

**Senior secondary school students' views towards choosing technology education as a subject and a career?****Pamela Tolich****Abstract**

*In New Zealand technology education is optional for all students after Year 10. This research compares the views of students who have selected technology education with those who have not. It aims to determine the attitudes of these secondary students towards technology and investigate possible links with career options.*

**Introduction**

This research investigated the attitudes of Year 11 and Year 13 secondary students towards technology education and their career choices. Hendley (2002) notes “there has been very little methodological investigation into pupil’s attitudes to technology” (p. 64). This research undertakes to contribute to this field by asking the following questions. Do all students at a similar year level hold the same views of technology no matter whether they have selected it as a subject or not? Are these views linked to their proposed career paths? What careers do students who are taking technology envision they will achieve and are these different from those students who are not taking technology? This research links to a study investigating Year 9 students’ views on technology education (also published in this edition). A comparison between these studies will determine if students’ views alter as they get older.

**Background**

In the 1995 ‘Technology in the New Zealand Curriculum’ (TNZC) it states “technology is a universal and age old human activity” (Ministry of Education, 1995, p.6). People have always invented and adapted resources to meet their needs. From the 1900’s technology was seen as a more manual and technical subject, with boys taking metalwork and woodwork and girls taking needlework, laundry, and cooking. This aimed to develop trades people and homemakers (Mawson, 1998). Society in New Zealand has evolved over the years to accommodate the growing economic and social needs, resulting in changes to the structure and subject area of the curriculum.

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An emphasis has been placed on moving technology away from the technical vocational subjects and moving it towards an integrated approach with the central 'core' curriculum (Treagust & Rennie, 1993; Snook, 1996; Lee & Hill, 1996). Currently in New Zealand technology has developed as an important curriculum area because of social, economic, and educational pressures (Treagust & Rennie, 1993; Mawson, 1998; Peters & Marshall, 1996). The Ministry of Education (MOE) states that "New Zealanders today find employment as technologists in many fields...New Zealand is rich in energy resources and primary products which can be processed into higher value products" (MOE, 1995, p.6).

Student's attitudes and concepts concerning technology and technology education influence learning and the ability to develop technological literacy (Boser, Palmer & Daugherty, 1998; Jones, 1998). If students see technology as a progression of skills, perhaps influenced by their parents, rather than as a holistic subject, then this will constrain and limit their development of technological literacy (Jones, 1998) and subsequent success in the subject.

### **Literature Review**

Throughout their time at secondary school, students are required to make decisions about future employment options. Curriculum areas are graded by students, on the basis of their usefulness to help them gain employment or entrance into higher education. Research identifies usefulness of the subject, in terms of gaining employment, as a major influencing factor on attitudes to and participation in the subject. Students opt for subjects that are dependable for higher education or employment (McCarthy & Moss, 1990; Kelly, 1988; Woolnough, 1990; Hendley, 2002; Ormerod & Waller, 1988; Nash, Allsop & Woolnough, 1984).

Interest and ability in the subject are also noted as important factors for choice of subjects in the last two years of compulsory education (McCarthy & Moss, 1990; Woolnough, 1990; Hendley, 2002). Lee, (1992) notes that vocational aspirations of students affect their subject choice. Employers' lists of credentials for employment positions also govern student's choice of courses (Lee, 1992).

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International research shows that girls are less likely than boys to study technology later in secondary school. Trends indicate that girls tend to drop technology in favour of subjects they perceive will give them better employment opportunities (Smail & Kelly, 1984; Whyte, 1986; Moore, 1987; Grant & Harding, 1987; Woolnough, 1990).

### **Participants**

The selected secondary school had a purpose built centre of technology where senior students were taught robotics, pneumatics, electronics and micro-processing. There were seven workshop and technology rooms where specific technology areas were taught such as biotechnology, electronics and control technology, food technology, information and communication technology, materials technology, production and process technology and structures and mechanisms. In Year 11 and 13 technology was not compulsory and optional subjects included electronics, hard materials, graphics, textiles and information technology. The school had a decile rating of 7 and an ethnic composition of 54% European, 8% Maori and 12% Chinese.

Data was gathered from two Year 11 classes (one which was taking technology and one which wasn't) and two Year 13 classes (one class undertaking technology and one not). Thirty-eight Year 11 and twenty Year 13 secondary students (approximately eighteen year olds) were given questionnaires in order to investigate their attitudes towards technology education and their career choices.

### **Instrument**

The following questions were used in the questionnaires given to the 58 secondary school students. These were handed out by the researcher after she had explained the questionnaire. Students were able to discuss their answers with their peers. To ensure all students used the same definition of the term 'technology', the New Zealand Curriculum (Ministry of Education, 1995) definition was placed at the top of every questionnaire.

### ***Questions***

1. Year level

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2. Do you take technology?
  3. Why have you chosen to take/not to take technology as a subject?
  4. Do you think technology is relevant to you? Why?
  5. What career or employment pathway do you wish to take?
  6. Does your career or employment pathway need technology or need prior education in technology?
  7. What made you decide to choose this career or employment pathway?
  8. Do you see technology as a valuable subject that you could use in the future, either in employment or as a life skill? If so how?

### **Methodology**

Data was gathered directly from individuals in their natural environment (the school classrooms) (Leedy, 1997) for minimum disturbance (Neuman, 1997). Research was gathered through use of a questionnaire in order to support the discovery of new information (Hoepfl, 1997). Results from these structured questions were easy to analyse and there were no verbal or visual cues to influence the respondent (Statpac Inc, 2005).

Variables were uncontrollable and may have affected the validity of the data gathered (Creswell, 1994; Leedy, 1997; Neuman, 1997; Pollard, 1985). Students may have perceived that they had more access to higher education than those of a lower decile. This could have affected their subject choice and their attitudes towards particular subjects.

The parent's attitudes and social standing may have affected how particular subjects were seen, whether they were useful to the child in their future employment or higher education decisions. The parent's job may also have affected how subjects were seen or which subjects were selected by the students. Whether parent was in a trade or professional occupation may have affected the child's decisions for future career options (Boser, Palmer & Daugherty, 1998; Woolnough, 1990). Career orientation

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may have been a deciding factor for subject choice, particularly in the final two years of secondary school, as students often begin to make decisions about their career pathway after Year 10 (Lee, 1992).

The school setting also provides many variables. How well the subject was taught and the way the school promoted technology may have significantly affected student's subject choice (Jones, 1998). The first two years of compulsory technology may have been unsuccessful and may have deterred or prevented the student from taking the subject again.

### **Findings and Discussion**

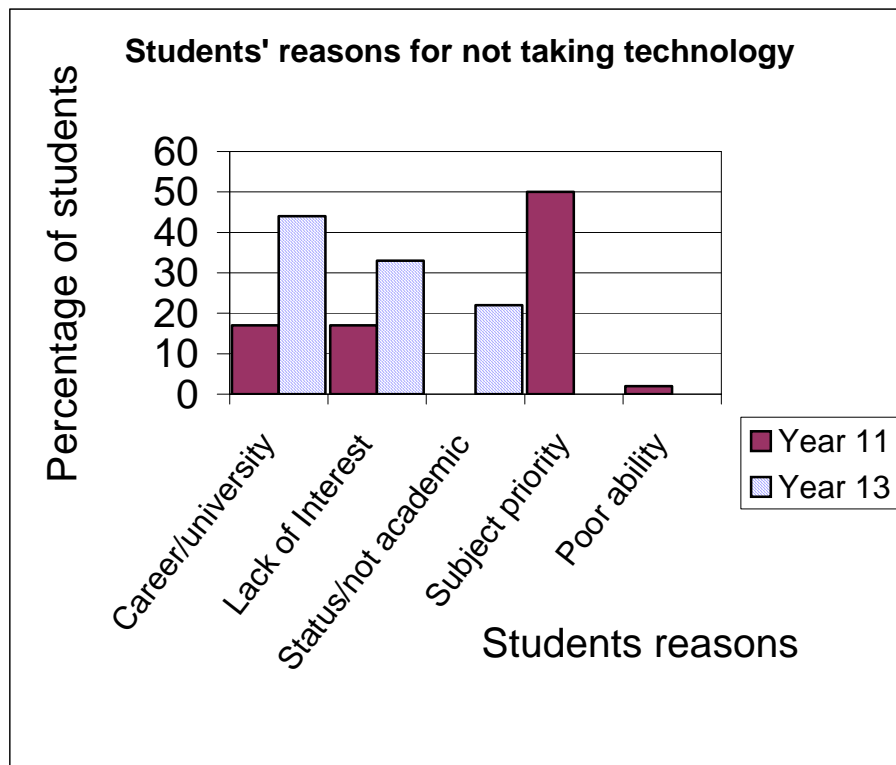
*Question one* of the survey was related to identifying which year the students were in. *Question two: Do you take technology?* produced the following findings. Within the two, Year 13 classes there were 9 students who did not take technology (3 males and 6 females) and 11 students who did take technology (8 males and 3 females). Within the two Year 11 classes there were 18 students who did not take technology (6 males and 12 females) and 20 students who did take technology (10 males and 10 females). Although females only made up 45% of the sample group at Year 13 66% had decided not to take technology. 72% of those taking technology in this sample group at Year 13 were male. These research findings support international findings which show that girls are less likely to take technology in the later years of secondary school (Woolnough, 1990; McCarthy & Moss, 1990).

*Question three: Why have you chosen not to take/ take technology as a subject?*

Reasons why Year 11 chose not to take technology could be broken down into 5 categories; priority of subjects, interest, no purpose, career and ability (see Figure 1). Comments included; "it is not required for the career I wish to pursue and there were subjects I needed more in the Arts than in technology", "Because I feel that I am better with words and the subjects like English and the Arts" and one student stated that their ability was the reason they had not pursued education in technology.

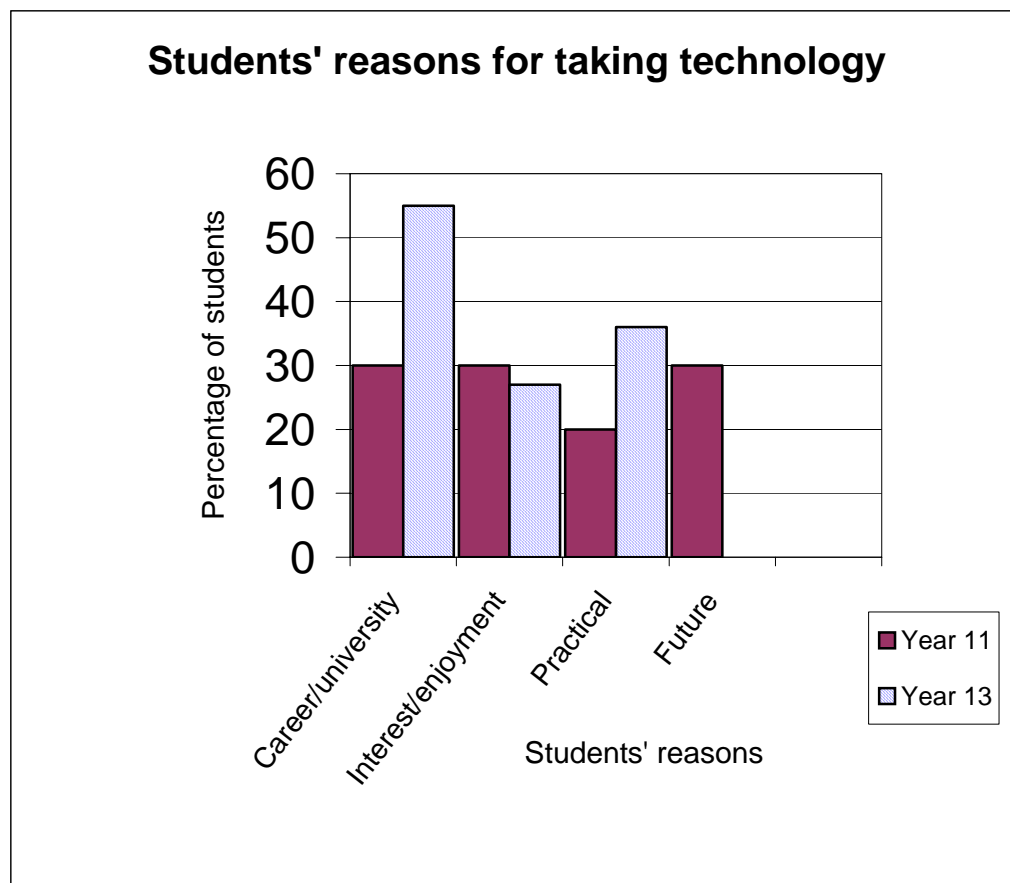
Findings from Year 13 students who had not taken technology could be broken down into three categories of reasons; career, interest and academic (see Figure 1). Comments from students included; "don't need it to get into university next year", "not needed for where I want to go in life", "None of these subjects interest me and

my timetable was already full of other subjects I wanted to do”, “because I like to focus on more academic studies for example Media Studies, English, etc” and “because I chose to have more academic subjects such as English or Classical Studies”.



**Figure 1: Reasons participants gave for not undertaking technology education**

Figure 2 summarises the findings from Year 11 and 13 students who chose to take technology. These results could be grouped into 4 categories; enjoyment/interest, career/university, practical, future. Students comments included; “I believe it is going to help me when I go to University”, “technology is everywhere especially in the workforce”, “I am an ideas person and drawing comes more naturally to me than academic things”, “I find it fun doing practical work and working with my hands” and “more interesting than English, Maths, Science etc”.



**Figure 2: Reasons participants gave for undertaking technology education**

These responses give a clear indication that at Year 11 and Year 13 students were thinking about their future and what subjects are necessary. Interest in the subject, was also a major factor which affected the student's decision whether to take technology. This research supports findings by McCarthy & Moss (1990) Kelly (1988), Woolnough (1990) and Hendley (2002) who also note that interest is an important factor for choice of subjects in the last two years of compulsory education.

Approximately half of the Year 13 students were or were not taking technology because of career choices. This supports findings of Lee (1992) who noted that subject choice was affected by students' vocational aspirations of students. In Year 11 students were focussed on selecting subjects which would be of future use to them. Technology was described as being not an academic subject by students regardless of whether they were taking technology.

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*Question four: Do you think technology is relevant to you?*

Table 1 summarises the number of Year 13 students who thought that technology was relevant to them. When asked why the student responses were very similar for both year groups. Of the Year 13 students taking technology comments included “it allows me to develop my ideas and express my thorts (sic). Technology allows me to improve on the skills I need for my future career”, and “I am not sure what I want to do with my life so at this moment I don’t really care”. Comments from the Year 13 students not taking technology included; “because most jobs in society today deal with some form of technology”, “because it is everywhere it is good because it can branch out into many areas”, “technology is our future”, “because it has nothing to do with the courses I want to take in University” and “because I don’t want to take technology for my career choice”.

**Table 1: Year 13 views to the relevance of Technology**

Year 13 students					
Degree of Relevance	Very Relevant	Relevant	Could possibly use it	Probably irrelevant	Irrelevant
Year 13 Students (not taking technology)	5	5	1		
Year 13 Students (taking technology)		3	3	2	1

Table 2 summaries the views of Year 11 students. The student who stated it was ‘probably irrelevant’ said they did not know why. The Year 11 student not taking technology who thought technology was probably irrelevant also stated “other people will build and cook and sew fore (sic) me, I have not (sic) interest in it”.

**Table 2: Year 11 views to the relevance of Technology**

Year 11 students					
Degree of Relevance	Very Relevant	Relevant	Could possibly use it	Probably irrelevant	Irrelevant
Year 11 Students (taking technology)	5	11	3	1	
Year 11 Students (not taking technology)	4	5	6	1	



90% (10) of Year 13 students who selected technology thought that it is either 'very relevant' or 'relevant' to their lives. 33% (3) of the Year 13 students who do not take technology still believed technology to be relevant. 80% (16) of the Year 11 students who took technology believed technology to be 'very relevant' or 'relevant'. 50% (9) of the Year 11 students not taking technology believed technology to be 'very relevant' or 'relevant'. Most of students thought so because of qualifications, careers, jobs, future use and everyday life skills.

*Question five: What career or employment pathway do you wish to take?*

Table 3 summarises the expected career or employment pathways of Year 11 and Year 13 students. Those students who did not respond in this question were not recorded.

**Table 3: Categories of expected career or employment pathways**

Category	Year 11 students		Year 13 students	
	Taking technology	Not taking technology	Taking technology	Not taking technology
Unknown	2	1		
Teacher		2	1	
Trade	1		5	
Design	3	1	2	
Armed forces			1	
University degree	7	4	1	7
Television	2	4		2
Computers	1	1		
Social	1			
Chef	2			
Sport		1		
Politician	1			
Nurse		4		

In Year 11 three out of the four people that expected to leave at Year 12, had decided to take a career in 'a trade'. In Year 13 those not taking technology were focussed on attending university whereas those taking technology were mainly pursuing careers in trades or design. This disparity was less obvious in Year 11.

*Question six: Does your career or employment pathway need technology or need prior education in technology?* Those students who did not respond in this question were not recorded.

**Table 4: Employment or career pathway and the need for technology**

Year 11				Year 13			
Do take technology		Do not take technology		Do take technology		Do not take technology	
Yes	No	Yes	No	Yes	No	Yes	No
65%	25%	33%	61%	91%	9%	22%	89%

Table 4 summarises results which indicate that as students progress through the school they get stronger views as to whether technology is needed for their career. Those taking technology believed it was more necessary for their career than those who had chosen not to take it.

*Question seven: What made you decide to choose this career or employment pathway?*

Figure 3 shows that the most common response for Year 13 students (who took technology) was due to the practical nature of their chosen employment pathway. With the majority of those Year 13 students not taking technology deciding their career on their interests or because they wanted to help society.

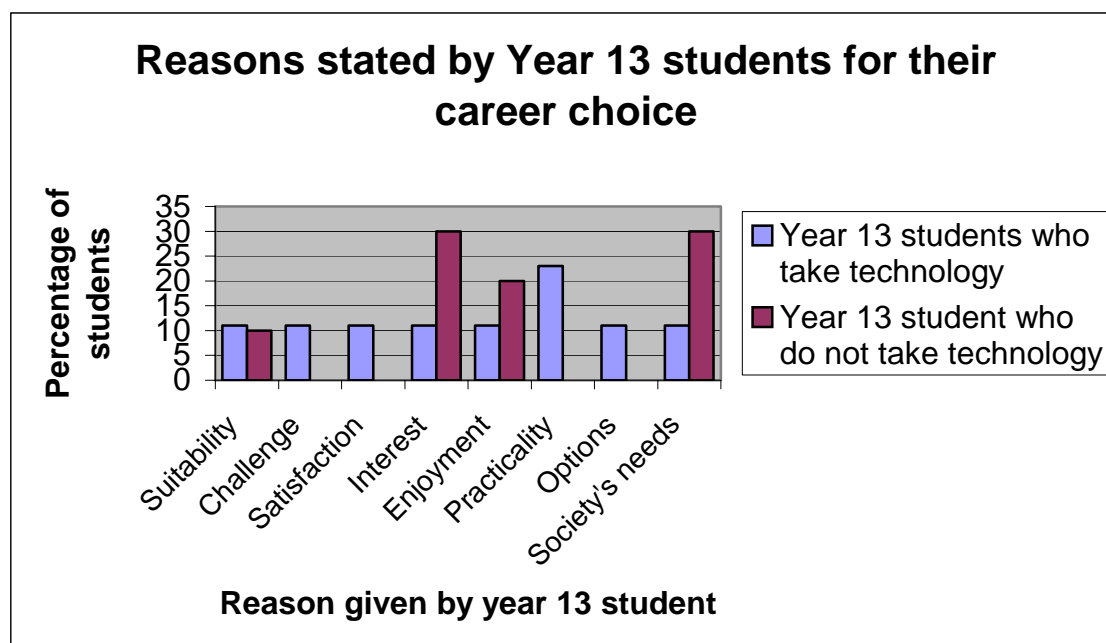
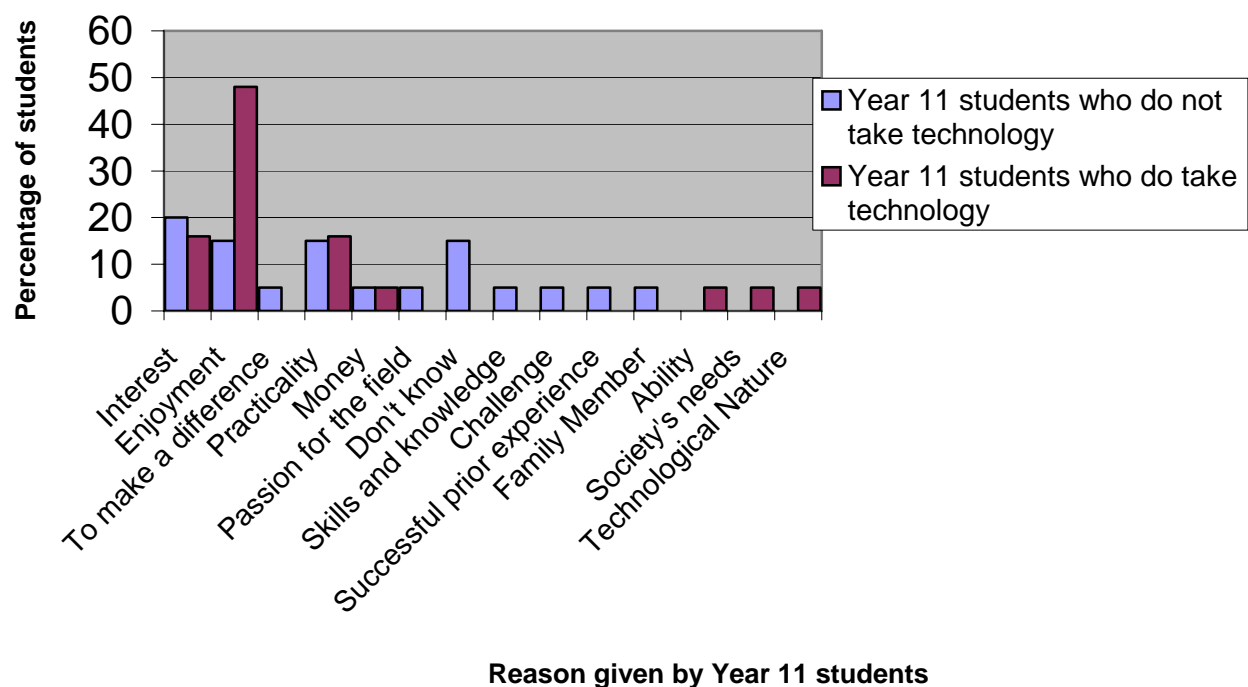
**Figure 3: Year 13 decisions behind selecting their employment or career pathway**

Figure 4 shows students who took technology choose their career because of enjoyment, the practical aspects and their interests. Those year 11 students who did not take technology stated they had chosen their career because of their interests, enjoyment or they did not know.

**Reasons stated by Year 11 students for their career choice**



This research found that the majority of students were enthusiastic about technology education, however, they tended to prioritise other subjects over technology in favour of subjects that are more relevant to their employment pathway, qualifications or career. Over half of the Year 13 students taking technology were doing so because of their proposed career. Career prospects are important to students and their parents (McCarthy & Moss, 1990; Kelly, 1988; Woolnough, 1990; Hendley, 2002; Ormerod & Waller, 1988; Nash, Allsop & Woolnough, 1984).

*Question eight: Do you see technology as a valuable subject that you could use in the future, either in employment or as a life skill? If so how?* Those students who stated they did not know or gave no response were not recorded. Table 4 summaries the

results of this question, and supports the earlier notion that as students get older they get stronger views as to the importance, relevance and value of technology.

**Table 4: Participants' views as to the value of technology**

Year 11				Year 13			
Do take technology		Do not take technology		Do take technology		Do not take technology	
Yes	No	Yes	No	Yes	No	Yes	No
80%	10%	94%	6%	100%	0%	56%	22%

Figure 5 (below) shows that most students at all levels rank technology as a valuable subject that they could use in the future, either in employment or for skills and knowledge. Most of the Year 13 students who took technology believed technology was useful for their career and skills. Most of the Year 13 students who did not take technology acknowledged skills and the quality of life for society as reasons why technology was valuable.

**Figure 5: Year 13 student's views as to why technology is valuable**

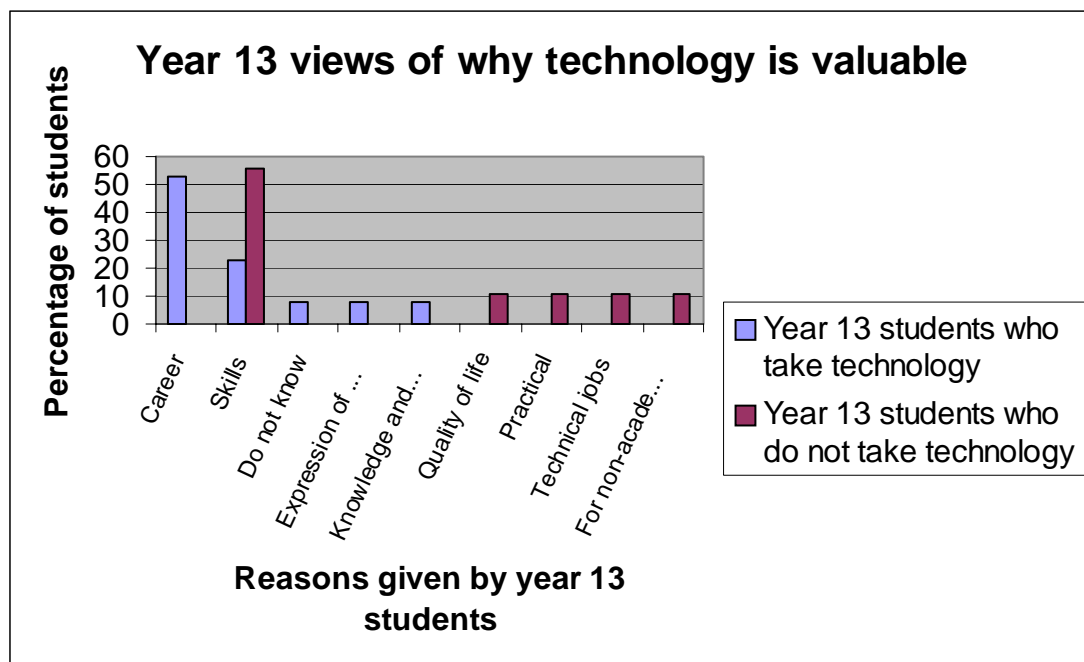
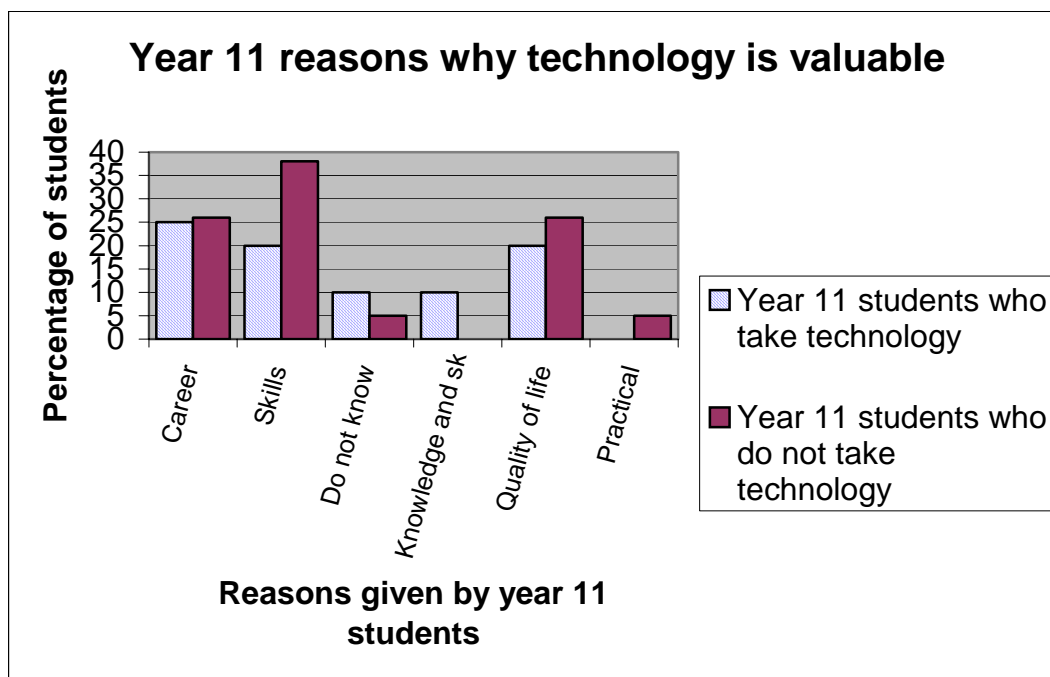


Figure 6 shows that the Year 11 students who took technology stated career, skills and everyday life use as the most common responses, whilst the Year 11 students who do not take technology gave career and everyday life use as their most common

responses. These results show a remarkable degree of agreement between all year levels on the valuable nature of technology for career, everyday life use and skills and knowledge.

**Figure 6: Year 11 student's views as to why technology is valuable**



### Conclusion

There were many similarities between the year group levels. As Year 13 students were in their final few months of school they tended to focus more on their career whilst Year 11 had a broader view. When comparing these results to the earlier Year 9 study one can see that the younger students have even more diverse reasoning. Having fun was a justification given by the Year 9 students but rarely mentioned by the students in this study.

Like the results from the earlier Year 9 study these findings are very positive. The majority of senior secondary students (whether they were undertaking technology or not) believed technology education was valuable for future employment, skills and knowledge, everyday life use and for the future. To contrast this however, the low status of the subject was mentioned by students in each group, as they referred to it being a subject which was “less academic”. This may explain why most Year 13 students intending to complete a university degree no longer took the subject. While

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those undertaking technology had selected a variety of career options including the 'trades'. Therefore support by industry is needed to assist teachers to educate students as to the myriad of careers in the technology field. Real life projects incorporated into technology programmes at all year levels will assist students to feel technology is of use to them in higher levels of education. Students' views do vary as they mature but one pleasing thing is that the majority of students believe technology to be relevant and valuable- long may it last.

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