schedules for the more independent and the less independent learners. Task completion took different amounts of time and it required persistence on the part of the teacher to get the last few games completed. The class size made this part of the teaching very demanding. The teacher worked with groups and individuals by posing questions that helped them to resolve problems and by getting students to refocus on the elements and criteria they were working to include. Specific teacher feed back and feed forward was used to form a link between the overarching concept of a functioning board game, the procedural plan and the technical skills and strategies to accomplish the tasks.



THE COOL LORAX RACE

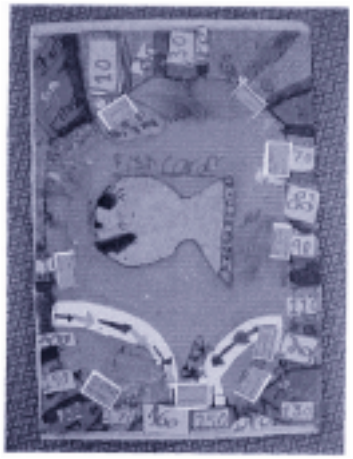
AIM: To try and collect the most tokens (truffula trees)

REQUIREMENTS:

- 1 dice
- 2 players
- Board game
- Counters
- Truffula trees

HOW TO PLAY:

1. Put your counters on the start.
2. Roll the dice. The person with the highest number starts.
3. Whatever number comes up on the dice you move that number.
4. Collect truffula trees when you land on a truffula tree.
5. The game is finished when the first player reaches the finish.
6. Count up the truffula trees. The player who has the most truffula trees wins the game.



Teacher evaluations

Marianne completed evaluative statements at the end of the teaching when all the portfolios were completed. She felt that these statements were still in the early stages of development. These statements reported on student success against the criteria in a complex technology task. They included comments on the quality of student work including thinking and problem solving, task commitment, areas of initiative, innovation and challenge, student independence and time management skills.

4. To what extent did the teacher's intentions appear to influence the performance outcomes of students?

One way to establish a match between teacher intentions and student-learning outcomes is to follow a student's progress in the classroom and see if there is a match between what the student says and do and what the teacher intended. The students were observed and interviewed to determine how successful this match was.

Working together

The students made the games in pairs, from a 2D plan. Skills of negotiation and a willingness by students to work together cooperatively, with each playing an active role, were necessary to complete the task. Most remained on task and focused for long periods. Up to half the teaching day was dedicated to the task. Students were observed to work though breaks in the school day including their own lunchtimes. Parents reported high levels of enthusiasm, and discussion at home about the environment and the activity.

Developing the consequences for the game

Consequence squares carried the environment message to the board game and were very important. This task was completed on the computer using a specific template provided by the teacher. In developing the consequence squares for the boards, students were asked to quickly write down at least five environmental negatives arising from *The Lorax* story and to generate an environmental positive for each negative through their own thinking. Many students did a lot more.

Maths problems in the game development

Problem solving was ongoing as students developed their plans and tried out ideas. Students used their mathematics skills to work out numbering systems for the board which involved them counting in twos, threes, fives and tens to mark the track and use of estimation and calculators for checking.

Rules, aims and objectives as procedural writing using ICT

As they worked through their criteria, the students needed to use a specific format for procedural writing. It was a format with which they were familiar. When word processing sets of requirements for the games (aims, rules for play) they considered lay-out, print size, font, and border as part of the task. Then they considered and made all the components, which contributed to a successful product.

Self evaluation

On completion of their games students completed their checklists and self-evaluation reports on how well they had got on with the task, whether they had each completed all the requirements of the task and what they thought of the standard of their work. Students reported against the criteria and the purposes for the task in reasoned and realistic ways. They articulated a conceptual understanding of the issues raised in *The Lorax* and had been able to apply them to the game board as positive and negative moves. They could discuss consequences in relation to the story and from their own ideas.

Task complexity

The students identified working with a partner and completing a rich task activity as harder than working in discrete subjects. There was a remarkable level of agreement between what the students reported about their learning, what the researcher observed happening, what the teacher established through the curriculum and the specific criteria as desired learning outcomes, and how she reflected her practice in the final peer reporting. The completed board games are a culminating outcome and show that each pair completed the rich task to a high standard. The supporting portfolio evidence confirms procedural completion and provides student comment.

Teacher peer response group

The peer response group provided an invaluable way of sharing practice and fostering professional discussion. The multi-dimensional nature of integrated rich task teaching was discussed and teacher responsiveness to the students, teacher craft and subject skill levels were all acknowledged. Workload intensity for the teacher was balanced by the buzz of innovation and student motivation. The novice teacher saw this approach as not suitable for those in the early years of learning their craft because of the complexity of the teaching. Developing a shared understanding of summative assessment to capture the complexity of integrated rich tasks was thought to be an area that warranted further consideration.

Conclusions

The conclusion reached is that a highly skilled teacher working with a rich task teaching approach can make a significant difference to student learning. Necessary conditions that underpin the teaching approach are found in the planning, the teaching and the assessment practice.

In the planning phase an essential representation of the nature of subjects, the development of conceptual and procedural objectives alongside societal objectives to enable completion of the rich task as a culminating outcome was important. Also important was the development of specific technical skills.

In the teaching phase several elements were critical: negotiation of the plan, ownership by students of the task, and the teacher displaying a repertoire of practices which were inclusive, skilfully responsive, appropriately supportive and focused on the goals of the plan. An important element was the establishment of varying levels of challenge which matched student ability.

In assessment, having a view of what is to be achieved embedded in the curriculum, planning outcomes specific to the purpose and the journey and providing monitoring and feedback in pursuit of the goals and the detail ensured success. The use of enabling criteria, collection of evidence as a demonstration of learning and student self-assessment were all-important.

The teaching approach was very complex, required high levels of skill and relied on the teacher's understanding of integrated teaching practice. It was not a simple design down process from predetermined outcomes nor an inflexible sequence of overlapping curriculum organised as a simple lesson sequence. Rather it was a dynamic approach developed through iteration between the teacher plan, the desired goals and the students.

REFERENCES

Australian National Schools Network, with Coalition of Essential Schools (USA) (2000), *Student Work : The Heart of Teaching.*

Beane, J. A. (1997), *Curriculum integration: Designing the core of democratic education*. New York: Teachers College Press.

Clandinin, D.J. (1989), Developing Rhythm in Teaching: the narrative study of a beginning teacher's personal practical knowledge in classrooms, *Curriculum Inquiry, 19 (2), 121-141*.

Cushman,K. (1996), Looking Collaboratively at Student Work: An Essential Toolkit *Horace*, Vol 3, No 2, Nov 1996 . The Coalition of Essential schools.

Education Queensland. (2000), *New Basics: Theory to practice*. Brisbane: Author.

Fraser, D & and Whyte , B. (1998), *Curriculum Integration Milestone Report Three*. Report to the Ministry of Education. Wellington. MOE.

Fraser, D & and Whyte , B. (1999), *Curriculum Integration Milestone Report Four.* Report to the Ministry of Education. Wellington. MOE.

Hattie, J. (1999), *Influences on Student Learning,* Inaugural lecture: Professor of Education, University of Auckland. 1999.

Hattie, J. (2002), *What are the Attributes of Excellent Teachers?* in Teachers Make a Difference: What is the research evidence? Proceedings of the NZARE Conference Wellington. Oct 2002.

Hayes, D., Lingard, B. & Mills, M.(2000), Productive Pedagogies. *Education Links*, Vol 60. pp10-13.

Lingard, B. (2002), *Teachers Making a Difference: Productive Pedagogies and Productive Schools*. New Zealand Council for Educational Research Annual Conference Wellington. 2002.

McGee,C. (1997), *Teachers as Curriculum Decision Makers*. Palmerston North. Dunmore press.

Ramsay, P., & Oliver, D. (1994), *Teacher Quality- a Case Study Approach*. Paper presented at the New Zealand Teacher Education Conference, Auckland.

Sadler. R, (1989), Formative Assessment and the Design of Instructional Systems. *Instructional Science,* 18, 119-44.

The New London Group. (1996), A Pedagogy of Multiliteracies: Designing Social Futures. *Harvard Educational Review*, 66(1), 60-92.

Whyte, B. (1995), Learner-centred Teaching Styles: Perceptions and practices of teachers. *Waikato Journal of Education*, vol.1, pp. 137 –149.

Note: This is an edited version of Irene Cooper's paper. The complete text is available on the NZEI Te Riu Roa website www.nzei.org.nz

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ISSN 1175-981X
Published by New Zealand Educational Institute, September 2003