

# YEAR 13 MATERIALS TECHNOLOGY STUDENTS' PERCEPTIONS OF TECHNOLOGY EDUCATION

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## ABSTRACT

This paper presents and discusses perceptions of technology education held by students who were studying technology at NCEA Level 3 Materials Technology in 2006. The research project surveyed 29 students about their perception of materials technology and their reasons for choosing to study it in year 13. These students were almost certainly the most technology literate students at their school and their anticipated perceptions provided insights with the potential benefits of teaching technology education to future students.

The findings were categorised into three key areas; firstly that the students choose a subject based on enjoyment and their technology teacher's influence; secondly the students suggested their technology learning programmes need to be technologically challenging using the range of modern technologies available and interesting by providing real life links to industry and thirdly the students wanted a viable tertiary pathway.

The findings from two Year 13 classes show that when compared to students' perceptions of technology in earlier years done by students at earlier stages of their school career, students still have a limited understanding of the wider impact of technology within society. The students have retained a positive outlook towards technology education and have hinted in their thoughts on what issues teachers and schools could exploit and work on, such as more practical and fun assignments or a clear definition of what is technology for students, to make technology more enjoyable and attractive to students. The implications are that improving students' perceptions of technology will lead to a more technology students' choosing to study Level 3 NCEA Materials Technology. The challenge for teachers' would be to find this pathway to retain those core reasons of contexts that show authentic issues that are relevant to those students that find Technology such an interesting and relevant subject.

## 1. INTRODUCTION

Understanding the perceptions students have of technology and technology education is the purpose of this study. The overall goal is to encourage more students into choosing technology as a viable subject selection at Year 13 and to develop these students' technological awareness to become informed citizens. The research question is: What are the perceptions of technology education held by students who choose Level 3 NCEA materials technology?

To question the perception of technology of our year 13 students allows us to review the success of our individual programmes in meeting the student's needs in our schools.

This study, though only a snapshot of how students in Year 13 view technology education, has allowed us a glimpse as teachers of our level of success in making this subject accessible and relevant to them and their future world.

## **2. THE CONTEXT OF THE STUDY**

The Research involved two schools (another two schools pre piloted the survey questionnaire), a survey of 29 students; and two focus group interviews with four students. Two schools were selected on the basis they were the only schools offering year 13 materials technology from one region. Both were single sex schools one male (15 students) and one female (14 students).

The survey questionnaires contained a mix of qualitative and quantitative questions and focused on gathering data on perceptions of technology education held by students and what influences students face in their choice to do materials technology at year 13. A semi-structured focus group was interviewed involving four participants from each school who had completed a questionnaire previously and who had agreed to be involved with the focus group interview. The four student participants were selected at random from the survey questionnaire respondents.

## **3. DISCUSSION**

A recent historical perspective of overall student perceptions and the influences on these perceptions was needed to be undertaken to understand if there had been any development or changes in attitudes and understanding, and what influences were prevalent.

### **3.1. Previous Studies on Student Perceptions.**

Both Jones (1997) and Jarvis and Rennie (1998) underline the key roles teachers have in expanding or limiting students perceptions of technology through their own responses to student understanding and their own broad concepts of technology. Jarvis and Rennie state quite openly, "teachers need to explore factors that foster and inhibit developmental learning of the concepts of technology", while Moreland (2004) says, "students perceptions of the nature of technology are linked to the effectiveness of their learning in technology".

An overseas study *Pupils Attitude Towards Technology* by Raat, de Klerk Wolters and de Vries (1987) and a later New Zealand study by Burns (1992) using PATT as well found students attitudes in junior levels (age 13 -14 years or Year 9) were positive, but most students 'mainly saw technology as artefacts that were made and how they worked' Hawkins (2007) or saw students having limited views on technology 'synonymous with recent technological products' (Burns, 1992).

Burns also discussed variables such as gender stereotype differences, teacher perceived abilities, students ability levels, the relationship between ability and attitude, ethnicity, equity and the type of school from co-ed to single sex, and argued that there is a 'strong relationship between ability and concepts and between ability and attitude', (Burns, 1992) while those with broader ideas of technology had a more positive perception of

technology education.

Key factors in influencing student choice were found to range from personal enjoyment, school as preparation for the world, academic versus vocational, pathways conceptualised and the influence of individual teachers (Hawkins, 2007).

The introduction of NCEA proved to be a difficult time for technology teachers (Blewett, 2004). Selection choices became more complex because of the increase in the range of subjects offered. At Level 3 technology has area specific subject choices as well as ITO subject courses. NCEA is meant to provide flexibility in assessment when schools design their courses allowing them to better meet student needs.

The academic versus vocational learning argument has long been used to sway students in one direction or another and colour the view in which technology based subjects can be viewed. Technology has the chance of delivering meaningful and relevant courses to both areas. An indication of Technology meeting students academic needs include the subject meeting the academic criteria for New Zealand Qualifications Authority at scholarship level and its inclusion in the Universities approved list of subjects, while the use of National Certificate Unit Standard courses and those ITO subject courses allow for a smoother pathway into industry.

Hipkins and Vaughan (2004) found 88% of students selected a subject because they enjoyed it. Expectations of enjoyment were highest for optional subjects in anticipation that the learning would be challenging and interesting, which reinforced the view that, 'Students seem to make subject choices based on personal enjoyment (and some intrinsic value they find in the subject) but they also have vague and instrumental views' Hipkins (2002).

Another factor Hipkins and Vaughan found was student enjoyment was linked to the student's attitude towards the teacher. Understanding the perceptions of technology from students may help teachers to deliver a more enjoyable and enriching learning experience for the students.

Pathways conceptualised for future options post-school are one influence that especially affects year 13 students. Through school career advice and guidance students are shown academic or vocational pathways through level One to Eight at Polytechnic, University or Industry. This is where parental encouragement and reinforcement of self perceptions of ability are factors that impact on subject choices, but are not necessarily the key influences.

Hipkins and Vaughan (2002) identified teachers, career advisors, parents / caregivers, friends, older siblings and Deans as being influential in subject choices made by students. Careers can be viewed as more glamorous through their portrayal by media and other sources, which is one more reason for an improved perception by students of Technology and Technology Education.

One major impact that schools can have is in the design of school option lines. These are designed to match school needs with resources (rooms, student numbers, teachers, materials etc) and an operational budget. The core subjects dominate student numbers because of their compulsory subject status and a traditional view of being important. Hipkins and Vaughan (2002) stated that 'just because' is no longer an adequate excuse for sound subject choice, however it is ever present and will continue until perceptions are broadened around the value of subjects for students to consider in their choices.

### **3.2. Perceptions held by Year 13 Students.**

Student awareness of past technology advances showed an understanding that new inventions did influence society; however the view of technology as still mainly about new equipment and products is prevalent. Students seem to find it hard to articulate on just what technology is, but do differentiate between what they view as 'school technology' and that which is 'worldwide'.

In the picture prompts used in the study by Hawkins (2006) students identified the objects easily enough, but did not describe broader technological aspects especially around the technological principles involved in producing a technological solution. This seems to reinforce the findings of limited understanding shown in the wider appreciation that a technology advance has on society and how well they could explain the question about inventions.

The major majority of students at Year 13 level identified that technology education had relevance for their future study or career options. In identifying technology education skills they would carry through with them, practical or 'designing and making things' were very evident along with problem solving and creative type skills that are hard to quantify. Planning is identified within two separate groupings while evaluation though only identified once would need to be evident for other areas such as 'problem solving' and 'making' to proceed.

The student's thoughts on how they would describe a Materials Technology course to an interested party was taken in a 'face to face' interview. The words the students used (practical work, design process or design and make type answers) tended to, 'reflect the capability strand of the technology curriculum and student's practical focus as there were limited responses from participants that reflect the knowledge strand of the technology curriculum' (Hawkins, 2006).

In questioning students on their experiences in different technology areas, all students replied to at least some experience only in Materials technology through their secondary career, suggesting this is a focal area of technology taught consistently at every level in secondary schools.

The next stage of looking at different types of materials used and their functions is confined as the boys and girls were working within environments of hard materials for boys and soft materials for girls. The boys surveyed also gave answers that reflected their classroom environs when asked to consider the roles of different materials, many of the boys did not consider materials (i.e stone, leather, glass) outside of building materials used in industry as 'construction materials' or relegated them to roles as secondary construction materials (i.e. foam, textiles etc). The girls answers also reflected their classroom environ though they did acknowledge doing hard materials or using different materials in other areas (electronics etc) taught in earlier years.

When talking of their favourite technology project the word enjoy or the fact the student could appreciate a finished product in action are apparent. The student's interaction with stakeholders and clients to give a broader understanding of the nature of technology also shone through.

Students in the study identified groups of people as very important or important in influencing their choice of technology as a subject, these being foremost the teacher and then parents or caregivers. Friends and other adults were behind them, while unfortunately for the pastoral care of schools - Deans and Career Advisors seem to have little impact.

It would seem from the study that students still rate enjoying the subject and the

subject's relationship to future post school options as major factors of influence in their subject choice. The fact that had succeeded previously in the subject was also the other major standout. Factors later in the survey of the opportunities presented to them by a materials technology course found that producing what you want and links with the outside world were by far the most popular and do correlate to the enjoyment factor and relations to future post school options for students.

The 'enjoyment' factor and the 'make what you want' do display an element of ownership in student projects that technology education can apply to its advantage in attracting and maintaining student interest especially when linked to their future career paths. It is also an opportunity to allow us as teachers a view into our student's world.

It is interesting to note that student's suggestions for encouraging more students to study materials technology strongly advocate the retention or promotion of practical aspects for technology education and of enjoying the experimentation and manipulation of material needed to produce a solution. The student responses also noted the need for the subject to be able to link to future careers.

Among the interesting replies were those that involved giving students a clear definition of what technology was about to maintain interest and gain better understanding prior to their Year 13 course.

## **4. CONCLUSION**

In conclusion student's need to understand what is technology and technology education in their own world view. This position may provide more diverse and real experiences for students and may require a sustained effort on the part of the current teachers of technology education to develop students' broad perception of technology. This effort would seem necessary and important given the circumstances of technological literacy in today's society. The implication of the research suggests that teachers of technology and technology education need to understand students' perceptions of technology.

The findings for two Year 13 classes show that when compared to students perceptions of technology in earlier years done by students at earlier stages of their school career, they still have a limited understanding of the wider impact of technology within society because, 'the detail of their perception of technology mainly concerned their experiences at school' (Hawkins 2006). They are mature enough in their learning to understand that technology in school is limited and that a wider experience awaits them outside.

The students have retained a positive outlook towards technology education and have hinted in their thoughts on what issues teachers and schools could exploit and work on, such as more practical and fun assignments or a clear definition of what is technology for students, to make technology more enjoyable and attractive to students. The teachers challenge would be to find this pathway and retain those core reasons of contexts that show authentic issues that are relevant that made those students find this such an interesting and relevant subject in the first place.

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Ko te pae tawhiti  
Whaia kia tata  
Ko te pae tata  
Whakamaua kia tina

Seek your distant horizons and cherish those you attain  
Set your goals and strive to achieve them, and hold fast to the things attained.

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