

# CATERING FOR 'GIFTED AND TALENTED' TECHNOLOGY STUDENTS

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## ABSTRACT

In Term One of 2005 it became mandatory for all New Zealand state and state-integrated schools "to show how they are meeting the needs of their gifted and talented learner" (Ministry of Education, 2004, p.6). There is evidence that New Zealand schools are catering for their gifted and talented student in curriculum areas such as mathematics, languages, science and the arts. However are New Zealand schools catering for gifted and talented students in technology, and if so how is this being achieved?

This article investigates and explores how twenty diverse primary schools from the Auckland region, are catering for their gifted and talented students within the technology curriculum. The research investigates the definition of the term 'gifted and talented', the criteria of identification, the purpose of the identification, and also the aims and expectations for those identified. Comparisons are established between the schools in order to understand the nature of gifted and talented technology programmes in New Zealand schools.

## 1. INTRODUCTION

### 1.1 Technology Education

Technology education is one of the eight essential learning areas in New Zealand schools (Ministry of Education, 2006). The importance of technology education in New Zealand was reinforced in 1999, when the Ministry of Education (MoE) made technology education compulsory for all students until the end of year ten (Creech, 1999). Technology in the New Zealand Curriculum identifies technology education as "a planned process designed to develop students' competence and confidence in understanding and using existing technologies and in creating solutions to technological problems" (MoE, 1995, p.7). Since the development of the technology curriculum there has been a great deal of confusion about what is entailed in technology education (Jenkins, 1997; Lee, 2003). With many believing it to have a computer focus (Brown, 1996; Hunt, 2000).

### 1.2 The development in Gifted and Talented education

In the last seven years New Zealand education has seen a rise in initiatives to provide relevant and appropriate education for students who are deemed gifted and talented. These initiatives include the publication of the Ministry of Education's Handbook, *Gifted and Talented Students: Meeting Their Needs in New Zealand Schools* (MoE, 2000); Ministerial Working Party on Gifted Education (MoE, 2001); and the most recent and influential, a change to the National Administration Guidelines (NAGs). The change in the NAGs also highlights the need for relevant New Zealand theory and research that supports the development and implementation of this new NAG. Research entitled *the Extent, Nature, and Effectiveness of Planned Approaches in New Zealand Schools for*

*Identifying and Providing for Gifted and Talented Students*, was commissioned by the Ministry in order to fulfil the need for theory relevant to the New Zealand setting (MoE, 2004).

### **1.3 The change in the National Administration Guidelines**

Prior to 2005, the National Administration Guideline 1(iii) required schools to be able to show how they were meeting the needs of students who were not achieving; who were at risk of not achieving; and those who had special needs; through good quality assessment information, (MoE, 2004). However as of Term One 2005 an alteration was made to NAG 1(iii)c which required schools to identify and meet the needs of students "who have special needs (including gifted and talented students)" (MoE, 2004, p.6). The implementation of this NAG now requires all schools to cater for gifted and talented students within school programmes.

The purpose of this research paper is to identify whether schools have fully implemented NAG 1 (iii)c to cater and extend gifted and talented students in the area of technology education. How are gifted and talented technology students being identified? Is it by the skills, achievement or the passion and drive that a student has for technology? How do technology education programmes, challenge and extend these identified gifted and talented students?

## **2. DISCUSSION**

### **2.1 Gifted and Talented**

The MoE (2004), have acknowledged that due to the recent implementation of the NAG 1 (iii)c and the low awareness of catering for gifted and talented students prior to 2000, there is an increased need for theory and practices to support this theme. Due to the lack of information related to the New Zealand context the MoE commissioned a research based programme surrounding gifted and talented education in New Zealand (MoE, 2004).

Defining gifted and talented students in New Zealand schools is very complex. It is acknowledged by, the Ministerial Working Party on Gifted Education (2001), and Bailey, Knight & Riley (1995) that it is not possible to have a universal term in order to define gifted and talented students. However the MoE does indicate that New Zealand's gifted and talented education is unique, as New Zealand "recognises that giftedness and talent does mean different things to different communities and cultures, and there is a range of appropriate approaches towards meeting the needs of all such students" (MoE, 2004, p.9).

However the report from the Ministerial Working Party on Gifted Education (MoE, 2001), states that it is necessary for schools to develop a definition based on that schools environment and cultural influences using the assistance of 'Gifted and Talented Students: Meeting their Needs in New Zealand Schools (MoE, 2000). The MoE (2004) suggest the following definition as a guide for schools:

"We welcome and celebrate the fact that there are gifted and talented students in all areas of school life – academic, creative, sporting, and social. They come from all backgrounds and show above average ability and/or commitment in one or more areas. They have particular personal and learning needs which we need to identify and nurture, in the same way that we respond to specific needs of other identified groups" (p.11).

From this definition it is apparent that all areas of school life should be catering for the gifted and talented student, including technology education.

A major contributing factor in catering for gifted and talented students in technology education is how to identify a child who is gifted and talented in this area? The MoE (2000) recognizes the importance of the definitions relating to the identification process of gifted and talented students. Without this relationship it is not possible to have mediation between the definition and the programmes developed later on. Throughout relevant research it has been stressed that the identification of gifted and talented students should never be taken from one method of identification, but use a number of methods in order to identify (MoE, 2000). The report from the Ministerial Working Party on Gifted Education (MoE, 2001), states that the identification process should start as early as possible, and use a variety of people and methods, such as Teacher Nomination, Rating Scales, Portfolio Assessment and Standardised Tests (Bailey, Knight & Riley, 1995; MoE, 2000, 2002, & 2004).

However, when dealing with the essential learning area of technology education it is vital to remember that the 1995 curriculum document is composed of seven technological areas. Children may be gifted in one of these areas and not another, so the focus question for teachers is, can they be then identified as gifted and talented? Design is an element of all technological areas. "A child may be talented at one aspect of Design and Technology: at making rather than designing or designing wonderful ideas that cannot be made" (Hope, 2004, p.156). These diverse abilities in design may lead people into career choices which support their talents for example the person good at sketching designs may select architecture whilst the practical designer may choose electronic engineering or a career as a chef. It must be acknowledged by the teacher of technology, that there are not experts in all aspects of Design and Technology in the workforce, so expecting this in one child is unrealistic.

Technology education also aims to contribute "to the intellectual and practical development of students, as individuals and as informed members of a technological society" (MoE, 1995, p.7). This is also reinforced by Lewin (1994), who expresses his view on the extension of gifted and talented students in order to contribute to society through technology education. Teachers of technology education should be catering for gifted and talented students. The Ministerial Working Party on Gifted Education (2001) states:

"all children have a right to an education that acknowledges and respects their individuality and that offers them maximum opportunities to develop their strengths and abilities. Gifted and talented children will flourish in a society that acknowledges and respects individual difference and recognises and celebrates the abilities of its most able" (p.5).

## **2.2 Methodology**

Twenty diverse schools were selected from two zones in the University of Auckland, Faculty of Education, Primary School Directory Booklet. These two zones supplied an assortment of full primary, contributing and intermediate schools. They also gave a wide range of schools with a mixture of decile rankings that were spread over a number of suburbs. By choosing schools from these two zones, variables such as discrimination against decile ranking, prominent ethnicity groups, levels of abilities, and funding and resources were minimised. All forty one schools in the two zones were contacted, with twenty schools agreeing to be interviewed.

To receive accurate and relevant information about the programmes provided the interview process was directed to the teacher appointed, either as head of technology education, or head of gifted and talented programmes. In those schools where there was no identified teacher responsible for such programmes the interview was undertaken by

the principal or deputy principal. However, in a few of the schools the receptionists were told to respond to the call. This method of research is identified by Leedy (1997) as 'Field Study Research', "in which data are gathered directly from individual cases or social or community groups in their natural environment" (p.111). Information was collected in a qualitative manner and was gathered from individual schools using a semi-structured interview whilst allowing schools individual input into the research (Mutch, 2005). As the NAG had only been recently introduced, it required the researcher to be able to adapt to the directions of the schools responses (Hoepfl, 1997).

Schools were asked three questions in a telephone interview to identify whether they provided programmes for gifted and talented students in technology. The first two questions were designed to discuss gifted and talented programmes in general '*How does your school cater for gifted and talented students? In what subject areas do you cater for gifted and talented students?*' This allowed technology to be mentioned without drawing attention to the purpose of the interview. The third question targeted technology '*Do you have a programme in place that promotes extension in technology?*' The last question was specifically designed to determine whether schools catered for gifted and talented students in technology.

Qualitative data was gathered and the notes were a detailed description of what was heard. The researcher did not attempt to alter the statements in order to 'tidy up' notes which "included ungrammatical speech, slang and misstatements" (Neuman, 1997, p.351).

It is important to acknowledge that since the Picot Report and subsequent curriculum direction changes, each school is able to place emphasis on different curriculum areas (Chamberlain & Nightingale, 1991). Schools choose what subject areas are most relevant to their community. If a school places a greater emphasis on academic knowledge, then this may influence the time and resources that are put into extending children in subjects like technology, the arts and physical education. Another variable that could effect how gifted and talented programmes in technology are implemented into schools is by having specialist teachers whose sole purpose is technology or designing gifted and talented programmes. If there is a person purely dedicated to such areas then it may allow time and expertise in order to develop programmes that can cater for the extension of children.

## **2.3 Findings and Discussion**

The results that were gained from question one '*How does your school cater for gifted and talented students?*' provided information on how schools are addressing the implementation of NAG 1 (iii)c. The most common method was that teachers cater for gifted and talented students within their class programmes, 75% of schools acknowledged this method. One school stated, "we encourage in class programmes to extend children, however it is the teacher's responsibility". As only 20% of schools, acknowledged providing teachers with professional development in order to implement successful extension programmes, the question needs to be asked whether teachers have the knowledge or the experiences to extend students effectively?

35% of schools recognised the importance of specialist teachers and sent gifted and talented students to 'one-day schools'. These school are designed to provide programmes for gifted and talented children. Children are usually identified to have talent in the area of Maths and Language. Another 30% of schools provide withdrawal programmes for students, although two schools acknowledged that withdrawal programmes were dependent on specialist teachers that are available within the school community.

Figure I below illustrates the response of schools to the second question of, 'What subject areas do you cater for gifted and talented students?' This question gave the opportunity for the schools to identify what curriculum areas they were addressing. All schools identified that they were catering for the curriculum areas through either extension in class, one-day programmes or withdrawal classes. All of the schools (100% of respondents) believed they were catering for Language (reading, writing, presenting). 90% of the schools, acknowledged that their school was catering for gifted and talented children in Mathematics. 55% recognised their schools as catering for the Arts (visual art, music, dance and drama). 20 % of the schools had sport academies in place, which provided extension for children gifted and talented in sports. Science was extended in only 15 % of schools. Social Studies and ICT was extended in identified gifted and talented children in only 10% of schools. Not one of the schools acknowledged the extension of gifted and talented students in technology education.

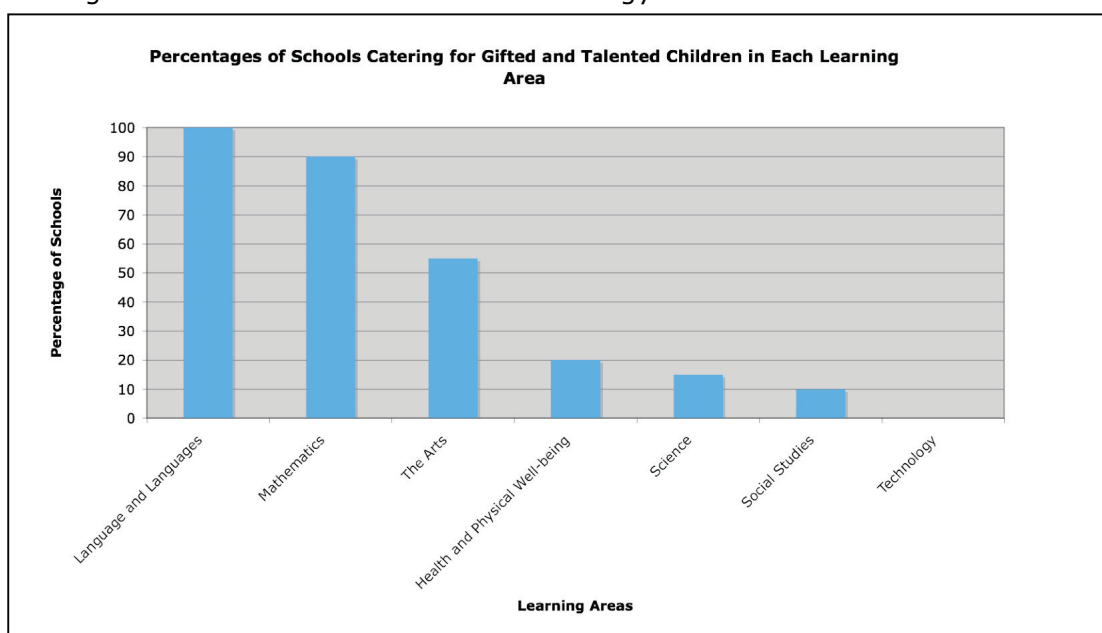


Figure I: Percentage of respondent schools, which are catering for gifted and talented children in each learning area.

The third question was designed in order to give the schools an opportunity to mention if they provided gifted and talented programmes specifically in technology education even though they may not have initially thought about it when first asked. 65% of the schools responded to the question, 'Do you have a programme in place that promotes extension in technology?' by stating "No". When asked why reasons were given as "not yet, will get there", "we only extended one subject area a term on top of maths and reading" and "that's the least of our worries". From such comments it is possible to see that many schools are not placing technology as high a priority, as other learning areas such as Mathematics and Language, for their gifted and talented children.

Although no schools initially mentioned a technology focus for their gifted and talented programmes, 35% (when prompted directly with the third question) stated they did cater for these children. Of these schools, 15% identified themselves as catering for gifted and talented programmes within the existing technology school programme. However when asked how they achieved this, it became apparent that they did not understand the difference between ICT and technology education as they commented "We integrate technology in with a lot of our core subjects; by getting them to do power point presentations, filming and editing", "Yes of course we cater for technology we integrate it with our literacy programme, students present their work by using the computer" and "Yes, they go to the ICT suite once a week; gifted and talented go about twice a week,

sometimes a whole day." Brown and Vossler (2000) believe there is still a great deal of confusion between ICT and technology education. From these findings it is apparent that some teachers and principals need to be informed about what technology education entails.

The remaining 20% of schools also stated they catered for gifted and talented students in technology, within existing classroom programmes. One school stated that it was the "teachers responsibility to extend students in all curriculum areas, including technology". So in effect, in these schools, there was no additional programme other than expecting the teacher to cater for all children's needs by adjusting the programme and activities accordingly. Therefore, a classroom teacher has to have the knowledge of technology and also the appropriate learning experiences in order to extend these gifted and talented students. Many teachers are unsure about what technology is and how you are expected to teach it. The high level of confusion amongst teachers about existing perceptions of technology, the nature of technology and curricula expectations was been recognised throughout the world (Anning, 1993; Jones & Carr, 1992; Mittel & Penny, 1997). Consequently it is probably a fair question to ask whether students are being extended in technology within the classroom setting?

### **3. CONCLUSION**

Although it is mandatory for all New Zealand state and state-integrated schools "to show how they are meeting the needs of their gifted and talented learner" (MoE, 2004, p.6), the majority of schools, from the data gathered, are not catering for children with strengths from each of the learning areas. Language and mathematics seem to have additional extension programmes in place however extending a gifted and talented child in technology education seems to be either not occurring or being left to the classroom teacher. As findings from this study show, there is still some confusion over what is entailed in the technology curriculum and how it is distinguished from ICT. Leaving extension programmes in the hands of staff who are not confident, familiar or both, with a curriculum, risks the programmes not meeting the needs of the child or the expectations of the curriculum documents. Further research is required to investigate why schools are selecting children to attend extension programmes, outside the classroom, in all other learning areas other than technology education. Is this due to the fact they place low priority on the subject? Is it too hard to identify these children? Is it too difficult to staff and resource an extension programme? Does the community not wish the children to be extended in this learning area? Do they believe children's needs are better catered for within the classroom programme? Or are children gifted and talented in technology education only extended within some existing classroom programmes for another reason. Further research needs to be undertaken to investigate how these children are best catered for, is it extension programmes, with specifically trained staff, facilities, resources etc or is it best within the classroom or do children naturally extend themselves and as such no programme is necessary? One thing is for sure, that unless schools are made to critique and justify their selections of programmes for the gifted and talented children, nothing will change.

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