TEACHING QUESTIONING WITHIN A CURRICULUM AREA: "I NEVER KNEW YOU COULD STEP UP YOUR QUESTIONS"

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INTRODUCTION

If excellence and equity are to be goals for all students in a linguistically and culturally diverse class, new ways of delivering the curriculum based on research in language and pedagogy need to be followed. The NZ Curriculum Framework (Ministry of Education, 1993a), which suggests that teachers teach the essential skills alongside the essential learning areas, provides another impetus for delivering the curriculum in a different way. While there is a language dimension to all curriculum statements, the fundamental language skills need to be made more explicit and thus underpin the delivery of the curriculum (Penton, 1996). This research shows empirically how one of the essential language skills, listening, can be taught within the context of the curriculum in a manner which benefits both L1 and L2 students. Thus equity is not compromising excellence.

LISTENING IN SCHOOLS

This article draws on my experience as a teacher in a large multicultural secondary school. Working with teachers and learners as a researcher compelled me to investigate skills which could be explicitly taught to enhance students' listening development through the curriculum. The predominant way of acquiring information in secondary schools is through listening to the teacher. While teachers need to be taught how to make their input comprehensible, students need to be taught how to process that input. Listening to text and extracting information, specified in the English curriculum (Ministry of Education, 1994a) requires sophisticated listening skills which are presumed rather than taught. Effective listening to text needs to be taught and rehearsed in all curriculum areas. Too often learners do not see the applicability of skills learnt in one subject to learning in another area. The challenge for teachers and researchers is to find ways of teaching these skills so that the range of needs in a mixed-ability, multicultural classroom is met, and the students understand how to transfer the skills to other subject areas.

Skills for listening: notetaking and questioning

There are several criteria to consider when choosing which skills are worth teaching students. Relevance of the skills to the demands of the curriculum and their usefulness in students' lives as well as the degree of mental activity which skills may prompt are important considerations. Skills such as copying or memorising may be predominantly reproductive, whereas other skills, such as elaboration, prompt deeper processing of ideas and are transformational (Cook and Mayer, 1983). The skill most often used when

extracting information while listening to text is notetaking, and there are ways in which notetaking can be made to be more transformational than merely reproductive (Nation, 1992; Gray, 1995). Useful accounts detailing how notetaking can be taught are available (Smith and Thompkins, 1988; Stahl et al., 1991). Work by King (1990, 1992) however suggests that questioning can also be an effective tool for deep processing of ideas when listening to text. Questioning is the focus of this article on classroom research.

Levels of student questioning

King argues that the mental activity required to formulate questions promotes greater depth of processing than that required to take notes and subsequently leads to better retention of information. In King's earlier studies students were given prescribed question stems, for example *"What is the main idea of?"* and *"What do you think would happen if?"* as the basis for generating their own questions to lift the cognitive level of their questions. These students outperformed notetakers in delayed knowledge tests, but, while the questioners became proficient at using the provided stems, they did not advance to generating their own question stems, remaining content to use the different types or levels of questions and the reasons for asking a range of questions at different levels. Thus in King's study (1994) students were being taught not only skills but also the language to analyse and discuss the types of questions they were formulating.

Herber's (1970) three level guide designed for reading comprehension is a specific way to categorise levels of thinking which many teachers will be familiar with. The three level guide includes the following types of comprehension: factual or on the lines; inferential or between the lines; and elaborative, beyond the lines. Similar distinctions can be drawn in listening activities (Gray, 1995).

Cultural questioning and pedagogy

Formulating questions, an important language skill underpinning the curriculum documents, does not necessarily come naturally to all students. Students are expected to be able to frame questions for many activities such as research, processing information and investigations (Ministry of Education, 1993b, 1994a). Explicit teaching of questioning needs to be part of the curriculum since for many students such a skill is not a part of their linguistic or cultural repertoire. Within some cultures, questioning especially of an authority figure is seen as impolite. As one Pacific Island student reported to Jones (1991, p.99):

> *Linda: I don't ask questions, even when I don't know something*
> *AJ: Why not*
> *Linda: Well she's already taught it so I should know it. I should! She'll think I'm rude and not listening and that.*

This example shows not only how valid cultural courtesies need to be acknowledged in skills such as listening and questioning but also how active listening and questioning techniques need to be taught in a non threatening environment.

As Delpit (1988) argues, it is vital to make overt the covert learning processes and values that underpin our education system, especially skills which may not be part of the socio cultural repertoire of learners outside the dominant culture.

Before teaching any skill to adolescent learners, it is important first to establish with them the wider purpose for time being invested in this activity. Too often students of this age perceive education as merely school work. They see no clear link between the isolated fragments of work given to them to complete and the wider purposes of learning (Bereiter and Scardamalia, 1989), so engagement in their own learning is low. However when students are convinced of the value in investing time and energy into learning a skill and see possibilities of being able to practise and use it in other situations, motivation is high (Pressley et al., 1989). Metacognitive awareness activities can also help engage learners by showing them how to understand what they are doing and point out how they could improve.

METHOD

The study was designed firstly to see whether students working in a curriculum area could learn and demonstrate the skill of formulating questions at different levels while listening to text; and secondly how L2 students of differing language proficiency in English would progress compared to all students over the pre-test and four sessions of the programme.

Subjects

The research was conducted with forty eight students from two mixed ability fourth form classes. Half of the students learned notetaking and the other half learned questioning. Of the forty eight students, twenty five spoke a language other than English at home. There were fifteen different languages represented. The results reported here concern the performance of six L2 students in category five[2] and six category three[3] L2 students who were part of the questioning group. The categories were the Ministry of Education (1994b) criteria for ESOL funding to schools. The results of these two groups of L2 students will be examined against the wider context of the total questioning group.

Procedure

The sessions took place in the timetabled one hour science classes. Information for the current science topic "Human Reproduction" was collected by the researcher and rewritten into five minute mini lectures which were then audio taped. Baseline data was collected about the quantity and quality of questions students were already formulating. The student questions generated in the pre-test were categorised according to Herber's three level guide. The students were then divided into groups of high and low questioners on the basis of

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[2] Reads,writes and speaks English competently - needs no additional support

[3] Adequate oral English but needs reading and writing support

these pre-test results. The training in questioning was conducted over four subsequent sessions.

After the pre-test, each session began with revision of the content from the previous session by examining questions which had been written by the students. This revision and discussion time reminded students of the different levels of questions, and further examples and explanations were added to the class chart (Appendix 1). Students were then told of the topic for that session and key words were written on the board and discussed. As the students listened to the audio tape they wrote questions. An extra five minutes was then given for formulating more questions before students worked in pairs asking and answering questions. Still in pairs, students scored each other's questions as belonging to level one, two or three with reference to the chart and entered their tally on grids in the learner diaries they were keeping. Each session finished with a reflection exercise designed to help students become more aware of their own listening and learning processes while developing questioning skills.

Analysis

Students' questions were collected at the end of each session. The questions were read by two colleagues and categorised as level one, two or three questions as on the class chart. This chart, emphasising the nature of questions, had been constructed by students and teachers, one of whom was the researcher. Each valid question scored one mark. Students' responses to the in-class reflection exercises and in their learner diaries were also collated and analysed.

RESULTS

One of the effects of the programme was to focus students on the higher levels of questioning, as evidenced by the increase of level two and three questions generated over the four sessions shown in Table 1.

	Level 1: Factual	Level 2: Inferential	Level 3: Elaborative
	Mean	Mean	Mean
Pre-test	5.6	1.7	0.0
Day 4	5.6	3.5	3.2

Table 1 Means of levels of questions asked by all questioners

High questioners

Among the forty eight students there were interesting comparisons between the high and low questioners As can be seen in Table 2, the mean number of questions generated by the high questioners also remained relatively stable over the first four sessions (10.3 in the pre-

test and 11.0 on day three). However the mean proportion of level one, two and three questions formulated changed over that period. Day four saw a pronounced increase in the total number of questions asked, and level three questions outnumbered level two questions. High questioners not only learnt to formulate more questions but diversified the levels of questions generated and made up their own question stems.

	Level 1: Factual	Level 2: Inferential	Level 3: Elaborative
	Mean	Mean	Mean
Pre-test	7.9	2.4	0.0
Day 1	7.6	2.2	1.4
Day 2	6.5	3.9	1.6
Day 3	5.6	3.2	2.2
Day 4	6.9	4.0	4.5

Table 2 Means of questions asked by high questioners

The contrast with the L2 learners (the subsection of six students in category five within the larger group of high questioners) shown in Table 3 is interesting. It seemed that these L2 questioners were already competent at formulating level one questions and were generally ready to move onto formulating level two and three questions. The change in levels of questioning was picked up with enthusiasm by most of the group

By the final session all high questioners, both L1 and L2, were formulating elaborative level three questions. However level three questioning was more marked for these L2 questioners. Questions seemed to flood out of them:

>*"When a new life begins is it just cells combining together or is it God creating a new life?"*
>
>*"When two cells divide and divide again to begin forming the baby does the size of the cells change?"*
>
>*"Why is it that we have no memories of the time we spent in our mothers' womb?".*

One student reported,

>*"My mind is always full of questions that I am too scared to ask in class but now I know it is a good thing to ask my questions".*

	Level 1: Factual	Level 2: Inferential	Level 3: Elaborative
	Mean	Mean	Mean
Pre-test	9.7	3.5	0.0
Day 1	7.7	4.0	3.2
Day 2	9.0	2.5	2.0
Day 3	6.2	4.5	4.5
Day 4	6.7	5.5	6.2

Table 3 Means of questions asked by L2 (category five) questioners

However for one L2 (category five) student the challenge to diversify levels was not greeted with such enthusiasm. "Sharon" wrote twenty eight level one questions during the pre-test and was quite shocked to find out that there were other sorts of questions to ask rather than just those at the level one recall. She would have preferred to have remained focussed on generating many recall questions. At the end of the programme she wrote,

> *"I still don't understand about level three questions and I still do not see the point of them."*

Low questioners

The mean number of questions generated by low questioners improved steadily throughout the treatment (3.4 at the pre-test to 9.2 in the final session) as seen in Table 4. The proportion of different kinds of questions asked by low questioners also changed during the treatment. The low questioners appeared able to generate mainly level one and two questions by the end of the study, providing only minimal evidence of an ability to construct level three questions.

	Level 1: Factual	Level 2: Inferential	Level 3: Elaborative
	Mean	Mean	Mean
Pre-test	2.5	0.9	0.0
Day 1	4.8	0.8	0.2
Day 2	5.1	1.8	0.9
Day 3	4.9	2.2	0.9
Day 4	4.3	3.5	1.4

Table 4 Means of questions asked by low questioners

This pattern mirrored the progress of the L2 (category three) questioners who only formulated a mean of 2.1 questions in the pre-test and a mean of 8.8 questions by the end

of the study as shown in Table 5. It was only in the final session that a few low L2 questioners started experimenting with level three questions. The focus for these questioners seemed not to be on diversifying the level of questions but rather on increasing the number of questions. They were learning to formulate comprehensible questions.

	Level 1: Factual	Level 2: Inferential	Level 3: Elaborative
	Mean	Mean	Mean
Pre-test	1.5	0.6	0.0
Day 1	3.3	0.0	0.0
Day 2	4.8	1.5	0.1
Day 3	5.1	0.8	0.3
Day 4	4.3	3.0	1.5

Table 5 Means of questions asked by L2 (category three) questioners

Especially for the L2 (category three) questioners there were a number of questions which when analysed did not make sense in terms of content or language. It seemed that as these questioners gained confidence in questioning and were prepared to take risks, some of their cognitive and linguistic difficulties were exposed. The pair work, in which students asked and then answered questions they had made was often used to negotiate and repair meaning. However, students rarely corrected the written form of their questions.

To summarise, all students made progress in learning the skill of questioning while following their normal science topic and these L2 groups performed in ways that mirrored the progress of the wider group to which they belonged, whether high or low questioners. High questioners were diversifying the levels of questions they formulated and low questioners were learning to produce comprehensible questions.

DISCUSSION

L2 (category five) students

The speed with which the L2 category five students adopted the idea of levels of questions is shown by the number of questions they began to produce at different levels. They generated more questions than the other high questioners. While this comparison may have been a function of cell size (6 compared with 12) the L2 students in this group were highly competent and they seemed to be *"blessed with bilingual brains"*. The teaching of questioning had helped them understand how to lift the cognitive level of their questions.

The L2 (category five) questioners appeared not only ready to experiment with their questioning style but were also to articulate their point of view about the programme.

> *"I always wondered how people learnt to ask such good questions and now I know I can too"*
>
> *"I learnt that good questions squeeze my brain"*
>
> *"I am now always trying to think beyond what we are given".*

The pair work with questioning structured the sessions in a non threatening way. The practice of questioning was now removed from the anxiety of respect for an authority figure

> *"I wondered why I was always frightened about questions, it was because it was the teacher asking the questions, not me working with a partner in a safe way writing down questions".*

The L2 (category five) students' engagement in questioning at different levels was intense, and involved risk and apprehension for one student in particular. Sharon who wrote twenty seven level one questions in the pre-test realized that there were other dimensions of thinking including inference and creativity which she had yet to master in questioning. She no longer had the security of feeling she was the top questioner in the class based on the quantity of questions she could produce. King (1990) found that when learners have skills already in place, which they consider to be successful, there is often an initial period of resistance to, or frustration with, new ways of questioning until they see that by changing their style, they also change their level of thinking. The four session period in which questioning was taught was however too short for some students, including Sharon, to change their ingrained style of questioning.

Student comments and experience show the importance of teacher/student dialogue. In this study, metacognitive awareness exercises were integrated through curriculum activities, giving opportunity for dialogue. Frustrations about previous difficulties with questioning and insights about the new levels of questions were voiced. The students also kept learner diaries "Light Bulb Books" in which they reflected on the questioning programme. These reflections later provided rich data for class and peer discussion. Hearing the diverse reactions of peers was one of the best ways to counteract doubts and difficulties encountered in learning.

L2 (category three) students

The L2 (category three) students encountered many barriers to learning. These barriers were linguistic, metacognitive and cultural. They had neither adequate language ability nor effective tools for listening to text and processing all the information. They were in the same position as their L1 counterparts (the low questioners) who were also in the process of learning to write questions. The L2 (category three) questioners were also struggling with both the grammar and content words needed to ensure their questions were comprehensible. The asking and answering of questions in pairs gave them immediate feedback about the comprehensibility of their questions. Often there would be a puzzled

face from a partner, indicating that rewording and clarification were required. Many authentic opportunities for negotiating and renegotiating meaning were provided.

Other barriers to their listening and subsequent learning were metacognitive and cultural. The L2 (category three) students were not able to manage the internal and external distractions that surrounded them. One student reported,

> *"What I have learnt from this study is that I am very shortminded".*

In this group students needed to be convinced of the relevance and importance of the skill they were learning. These discussions opened up new ways of approaching questioning which challenged cultural attitudes to the roles of teachers and students. This perception was voiced by one L2 student, who said,

> *"It's not my job to ask the questions that's the teacher's job".*

The linguistic and cultural barriers meant that the L2 (category three) students had had little practice in exploring questions. They needed to build up confidence in their ability to ask simple comprehensible questions before they could experiment with different levels. Explicit teaching of questioning at different levels is needed in language support classes. Students at this stage of cognitive development can not wait for full comprehension before being challenged with higher levels of thinking. While these students were not generally producing questions at inferential and elaborative levels they reported understanding the nature of these levels. As one student said,

> *"I ask level three questions in my own language but only level one in English because I may not understand a level three answer in English".*

In the last session a few L2 (category three) questioners were only just beginning to ask level three questions as were some of the other low questioners.

Student learning is further inhibited by the speed at which teachers move from one topic to another. Often the high proficiency students will have absorbed the content of the topic and can question elaboratively, whereas the low proficiency students will have acquired only fragments of the required content and can only question at the factual level. Before this programme most low proficiency students had neither the time nor support to reach higher levels of thinking. The results of this research show that all students can be made aware of higher levels of thinking. Teachers need to structure opportunities for elaborative thinking from all students. The science teachers of these classes, who were partners in the research, reported that they were looking for opportunities in the next topic to reinforce and extend levels of questioning and thinking. It is expected that this reinforcement would give the low questioning students time to master these fundamental language skills with different content. This area should be recommended to teachers and researchers for further investigation.

Delivery

Two important aspects of the programme delivery warrant discussion. All students were interested in class discussions with the teacher about the place of questioning in their learning. They saw the relevance and wider purpose of questioning at different levels:

"Questions help us know what we do not understand"
"Questions show us the path for learning".

Second, the key to the explicit teaching of questioning had been the use of peers' questions as examples. Using student exemplars rather than giving King's prescribed question stems engaged students actively in their learning. The opportunity to utilise existing class expertise provided both the modelling of and scaffolding for questioning at different levels.

The language to analyse levels of questions

Herber's levels and the associated symbols devised by Coley et al. (1993), as outlined on the class chart, gave students the language to analyse the range of possibilities in questioning. Students reported being intrigued in the past by good questions posed by other students but had not stopped to consider that they too might be able to ask similar questions. They discovered that varied questioning was within the realm of all. As one reported,

"I never knew that you could step up your questioning".

Usefulness of teaching levels of questions

The improvement in quantity and quality of questions generated by students and the improved engagement in their listening suggested that questioning at different levels was relevant to their needs. Pressley et al. (1989) argue that when learners perceive that instruction in a skill makes up for a deficit in their range of skills or see it as more effective than some of the current methods they employ, it is more likely that the new skill will be internalised and used widely. In discussion later, students commented that now they would be able to write better research questions in other subjects. Partner teachers realized that they needed to actively teach questioning by ensuring that input was comprehensible, to structure activities and discussion but not necessarily to ask the questions themselves. These subject teachers were genuinely amazed at the originality and depth of thinking revealed in students' questions and wondered how many great questions they had missed out on by not teaching this technique earlier.

CONCLUSION

This research sought to highlight ways to teach linguistic skills that make a difference to teaching and learning in real classrooms. It made a difference to teaching in that the partner teachers involved saw that there was a place for essential language skills underpinning the delivery of the curriculum. This language focus could then provide continuity in skill development from topic to topic and allow opportunities for both reinforcement and extension of ability to think and question. Teachers recognised that a dual approach to

instruction worked best, based on modelling examples of peers' work and on a dialogue about students' progress through metacognitive awareness activities. The teachers realised that the benefits of working in partnership with the researcher could also be gained by working in partnership with ESOL teachers or other language specialists to focus on language development through the curriculum.

Students learnt about the value of questioning in their learning. They learnt that questions and levels of questioning could be used for many different purposes and were tools not only for *"stepping up their questioning"* but also their thinking. They saw that what they had learnt about questioning in science would also help them in social studies and English. All learners regardless of their proficiency in English benefitted from this class approach to the teaching of questioning.

This programme gave students a model for framing their own questions. Unfortunately, teachers assume that students already have or will acquire these fundamental skills and neither explicitly teach the skills nor structure opportunities for students to learn from each other.

NOTES

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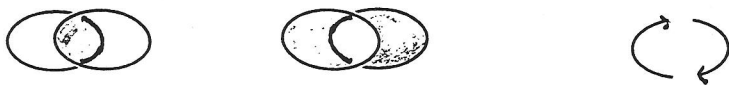
APPENDIX 1

Level one Factual	Recall. Questions usually start with what, who, when or where. A level one answer usually requires a simple answer which can be found by reading the text accurately. An answer to a level one question is usually right or wrong. R_6
Level two Inferential	Comparison, contrast, cause and effect. Questions can start with explain how, explain why or "How are X and Y similar?", "How does X affect Y?". A level two question generally requires an answer which can be found seeing relationships between ideas.
Level three Elaborative	Questions which require you to evaluate, synthesise, advise and go beyond the text. These questions are original and philosophical. A level three question generally requires an answer that is well thought out and there may be no right answer. Whether an answer is acceptable depends on how it can be justified and whether it is convincing. A level one statement can begin a level three question, "When the sperm cell joins with the egg cell and the single new cell divides into two and then four and so on, does the cell size change?"

Figure 1 Class chart which also served as the marking schedule