Student Voice - *Whakatuppuhia te reo, whakatupuhia te tamaiti*

The Critical Thinking Skills Project

1 **RESPECT for reasons**
Think it through
What is my view?

2 **RESPECT for difference**
Talk it through
What are different views?

3 **RESPECT for change**
Reflect your view
What is my revised view?

RESPECT
Dr Maree Davies & Dr Patrick Girard,
The University of Auckland, 2018

CAN WE...

...encourage senior secondary school students to use their voice to express new critical thinking skills?

Impact Report
        for Cognition Education Trust
12 April 2018

CAN WE PREVENT ADULT DISEASE BEFORE BIRTH? ··· CAN WE KNOW HOW THOUGHTS ARE MADE? ··· CAN WE PROLONG THE QUALITY OF PEOPLE'S VISION? ··· **CAN WE REDUCE INEQUALITY THROUGH EDUCATION?** ··· CAN WE HELP WOMEN IN PRISONS TO GAIN SELF-ESTEEM? ··· CAN WE BRING BACK THE DAWN CHORUS TO OUR CITIES? ··· **CAN WE HAVE THE BEST SCHOOL SYSTEM IN THE WORLD?** ··· CAN WE LEARN FROM THE MISTAKES OF HISTORY TO CREATE A BETTER WORLD? ··· CAN WE BUILD A SOCIETY THAT PROTECTS ITS WEAKEST MEMBERS? ··· **CAN WE BUILD STRONGER COMMUNITIES?** ··· CAN WE NURTURE CUTTING-EDGE INNOVATION WITH TRADITIONAL INTEGRITY? ··· CAN WE USE VISUAL TESTS TO DIAGNOSE AUTISM? ··· CAN WE FACILITATE THE CREATION OF AMAZING ARTWORKS? ··· CAN WE REDUCE OUR RELIANCE ON FOSSIL FUELS? ··· CAN WE DEEPEN OUR UNDERSTANDING OF THE CREATIVE PROCESS? ··· CAN WE BRING UP A GENERATION OF CRITICAL THINKERS? ··· **CAN WE STOP WASTING TALENT?** ··· CAN WE MAKE EVERY BUILDING SAFE FROM EARTHQUAKES? ··· CAN WE EMPOWER YOUNG ADVOCATES TO FIGHT INJUSTICE? ··· CAN WE TURN OFF THE OBESITY SWITCH? ··· CAN WE TAKE MORE GAME-CHANGING IDEAS TO MARKET? ··· CAN WE ATTRACT AND RETAIN THE BEST MINDS IN NEW ZEALAND? ··· CAN WE MAKE OUR HEALTH SYSTEM MORE EFFICIENT? ··· **CAN WE ERADICATE CHILD ABUSE?** ··· CAN WE BUILD A MODERN ROBUST ECONOMY? ··· CAN WE PREVENT PROGRESSION OF MYOPIA WITH CONTACT LENSES? ··· CAN WE CAPTURE THE FORCE OF LIGHT? ··· CAN WE IMPROVE SOCIETY THROUGH UNDERSTANDING OF INJUSTICES? ··· CAN WE POWER OUR DEVICES WITHOUT WIRES? ··· CAN WE DEVELOP THE GO-TO PRODUCTS AND SERVICES OF TOMORROW? ··· CAN WE CREATE CHANGE, INVITE INNOVATION AND LEAD THE WAY? ··· CAN WE COMBINE CREATIVE FLARE WITH FUNCTIONALITY? ··· CAN WE DEVELOP EFFECTIVE INTERVENTIONS FOR ADDICTION? ··· CAN WE PREPARE YOUNG NEW ZEALANDERS TO BE GLOBAL CITIZENS AND INFLUENCERS? ··· **CAN WE ENSURE ALL OUR YOUNGSTERS ARE READY FOR SCHOOL?** ··· CAN WE PREVENT MIGRAINES? ··· CAN WE PROVE THE VALUE OF CREATIVITY? ··· CAN WE DESIGN CITIES READY FOR A CHANGING WORLD? ··· **CAN WE OVERCOME ECONOMIC BARRIERS TO BRILLIANT STUDENTS?** ··· CAN WE SEE INTO A VOLCANO? 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THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

EDUCATION AND SOCIAL WORK

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CAN WE encourage senior secondary school students to use their voice to express new critical thinking skills?

THANK YOU

The University of Auckland would like to thank Cognition Education for generously supporting Dr Maree Davies in the longitudinal Student Voice senior secondary school project in critical thinking (CT) and group discussions during 2016 and 2017.

The students and teachers were from four co-educational secondary schools in Auckland.

The current study is the third in a series in the field of dialogue and focused on student voice within small group discussions at senior secondary level in the curriculum areas of English and Geography.

The initial aim was for senior secondary students to gain confidence in learning to use their voice to express their critical thinking skills in group discussions that were taught within the project. However, the wider outcome was that the students in the project also gained confidence in using their new critical thinking skills outside of the project, i.e. in other curriculum areas and in conversations with friends, family and the wider community.

FINANCIAL INPUT

The generous $50,000 grant from Cognition Education Trust has:

- assisted in paying for 16 teachers in the intervention classes to be released to attend the professional development days on critical thinking;

- allowed the 16 teachers in the non-intervention classes to be released following the study for the same professional development as a gesture of goodwill and equity for students and teachers in the project;

- provided an ongoing professional relationship with Professor John Hattie as advisor of the project at the University of Melbourne; and

- enabled a Research Assistant to assist Dr Davies with data collection, coding and data analysis.

"Critical thinking skills are important in student voice because student voice is not just a matter of increasing students talking but guiding students to gain confidence and knowledge in how to talk so that their ideas are heard and respected." – Dr Maree Davies

OUTCOMES

You will see from Maree Davies' comprehensive report below the various activity that took place to support this investigation of critical thinking skills during group discussions across the school year, and through student and teacher interviews, examined the use of and beliefs they held about critical thinking. The outcomes can be summarised as follows:

- The students in the intervention lesson developed critical thinking skills and responded well to a taught structure of talk.

- The students were mostly able to recall the key elements of the critical thinking model that was taught, i.e. to use arguments which consisted of an increase in their use of evidence, to consider different viewpoints and to use more questions during their discussions to foster higher levels of interaction.

- Depending on what band their class was, depended on to the levels of the sophistication of the elements of the critical thinking model but overall the banding of the classes, i.e. low band or accelerant was irrelevant as most of the students in the intervention classes showed the nature of many of their interactions shifted once they had been taught the critical thinking model.

- However, by contrast **the levels of talk between the low band and the accelerant classes who were non-intervention were profound,** with some groups in the low band classes continuing to stay off task through the entire study. **This is a significant finding because the study has revealed the importance of teaching all students a sophisticated framework of talk.**

- All participating classes responded better when the students were motivated with a statement or question to discuss that they found challenging and provocative, and responded poorly if disengaged with a topic they felt was not worthy of discussion. All participating classes seemed to enjoy and benefitted from having the transcripts of their group discussions to retrospectively consider how well they talked to each other.

IMMEDIATE IMPACT

The students who were in the intervention classes were mostly able to articulate what critical thinking was following the study. Importantly many students identified that they were aware that they used the skills in other curriculum and some identified using the skills in their own lives outside of school.

FUTURE IMPACT

One of the key recommendations of this research is that a critical thinking skills framework, such as the model designed for the study by Dr Maree Davies and Dr Patrick Girard, should be taught to all Year 9 students so that the nature of the interactions that foster deeper and more complex discussions using critical thinking skills become habitual by NCEA or Cambridge.

This study offers a new and innovative critical thinking model which will be made available to all schools on the Ministry of Education site and will be accompanied by professional vignettes to be used as teaching resources. The findings of this study have been presented at the American Educational Research Association (AERA) annual meeting in New York on 13th April 2018 as part of an international symposium on classroom talk.

The findings will also be presented at the University of Auckland and to the schools who participated in the study. The findings will be pursued with the Ministry of Education in light of changes to policy around the use of critical thinking in both primary and secondary schools.

IMPACT REPORT ON STUDENT VOICE
Whakatuppuhia te reo, whakatupuhia te tamaiti

The Critical Thinking Skills Project

Prepared for Cognition Education Trust

Prepared by Dr Maree Davies
Faculty of Education & Social Work
10 April 2018

Introduction – Student Voice

'Student voice' is the intentional collection of students' thinking and feedback on their learning and the use of these voices to inform and improve teaching, learning, and school-wide decision making.

Student voice is not an additional process or requirement: it is a source of data within existing pedagogy, systems, and procedures.

Student voice contributes to the next learning steps for students and guides decisions about content and approaches by teachers, leaders, and the community. These decisions might be based in individual classrooms or at the school-wide level, where they contribute to changes in leadership, systems, and structures that affect teachers and students across and beyond the whole school.

Research Objectives of Student Voice and the Critical Thinking Project

The Study

The current study is a third study in the field of dialogue and focused on student voice within small group discussions at senior secondary level in the curriculum areas of English and Geography (but mostly English students). This third study was conducted because Study Two results found significant increases in the number of questions students asked of each other, namely uptake questions and high level questions (Davies & Meissel, 2016) following an intervention called Quality Talk. The increased use of questions also resulted in more complex discussions when the use of these questions increased. However, though there were positive results from the study on Quality Talk, the students did not appear to use critical thinking skills during their group discussions.

Critical thinking skills are important in student voice because student voice is not just a matter of increasing students talking but guiding students to gain confidence and knowledge in how to talk so that their ideas are heard and respected.

In this third study, an investigation of critical thinking skills during group discussions across the school year, and through student and teacher interviews, examined the use of and beliefs they held about critical thinking within group discussions. A mixed-methods approach was used, because using interviews made it possible to capture in greater depth what the teachers and students thought of the uses of critical thinking in group discussions and outside of group discussions.

Two overarching questions guided the investigation:

(1) To what extent do students use critical thinking skills during their group discussions after being taught a model of critical thinking?

(2) To what extent can students recall the critical thinking skills model following the intervention.

Method

Design

The study took place during the 2016 and 2017 school year and followed a quasi-experimental design that included four measurement points. Time 1 data for both years provided the baseline data. Fifteen minute group discussions, incorporated in to the teacher's usual way of taking a lesson were audio recorded to establish ways in which critical thinking was already being used by the students. The teachers and the students filled out questionnaires that included Likert scale questions and short answers.

Approximately two weeks after the Time 1 data were gathered, the teachers in the intervention classes gathered together for a whole-day professional development workshop. The Principal had invited teachers to participate as part of the ethics procedure. Once the teachers who wanted to be part of the study were established, a matching class was assigned so that each class had non-intervention data to compare. The teachers in the non-intervention classes were invited to attend the same professional development following the completion of the study.

The whole-day professional day was run by Dr Patrick Girard from the Faculty of Arts who is an expert in logic, reasoning and understanding bias and Dr Maree Davies from the Faculty of Education & Social Work, who is an expert in adolescent learning, and in particular the use of dialogue to enhance deep learning for students. Following the whole day professional development day, Dr Davies taught all but two of the intervention teachers' students. This lesson included a discussion on why critical thinking was important and some practical examples of how to increase the use of critical thinking within the students' group discussions. In 2017, Dr Davies used the Salvador Dali picture - The Three Spinxes of Bikini - to demonstrate the various skills of critical thinking. The picture was chosen as it seemed likely it would be a popular and interesting picture no matter the curriculum area, gender or ethnicity or students.
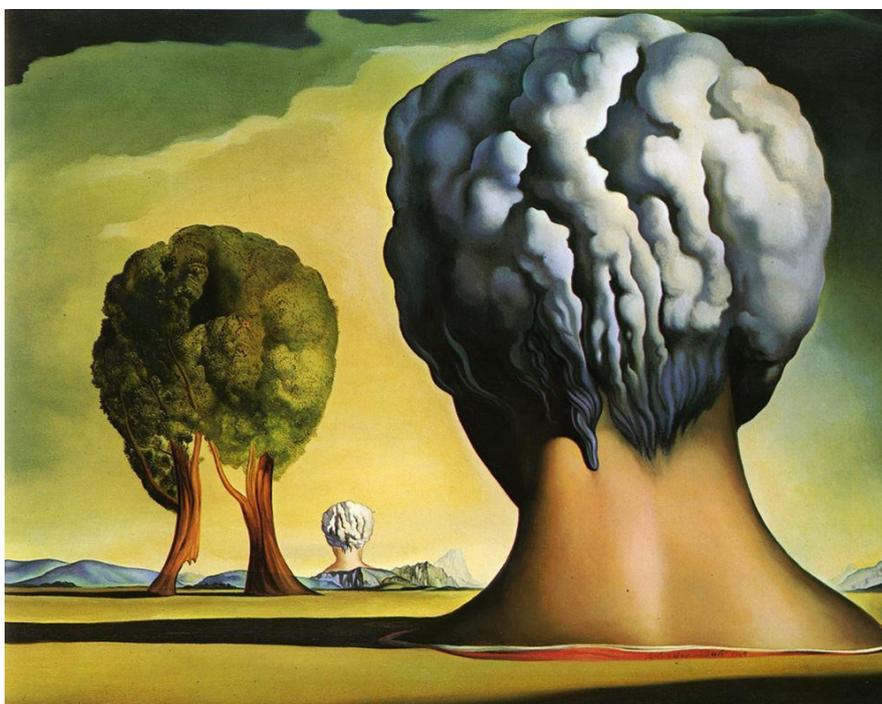
The students wrote on their own what they thought the picture was about, then Dr Davies taught the classes through powerpoint some practical ideas on how to incorporate critical thinking in to their group discussions. Following the powerpoint, the students practiced using the skills in a 15 minute group discussion. These ideas were based on a model of critical thinking and dialogue that has been developed by the researchers. This model has been modified and will be published and available for all schools by the end of 2018.

1 RESPECT for reasons

Think it through

What is my view?

2 RESPECT for difference

Talk it through

What are different views?

3 RESPECT for change

Reflect your view

What is my revised view?

RESPECT

Dr Maree Davies & Dr Patrick Girard,
The University of Auckland, 2018

Explanation of the Critical Thinking Model

Respect for reasons:

Knowledge of argumentative structure is important to give students confidence in how to put their views across in a diplomatic manner, both convincingly and logically. Argument structure is derived from the philosophical tradition, breaking down arguments into manageable structures to better assess the impact of pieces of evidence or reasons on conclusions. **We believe that secondary school-aged students should respect this process and the model will help students to learn to argue the evidence, logic and reasoning rather than the person**. As part of the training for this part of the model, we would suggest the teaching of confirmation bias, and availability bias.

Respect for difference:

We believe that schools can assist students to develop a moral blueprint. **In order to develop a moral blueprint, we believe it is necessary for students to have opportunities to grapple with difficult issues, because without having to confront their own beliefs and those of others, who may hold different views, this moral compass may not fully develop and mature.** Controversial issues can divide a society because significant groups within society can offer conflicting explanations and solutions (Stradling et al., 1984). Immigration, terrorism, reproductive right (Hess, 2009) and contested histories (Foster, 2014) are examples of controversial issues. For any generation there is intensive, political, economic and cultural conflict, however there is also now rapid rising student

diversity from immigration (Kerr & Huddleston, 2015). Positioning yourself and understanding your origin of beliefs is vital. Therefore, our model includes a section for the students to consider why they and their group might hold particular views and who in society might think differently to them about their views and why they might hold these different views. As part of the training for this part of the model, we would suggest the teaching of unconscious bias.

Respect for change:

Daniels (2001) argued that schools were far less reflective about what was said than what was written, and so did not place much importance on discussion skills and tools. **It is fairly common practice for secondary school-aged students to self-evaluate what they have written but it is extremely rare for students to be given the opportunity to self-reflect on a group discussion.** The skill in group discussions should be as much about listening as talking. Once the students have had their group discussions, students can be encouraged to consider if their view was changed, affirmed or challenged and if so why. What was the compelling evidence given? A question that they were asked that prompted them to realise that their evidence was not strong but based on stereotyping perhaps?

This model will be made available to all schools on the Ministry of Education site and will be accompanied by professional vignettes. These vignettes are being written by a professional script writer and will be acted by professional teenage actors for maximum effect for secondary school-aged students. The Woods Fund is funding this part of the project.

The critical thinking skills developed is a new and innovative model that draws upon the traditional philosophical view of critical thinking, sociological view and the education view.

Coding of the Study:

Maree Davies, Katharina Kiemer and Adam Dalgleish wrote the coding for the 15 minute group discussions for this study. The coding has been designed to incorporate the traditional Philosophy component of the critical thinking model taught, the sociological and the questioning. This coding chapter will be published in the Cambridge Handbook of Group Interaction Analysis, edited by Professors Brauner, Boos and Kolbe in 2018.

Table 1. Summary of indicators of critical thinking (CT) in group interactions.

Category	Code	Description	Example
Philosophical view on CT	*A - Argument*	Speaker provides a group of statements some of which (the reasons) are intended to support another (the conclusion) Conclusions usually need an indicator such as therefore, thus, consequently, so.	*"This painting was done during the time when nuclear testing was controversial and the two heads look like nuclear heads so I think the Salvador Dali picture might be about nuclear testing"*
	E- Providing a statement of evidence	Speaker provides clear evidence for a claim by supporting their argument with data or relevant examples (Facione, 1990). Speaker may use words such as because, in view of the fact that, given that, since, for the reason that, assuming that.	*"There was nuclear testing at Bikini Atoll between 1946 and 1958, and Dali was painting then, so then the picture might represent the destruction of humanity from the tests"* *"It looks like a head full of activity, or smoke to me"*

	B – Building on to the discussion	Speaker stays on topic and builds on the discussion but the statement does not include evidence.	
	CE - Critical Engagement	Evidence of a speaker providing a strong or insightful counter example to a particular argument or point. Shows engagement with and critical thought about ideas presented. (Facione, 1990)	*"The tree is closer to the explosion than the other head though, so maybe it doesn't represent the destruction of humanity but the destruction of nature?"*
	RAB - Recognizing Availability Bias	Speaker recognizes that, just because they see an idea presented often, it does not make it true (Kahneman, 2011)	*"I heard on the news that there was a flood of migrants to Germany, I wonder what they mean by a flood of migrants though?"*
	RCB – Recognizing Confirmation Bias	Speaker recognizes that, they believe something because the information confirms previously existing belief or biases (Kahneman, 2011)	*"I am worried about flying now because of a possible terrorist attack. But I wonder if that is because terrorist attacks are made such a big deal in the media?"*
Sociological view on CT	**PS - Power Structure**	Speaker identifies a relevant societal power structure, showing knowledge of contexts likely to impact arguments. External influences such as media, politics, gender, ethnicity, religion are examples (Apple, 2010; Giroux, 2015; McClaren, 2006).	*"Only 200 Micronesians inhabited the islands when the US conducted the nuclear tests, I think they thought they would get away with it because they are such a big and powerful country."*
	SASQ – Situated awareness question	Speaker asks who in society would challenge our group's view.	*Who would challenge our view?*
	SAC – Situated awareness Challenge	Speaker suggests what other group (s) in society may challenge the group's view on the discussion topic gender, ethnicity, political, socio-economic, and religious different perceptions say be suggested (Freire, 1970; Ladson-Billings & Tate, 2006) and those with disabilities or learning differences (	*"A person who holds liberal views might not agree with our view that health insurance should be compulsory."*
	SASG – Situated awareness – self and group	Speaker acknowledges why the group or themselves would hold a particular perspective such as gender, ethnicity, political, socio-economic, and religious influences might shape perceptions of you or other people in different contexts than (books, 1994, 2010; Delpit, 1995).	*"New Zealand has a strong anti-nuclear history so perhaps that is why we think it is about nuclear testing."*

Educational view on CT	DM - Discourse Management	A question or statement which aims to keep the group on task, a sign of positive and honest engagement with ideas (Facione, 1990).	*"I think we are getting side tracked."* *"We haven't heard from Peter, what do you think Peter?"*
	UQ - Uptake question	Student seeking further information from a student in the group (Nystrand, Wu, Gamoran, Zeiser, & Long, 2003).	*"When you said you think your family would think the nuclear testing was necessary why do you think that, Sara?"*
	HLQ - High level question	Student seeking further information by asking either a question that elicits a generalization, analysis or speculative question (Applebee, Langer, Nystrand, & Gamoran, 2003)	*Generalisation – "Would all artists have been anti-nuclear?"* *Analysis –* *"I wonder if Dali had a friend involved in the nuclear testing and that inspired him to paint the picture?"* *Speculation –* *"I wonder to what extent would famous artists like Dali impact political opinion with their work?*
	IIE- Imagination/Intuition/Emotion	Opening up the discussion to new ideas that haven't yet been explored (Thayer-Bacon, 2000).	*"Maybe there is another message than the effect of nuclear testing that Dali was trying to say."*

During the lesson the teachers observed Dr Davies and took notes and were then encouraged to continue the process of teaching critical thinking during their own lessons. According to Bandura (1977, 1997) theoretical framework on self -efficacy, the experience of observation can be fundamental to strengthening self –efficacy and it was hoped that having observed the lesson and combined with the professional development day, the teachers would feel reassured in their ability to teach critical thinking skills to the students to be used within their group discussions. Dr Davies did not teach the students in the non -intervention class this lesson and therefore the teachers in the non -intervention classes did not observe Dr Davies teaching the critical thinking skills.

Following the intervention lesson on critical thinking skills, two more data collections to establish whether there were differences between the intervention and non -intervention classes in their use of critical thinking skills within their group discussions. The Time 2 and Time 3 data collection involved the students being given transcripts of their group discussions from Time 1 and Time 2 respectively. The students were audio recorded discussing the extent to which they talked to each with depth/critical thinking skills and how they could improve for the following discussion. These discussions have been transcribed and will be analysed at a later date. Following the opportunity to read the transcripts the students engaged each time in a 15 minute group discussion that was audio recorded for the purposes of transcribing and coding.

The students also completed questionnaires that were the same as the baseline questionnaires in order to see any patterns in their shifts of thinking and beliefs about critical thinking and dialogue. Outside of these group discussions the teachers were encouraged to continue to teach the skills of critical thinking.

Participants

The students and teachers were from four co-educational secondary schools in Auckland, New Zealand.

One school was classified as low socioeconomic status (SES), one mid-level to low SES, one mid-level to high SES and one high SES.

Based on self-report the students were from a variety of ethnic backgrounds:

- New Zealand Pakeha/European,
- Pacific Island heritage
- Asian
- Fiji Indian
- Indian
- South African, and
- 'others'.

Ethics approval for the study was obtained from the University of Auckland. All students, teachers and parents signed either an assent form (students) or permission form (teachers, parents, BOT and Principals of schools).

The Principals invited English and Geography teachers from their respective schools to participate in the study either in 2016 or 2017 or both in some instances and 32 teachers agreed to take part.

16 teachers were in the intervention group and 16 teachers were in the non -intervention group.

18 teachers participated in 2016 with 9 intervention and 9 non intervention and 14 teachers in 2017.

The teachers in the study ranged in experience from a first year teacher to a teacher who had taught for 30 years.

For an overseas of the sample, see Table 3 below. The names of the schools and teachers are pseudonyms.

Table 2. Description of participants (pseudonyms have been used for schools and teachers) in 2016

School	SES	Number of classes in study	Number of teachers in study
Matai	Low	2 x mid to high ability classes 2 x low to mid ability classes	Intervention: Teacher A, 1 year's experience, mid to high ability class Teacher B, 2 x non intervention Teacher C and Teacher D
Kauri	Low to mid	2 x intervention 2 x non intervention 2 x matching high to mid ability 2 x low to mid ability	Teacher E and Teacher F Teacher G and Teacher H
Miro	Mid	4 x intervention 4 x non intervention 2 x low ability 4 x mid ability	Teachers I, J, K, L Teachers M and N Teachers O, P, Q and R
		18 classes in total, 2016 9 intervention 9 non intervention	

Table 3. Description of participants in 2017 study

School	Socio Economic Status	Number of classes in study	Number of teachers in study and information
Matai	Low	1 x intervention 1 x non intervention	Teacher S Teacher T
Kauri	Low to mid	1 x intervention 1 x non intervention	Teacher U Teacher V
Miro	Mid	2 x intervention 2 x non intervention 2 x Geography Year 13, mixed ability 2 x mid ability	Teacher W and X Teacher Y and Z
Totora	High	3 x intervention 3 x non intervention	Teacher AA, BB, CC Teachers DD, EE, FF
		14 classes in total, 2017 7 intervention 7 non intervention	

Results

Shifts in the nature of their interactions

Results showed that following the intervention, the students in the intervention classes were able to show a significant increase in the use of arguments, that is were able to reason logically with evidence and provide a conclusion. They were also able to identify when they were using confirmation bias in their evidence, used more building points (which demonstrates better listening to one another, because they weren't just adding their points but rather were adding on to each other's) and stayed on task to a much higher level than the non-intervention classes.

The high band classes were also able to identify the more sophisticated skill of identifying biases in their arguments in the intervention classes more than all other classes.

The students in the low band intervention classes interacted with each other using uptake questions and explored who in society would take a different stance to their position more than the non-intervention classes. The students in the non-intervention low band classes used little evidence, rarely asked each other questions and remained mostly off topic.

Provocation/question/statement important

All classes responded better when the students were motivated with the provocation or statement to discuss and discussions remained largely off topic when students were disinterested in the topic. Students complained in transcripts if they felt the topic was boring/already discussed with the teacher/didn't stretch them enough.

Questions that didn't work very well:

- Would you ever go to war for your country? (This question is subjective, and so the students could merely talk about themselves with no room for dispute).

- What are the advantages and disadvantages of living in a structured society? (Doesn't foster engagement). When given a question like this students generally just listed what they thought is good and what they think is bad and then considered their discussion was over.

- What was the author/director thinking in this exploratory example? (Not enough room for a complex and in-depth discussion, most students didn't care enough to engage and many even said so. They said it was a boring topic and had already discussed with their teacher).

Questions that generated robust dialogue

- Is going to war every justified? – This question worked well, as the students could remain objective about their views and this in turn incites disagreement.

- Do you think revolution/violence can ever be justified? – The students also responded well to this question and were able to draw links between the film they were studying and larger wider societal issues.

- Are media and advertising forms of social control? – The students assessed power structures as well as general arguments, so their thinking and talking skills were stretched well.

Sample analysis

Quantitative data is still being entered in and analysed, however the sample results are promising. The sample results in this Impact Report involve analysis of two High Band, two Mid Band and two Low Band classes to represent overall data (32 classes in total).

All of the features of the model did not increase with statistical significance and this is of course to be expected, as the students were only taught one lesson by Dr Davies with some follow up by their teachers. However, interestingly, the students were able to recall the key components of the model in their interviews following the study.

The features that did increase with statistical significance were:

• Arguments (an argument is when the students provide reasons with a conclusion);

• Recognising when they may have confirmation bias (when you recognise that you think something, just because you have seen or heard it many times so you think it is true);

• Building point (students adding additional evidence to an argument of someone else); and

• Staying on Task.

The students appeared to enjoy the study and spoke very favourably of the CT model when interviewed post study, this perhaps explaining the high shift in staying on task behaviour.

Sample results

A total of 147 students (66 control versus 81 intervention) from three schools were included in this sample. Students were from six English classes:

School SES	Subject	Status
Mid	English	Intervention
Mid	English	Control
High	English	Intervention
High	English	Control
Low	English	Intervention
Low	English	Control

The transcript codes/categories were given numeric values in line with the table below: **Table 4.**

Code	Number
A - Argument	1
E- Providing a statement of evidence	2
CE - Critical Engagement	3
R - Recognizing confirmation bias	4
PS - Power Structure	5
SASQ – Situated Awareness question	6
SAC – Situated Awareness Challenge	7
SASG – Situated Awareness – self and group	8
DM - Discourse Management	9
UQ - Uptake question	10
HLQ - High level question	11
IIE- Imagination/Intuition/Emotion	12
BS – Off task behaviour	13
BP – Building Point	14

This enabled the comparison of the proportion of codes that were recorded for each student at Time 1 versus Time 2, and examine whether there were statistically significant changes over time between the intervention and control groups. This was done using a repeated measures ANOVA test.

Descriptive Statistics

The table below shows the average proportions of codes recorded for each of the 14 categories, rounded to two decimal points. So, for example, 0.03 (or 3%) of codes recorded in Time 1 were about making arguments, which became 0.04 (or 4%) in Time 2.

As you can see from the table, most of the codes recorded were either to do with students saying off task statements (37%), recognising confirmation bias (31%), or building points (13%).

Similar patterns exist within Time 2 data. If both M and SD were zero, it means there were no codes for that particular category at all.

Table 5. Average proportions of codes recorded for each of the 14 categories.

Overall Proportions	Time 1		Time 2	
	M	*SD*	*M*	*SD*
Argument	0.03	0.06	0.04	0.06
Providing a statement of evidence	0.03	0.07	0.05	0.10
Critical Engagement	0.03	0.05	0.05	0.07
Recognizing confirmation bias	0.31	0.15	0.39	0.23
Power Structure	0.00	0.01	0.00	0.00
Situated Awareness question	0.00	0.00	0.00	0.00
Situated Awareness Challenge	0.00	0.00	0.00	0.00
Situated Awareness – self and group	0.01	0.04	0.00	0.01
Discourse Management	0.07	0.07	0.08	0.10
Uptake question	0.02	0.04	0.03	0.04
High level question	0.01	0.02	0.01	0.02
Imagination/Intuition/Emotion	0.00	0.01	0.00	0.00
Off Task	0.37	0.24	0.24	0.20
Building Point	0.13	0.15	0.13	0.11

Note. N = 147.

The two tables below contain a breakdown of the above proportions, but for intervention and control groups. It is important to note that at Time 1, a one-way ANOVA test (following a Bonferroni correction) indicated that there were no statistically significant differences across 13 out of 14 categories between the intervention and control groups. The only statistically significant difference was that students in the intervention group had a significantly higher proportion of off task statements recorded for them than those in the control group, $F(1, 146) = 12.997$, $p < .001$, eta-squared = .08 (medium-to-large effect size).

Table 6. Control Group proportions

Control Group	Time 1		Time 2	
	M	SD	M	SD
Argument	0.03	0.07	0.03	0.06
Providing a statement of evidence	0.04	0.09	0.05	0.13
Critical Engagement	0.02	0.05	0.06	0.10
Recognizing confirmation bias	0.33	0.18	0.35	0.26
Power Structure	0.00	0.01	0.00	0.00
Situated Awareness question	0.00	0.00	0.00	0.00
Situated Awareness Challenge	0.00	0.00	0.00	0.00
Situated Awareness – self and group	0.01	0.06	0.00	0.00
Discourse Management	0.07	0.08	0.08	0.10
Uptake question	0.02	0.03	0.03	0.04
High level question	0.01	0.02	0.01	0.02
Imagination/Intuition/Emotion	0.00	0.00	0.00	0.00
Off task	0.29	0.23	0.30	0.23
Building Point	0.16	0.16	0.11	0.11

Table 7. Intervention Group proportions

Intervention Group	Time 1		Time 2	
	M	SD	M	SD
Argument	0.02	0.04	0.05	0.06
Providing a statement of evidence	0.03	0.06	0.05	0.06
Critical Engagement	0.04	0.06	0.04	0.05
Recognizing confirmation bias	0.29	0.13	0.42	0.19
Power Structure	0.00	0.01	0.00	0.01
Situated Awareness question	0.00	0.00	0.00	0.00
Situated Awareness Challenge	0.00	0.00	0.00	0.00
Situated Awareness – self and group	0.00	0.01	0.00	0.01
Discourse Management	0.06	0.06	0.09	0.10
Uptake question	0.02	0.04	0.03	0.04
High level question	0.01	0.02	0.01	0.03
Imagination/Intuition/Emotion	0.00	0.02	0.00	0.00
Off task	0.43	0.24	0.19	0.15
Building Point	0.10	0.14	0.14	0.11

Repeated Measures ANOVA Results

The table below summarises whether there were any significant main effects of time or group-by-time interaction.

The first column represents whether there were any significant shifts in the overall score (i.e., all students irrespective of intervention or control) over time.

The second column represents whether the intervention group scores has significantly changed at a different rate than the control group, vice versa.

So, if the intervention did make a difference, then you would expect a significant group-by-time interaction where the intervention group scores would become more positive over time than the control group scores.

Table 8. Main effects of time or group-by-time interaction

	Did overall scores significantly change?	Was there a group by time interaction?
Argument	No	Yes
Providing a statement of evidence	No	No
Critical Engagement	Yes	Yes
Recognizing confirmation bias	Yes	Yes
Power Structure	Yes	No
Situated Awareness question	No	No
Situated Awareness Challenge	No	No
Situated Awareness – self and group	No	No
Discourse Management	No	No
Uptake question	No	No
High level question	No	No
Imagination/Intuition/Emotion	Yes	No
Bullshit	Yes	Yes
Building Point	No	Yes

The above table shows no significant main or interaction effects for 7 out of the 14 coding categories, which basically implies that the intervention is unlikely to have 'caused' a difference in those areas.

The next part focuses on the categories where there was either a significant time or interaction effect. This is entirely expected, after only one lesson using the model and does not mean the model does not have potential to show more features gaining a significant increase over a longitudinal study.

The features that did show a significant increase from Baseline (Time 1, before intervention) to Time 2 following intervention **were the students use of arguments** (having evidence with a conclusion); **recognising confirmation bias, use of building points and staying on task** during the group discussions.

Argument

There was no statistically significant main effect for time (i.e. the average proportion of codes recorded are similar between Time 1 and Time 2. However, there was a statistically significant group-by-time interaction.

As the figure below shows, while there were no statistically significant differences between the control and intervention groups at Time 1, the intervention group significantly increased on the proportion of argument statements used by them during discussion by Time 2.

Figure 1.
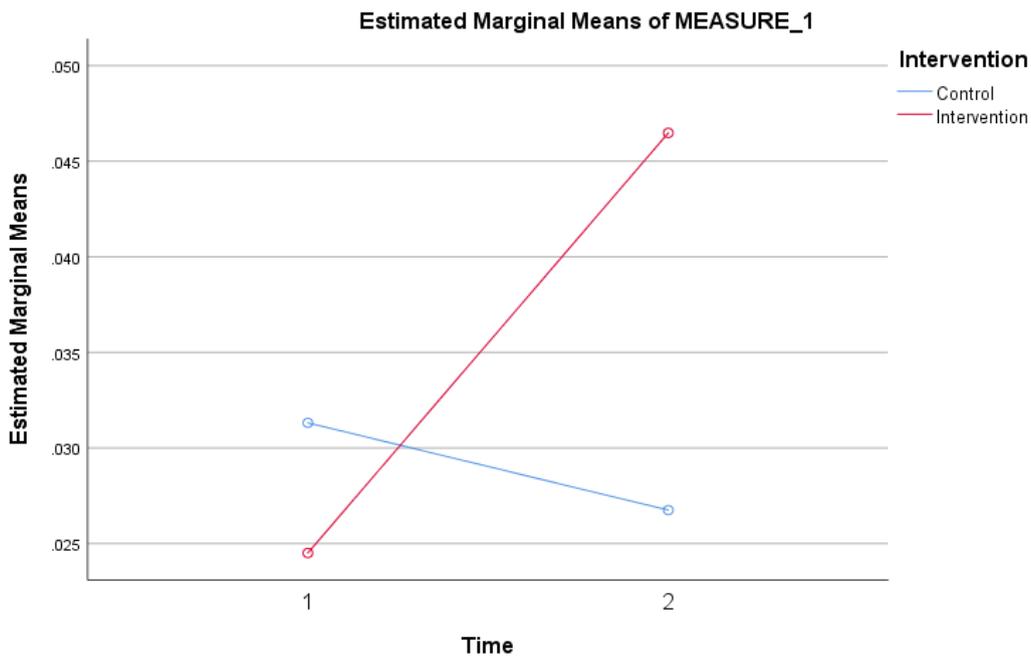
Recognizing Confirmation Bias

There was a statistically significant main time effect, as well as a significant group-by-time interaction. As the figure below suggests, overall, proportion of statements associated with recognising confirmation bias significantly increased.

In addition, the significant interaction shows that the intervention group provided significantly more statements within this category than their peers in the control group. This is important especially since there were no significant Time 1 differences, and **it is possible that this 'accelerated increase' of the intervention group is due to the intervention.**
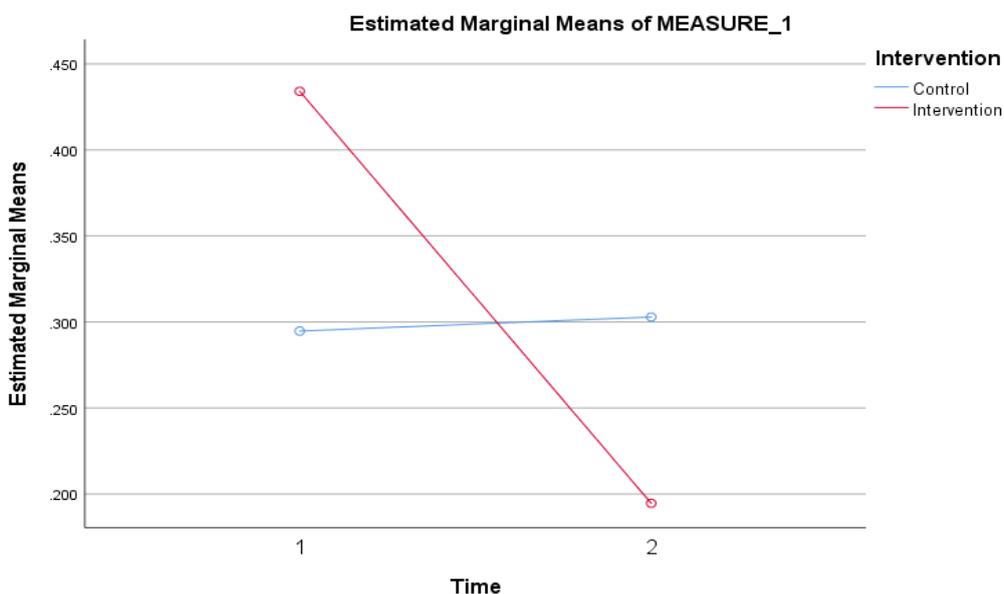
Figure 2.

Estimated Marginal Means of MEASURE_1
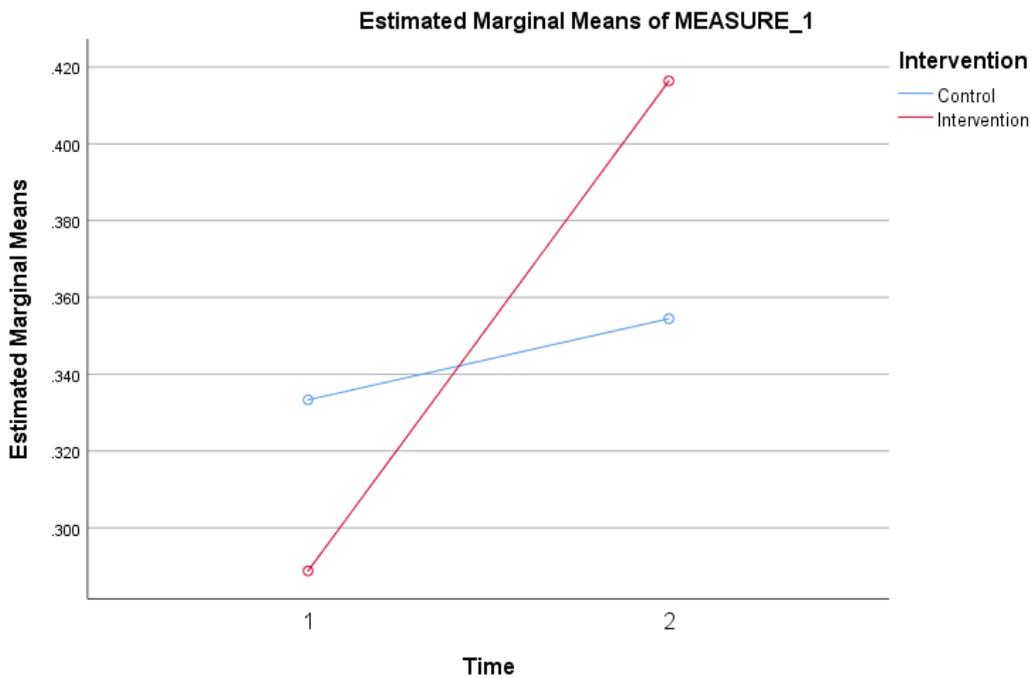
Staying On Task

Interestingly, there was both a main time effect and a group-by-time interaction effect. First, the amount of off task talk overall significantly dropped from Time 1 to Time 2. Second, the interaction effect shows that this drop was **due to the significant decrease in the amount of off task talk within the intervention group in particular,** whereas the control group remained relatively at the same level. A drop from roughly 44% to less than 20% on task is very promising, especially since there was a statistically significant difference in those scores between control and intervention students at Time 1.

Figure 3.

Estimated Marginal Means of MEASURE_1

Building Points

There was no main time effect, which is understandable when you look at the figure below and note the overall means in Time 1 and Time 2. However, there was a statistically significant group-by-time interaction, where **the intervention group significantly increased on the proportion of building points used in their conversations,** and the control group decreased by Time 2. **So, it is possible that this 'flip' in scores may have been due to the intervention.**

Figure 4.
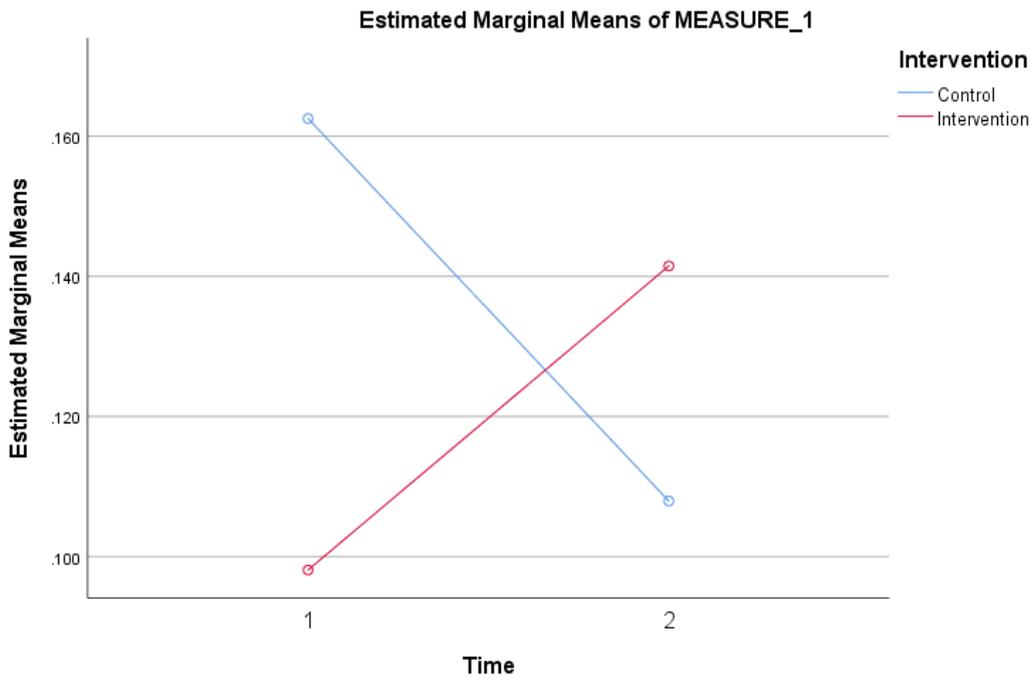
Student Transcript Exerts

As part of the study, all classes were given transcripts of the previous group discussions. Having an opportunity to read through what was said benefitted both intervention and non-intervention classes. The following are samples of students *identifying and critiquing* what they said.

NB: The transcripted quotes in this report have been included verbatim – we have not edited out student slang such as repeated use of "like".

- "We started to get a point here – well I'm a vegan and as a vegan, I like to talk about deforestation and global warming and then Damien just cracks a joke and there was a point and he shuts it down."
- "We briefly got into a point and then it's followed up like Anna making a joke."
- "Any point we try and make will be followed up by a terrible trash joke that kill the argument."
- "But we don't actually know what we are meant to be talking about so we are just falling back into the same loop yeah."
- "Like the whole time we didn't really find any direction for the conversation, we didn't really know how to start and it's such a big topic. Like a normal person might just actually find a point and go through it consecutively and we keep trying to look at the bigger picture immediately without exploring anything beneath that. Interruptions and wanting to delve deeper."
- "Honestly what I've noticed around this whole thing is that we interrupt each other so much. There are just so many unfinished sentences."
- "I think I need to make my questions more distinct. So what I was saying about Gloriavale is that I think it's bad because everything is controlled, not just what time you go to bed or what time you wake up - like everything in Gloriavale is controlled and your personality that is controlled by Gloriavale."
- "We could have discussed his reasons for rebelling - we just said he had reasons but we didn't delve into what."

The students enjoyed reading their transcripts and there was much laughter as they read them. Some students were embarrassed but many of the teachers commented that they felt the students feeling a little embarrassed was positive because it seemed to accelerate a more mature and focused group discussion the next round.

Following all of the group discussions, most of the students in the accelerant classes and low band were interviewed to identify if there were differences between accelerant students and low band students ability to recall the critical thinking model.

Accelerant students' ability to recall the key features of the CT model

Each student in the accelerant classes was interviewed by Dr Davies. The following quotes from the transcripts firstly, shows how much the students recalled from the critical thinking study, and secondly, their beliefs about how teachers should set about to teach critical thinking, with regards to grouping etc.

The students in the accelerant class in almost all cases were able to recall the key points of the model of Critical Thinking and understood the importance of questioning each other to elicit deeper and more complex conversations.

Dr Davies asked "Can you tell me about what you remember from the critical thinking study?"

A

"Well critical thinking is kind of thinking deeper into subjects and topics and delving into why things are, why you would think that way like availability bias and your cognitive dissidence and it showed me how my background differs from quite a few people because I lived in three different countries and I've seen people from different groups, different socio economic statuses and it shows how when my friends would say something like around The Truman Show or how they would see it I found myself kind of having a different side but also seeing how they could think that way because of how what I've been exposed to and what I have experienced."

D

"Yeah, you have to ask why and you have to relate it to the outside world and like think if somebody else was in your position or thinking about this how they would see it. So if you were saying like the sky is blue you have to ask like why is the sky blue you can't just state the point you have to elaborate on it and give reasons and like have an argument.

It helps you like further develop your ideas and make you think more like deeply about how things work and why you think that way. It kind of brought like my brain, it was brought to my attention that I need to start thinking like that."

L

"You have to like view it from other people's perspectives because then it shows what they may be thinking based on what they've experienced because everyone has all experienced different things."

S

"I remember that it is important to have lots of evidence when you are backing up a point.

I remember that it is important to look at different groups and what their view would be and not just your own group. I also remember how we looked at the paintings and how things can have different messages."

N

"I can remember that when you are speaking with someone else using critical thinking means that you have to ask them questions to delve deeper into their reasons for saying and believing in what they believe. I also remember that there are different ways that influence peoples thinking like for example their situation or the lives they have led as well as their influence from their parents or their culture."

B

"Like talking in groups, like sharing ideas and we were free to like critique each other's ideas. We didn't, you know, hold back if we had an argument to say, and what else. Yeah and the questions

were quite mind opening and stuff. I didn't really think of that before for a lot of the questions and yeah we gained information by talking to people to dialogue."

C

"I do recall a lot about like how you are meant to ask questions and like think about a lot of bias and asking like what would other people think in the situation and how their experiences would hinder what they would think about that kind of thing."

E

"Your deeper more in-depth understanding of the topic and argument and to get a deeper understanding you make sure everyone is involved and ask questions and think about groups that would disagree with what you are saying and look from other perspectives."

Low band classes ability to recall the key features of the CT model

The students in the low band classes were unable to recall as much detail about the Critical Thinking model as the accelerant students and some students only recalled that they were to ask questions of each other, however some recalled most features of the Critical Thinking model which is promising.

A

"I can't remember, it's like when someone asks you a question you say a response with another question that's all I remember."

B

"A little bit. It's about talking to other people and getting in conversations and asking for more information when a question is asked."

D

"The questions you asked and what the sort of test we did to see how we communicated and stuff and how different it was. Yeah, like there was more extended thinking like more in-depth to get like the idea of the deeper meaning."

D'A

"You are sharing your ideas with your friends and you can have different concepts and different ways of thinking about it different ideas."

L

"Isn't it where you think about something, but then you think more in-depth about it, like you don't like if there is one question then you think about how others relate to it and stuff like that.

You wanted us to talk like disagree with each other and all that, so not in a bad way but in a good way so you get more discussion."

J

"I definitely talked in group, it is better you see different idea, different way and you learn with other people."

X

"About giving your ideas and showing from different perspectives why they would think that or why they wouldn't agree with that."

Da

"We all had different opinions on things. We talked about New Zealand how the racial things going on and some others were agreeing with some racial things and sort of I don't know we stuck in that argument thing kind of yeah. It was good."

T

"But what I learned was could have an argument. I liked that part it was more like challenging even though it was like I felt pretty nervous knowing I hold it in for a long time and even though they were my friends it was just that judge they had, like I had of them of like their judge of me. So yeah I argued back, said my rights and they said their rights, was more balancing even though there were no rights and wrongs."

V

"It's like argument and stuff.

Like problems and stuff, solving problems and in solving a problem you have to have an argument."

How learning the CT model affected the students' thinking in other curriculum or outside of school

Many of the accelerant students were able to recall how learning the Critical Thinking model affected their thinking in other curriculum or outside of school but **perhaps the most gratifying moment of the entire study were students in the low band classes who described how learning the Critical Thinking model affected their thinking.**

Low band student

J

"So I started thinking about what people were saying. I started listening to my friends, and my family differently. I would be like oh maybe that isn't right. I started asking more questions when I talk."

The students in the low band and accelerant classes were asked in their interviews for advice for teachers in how they should set up critical thinking and group discussions. There was a clear pattern of the results with the low band students convinced that they would only talk if they were with their friends. By contrast, the students in the accelerant classes identified the importance of the teachers providing opportunities for them to talk to other students who may hold differing viewpoints. **This finding is problematic for teachers of low band classes as critical thinking is dependent on listening to different viewpoints** and yet the low band students were adamant they would only speak up if with friends.

Low band sample

D'A

"Teachers should send you to talk with your friends. You wouldn't really know them, if they weren't your friend, it would be awkward to talk to them."

T

"So if you are in a group that you don't know anyone it is just hard, it is like starting to meet some new people. It is all right but you are just too uncomfortable to talk."

Accelerant student samples:

N

"I would say that they (teachers) should show direction but they should let the students have their freedom in how they should say things and what they should think."

A

"I do like talking with my friends, it's the familiarity that I like and I can be honest, but sometimes I would like to talk to different people because I do kind of know what my friends think but if I were to be put in with a group with a bunch of boys I don't know what they would say. So I think that would be cool to be exposed to that and to see how they think."

B

"I think the teacher should put you into groups because then you can talk to people who you haven't really talked to before and get new ideas."

C

"I think either or because sometimes when you are put into groups like you are able to understand another person's perspective and like when you are with your friends you already know the way they think."

Findings related to the Teachers

All of the teachers in the study were interviewed following the conclusion of the group discussions.

Teachers recall of the key features of the CT model

The teachers were asked what they thought their 'take home' message would be and how their students responded.

K

"Well a couple of things, one of which is to build on responses. Build on other people's responses so as they respond instead of saying good idea and bringing in something different you follow a thread and sort of push the thinking and push the critical thinking.

The other thing that is part of that is the idea that there is never one opinion on any issue and to try and think ok if you think clearly, that if you think A is the way to go, how about arguing for B or seeing B or understanding how somebody else might be thinking in a different way.

So those are two things I would strongly emphasize along with what do you when your friend is getting side tracked."

J

"I think certain students most definitely would recall the model. I think they found it quite empowering. I think other students would be quite indifferent. They tend to be more passive learners. I think of the ones who would remember, certainly what they would remember is that idea of how can we look at this in a different way. That idea of like this is one way of looking at it, are there other ways of coming at that and I think those students definitely enjoy that idea, they could see things from a different perspective.

And keeping it simple, I mean one of the things I liked about your research was that, you know, you tried to kind of bring it down into manageable chunks for the students to understand."

S

"For me definitely I think the main thing was getting those basics in place about how they talk to each other early on. Those that want to be involved tended to be having at the beginning of the year quite one sided contributions whereas by the end for them to be able to feed off each other but to be able to do that in a nice way, to do that in a constructive way rather than lots of single contributions for those to build on each other.

So yeah I would really like to get that in place early on just every sort of discussion they have."

S

"Again that contrast between what they do at the moment which is listen to the question and answer, I think I would really like to emphasize that they actually listen to other contributions before giving their contributions. So even if they have got something in mind that they are not just tapping their desk until it is their turn, that it is a chance to take in."

Teacher perspective - holding group discussions with adolescents

Most teachers recognised the problematic nature of adolescents and group discussions.

J

"Obviously it is not something you can do at the beginning of the year. You need to kind of, sort of, gauge ability. Obviously what type of personality the students are and from that you almost have to choose which groups the students would have to be in and then assign a role in a sense, where people who were a little bit reticent have the opportunity to speak, but also kind of understand the nature of what they are meant to be talking about as well. So it is not just simply we are in a group here and we've got Fred and Fred can do all the talking for us, you know, so it has to be quite structured."

M

"The thing about mixing people up I think is a great idea. So I think it is a good idea and again I think myself too often that I don't do it. What I've tended to do is have the conversations channelled through me and do that. So you call them response and so then what the project has made clear to me was the thing about getting students to talk amongst themselves, you know, and to put them in those groups so they can take part in those conversations and setting up situations like organising your classrooms in different ways and having those topics there."

Teacher perspective - the current curriculum and Critical Thinking

A number of the teachers spoke about the current curriculum being unconducive to critical thinking.

S

"We need our students to be more active learners, at the moment the way the system is they are just passive, they are waiting for it to happen to them.

I think the teacher who is in front of them sort of leads them to just sit back. If you don't have a teacher who is going to have them chat with a purpose, if you don't have lessons or a learning unit that is going to challenge their way of thinking then clearly they are going to sit there and go right this is the theme, this is the setting, this is the plot and if we give them too many scaffolds I think scaffolds is important at the start, but we shouldn't be using those activities at level 2 level 3.

We are expecting them to be independent thinkers and yet we at this current time aren't actively doing that because we just want to get through an assessment because it says so in the calendar."

Use of the CT model – transcripts showing the impact

The students in the following transcripts *at baseline* are providing reasons, building points, elaborating and some critical engagement but are not providing an argument.

By contrast, following the teaching of the critical thinking skills intervention and strong follow up by the teachers in the study, the transcripts demonstrated their growth in ability to talk to each other including features of the CT model and in particular the use of arguments. This particular group were quite taken aback by the level of the baseline transcripts and were overhead working out a method to talk to each other in a more disciplined way. This group agreed to pass a hat around when they wanted to talk to stay on task for example, this idea was unprompted by the teacher or the researcher.

Cole Yeah but…	R
Jack Society rules and society is like social networking…	BP
Cole It's your choice…	CE
Liam We are making it very hard for the transcriber to talk over each other like three at a time.	DM
Cole I don't care about the transcriber.	BS
Jack Society influences our choices.	DM
Cole But we choose to let society so the choice…	CE
Tim So our society chooses us to influence us to choose us.	R

Cole	
A perfect example of that is my brother who like he doesn't give a shit about anyone. He doesn't care about what anyone thinks of him which is really.	E
Liam	
So your choices make who you are.	R
Jack	
That's his choice not to let society make his choices.	BP
Samuel	
Other people never care what society.	BP
Cole	
And you can't because they are trying to examine how we talk and if we are talking like a sterilised bunch of people who like oh.	BS
Cole	
Yeah but…	R

Cole	
Society makes us who we are.	DM
Tim	
I think it's like 50/50.	R
Liam	
Society means us high species.	R
Jack	
What is that Cole?	DM
Cole	
It should be our choices in society make…	R
Jack	
No it's a bit of both so you get influenced by what your friends did, but also you do stuff.	CE
Cole	
Society doesn't make you who you are your choices make you who you are.	CE
Samuel	
Society influences your choices.	CE

This next transcript shows the impact of the CT model, having stronger arguments that include a conclusion and evidence to argue their thoughts.

Jack	
So expanding on that the skills that are taught in health in Year 9 again don't go into enough depth and as you said the only amount of depth that they go into is if you take it further on down the line. I think a better way to do this would be to start teaching it at a younger age so that by the time they are in Year 9 and 10 there is enough depth that it is like sufficiently it is sufficient for living and for the budgeting again that shouldn't have to be a full subject that needs to be taken in high school because a lot of people are put under pressure by selecting subjects because they think if this is what I want to do in the future how would this subject choice affect my choices in the future.	A
So you know if they use that, I don't know where I'm going with this, if they use that subject slot for something like business which is a necessary skill for everyone then they could be losing out on another subject that would actually help them further in the future.	BP
Tim	
On the topic of who is responsible to teach budgeting rather than drinking responsible, sex and child care I think it is your parents responsibility because one I know that is what my parents have done and then not only is it your parents responsibility I also think it is your own responsibility because you know your limits, you know what you can and can't do better than anyone else can and so if you, well this is more like driving and drinking responsibility, budgeting is like you need that.	A
But for those things you don't know what you don't know. So you ask people and all that and then Jack was saying something about what were your points.	BP
Jack	
I was talking about how something like business studies shouldn't…	R
Liam	
Never mind, so what Jack was saying introducing the subjects earlier in life I think that is a good thing and a bad thing because it is good because yes then they have more knowledge by a younger age but then there is also the fact that they would be introduced to these things at a lot younger age. So I know I didn't even think about drink and alcohol before I was like Year 9 or sex before Year 9.	A
Tim	
Ok you guys all had valid points but if you want to know about something and you don't want to take a subject for it or something in the library in the school there is the internet. You can do your own research if you want to find out about something and I think a lot of this is the responsibility of your parents and if you want to know any of these things you can ask your parents about it and also with drinking responsibly I mean it is your choice. If you drink irresponsibly then you are the only one it is going to affect like it is not anyone else's problem.	CE

Discussion

These findings show that senior secondary students respond favourably to a taught structure of Critical Thinking.

The low band students shift in the use of critical thinking was of particular significance as most Critical Thinking is offered only to accelerant students in programmes such as Philosophy for Schools.

The students from low band to high band were mostly able to recall the key elements of the CT model and transcripts provided evidence of their shift in the use of CT skills. Of concern in this study was the extremely low levels of interaction of students in low band classes who were in the non-intervention classes, suggesting low band students very much need guidance for group discussions and opportunities to practice critical thinking skills.

Many teachers complained that though they believed critical thinking was essential for all of their students to learn, the over-crowded curriculum and continual assessment pressures left little room for robust and provocative classroom talk. This finding has implications for NCEA and the teachers were encouraged to share their views with the current Ministry-driven revision of NCEA. This study could contribute to policy changes around group discussions and the use of CT in schools.

Both intervention and non -intervention classes enjoyed reading the retrospective opportunity of reading transcripts from the previous group discussion. I-pads and phones could be used by the students to recall their group discussions and played back, as the schools could not afford to hire a professional transcriber for group discussions.   Many students were quite taken aback at the amount of time wasted in these group discussions when they read their transcripts and their surprise and embarrassed seemed to accelerate more concerted efforts next group discussion.

Barnes and Todd's (1978) secondary study in dialogue showed that pupils were more likely to engage in open-ended discussion and argument when they were talking with their peers outside the visible control of their teacher, and this kind of talk enabled them to take a more active and independent ownership of knowledge. Their findings also demonstrated that students often lacked a clear understanding of how they are meant to "discuss" and "collaborate". Barnes and Todd (1978) work was highly regarded: following Barnes' suggestion of treating talk as a site for exploration rather than simply for evaluation, a number of studies investigated the possibilities of making classroom interaction more dialogic (Nystrand et al., 1997; Wells, 1999). This study concurred with this finding and the teachers were encouraged to discuss the use of CT in lessons but participate only if absolutely necessary during the group discussions so give students maximum opportunity for student voice.

The schools in the study were all interested in a larger scale project with all Year 9 students having the opportunities to learn CT skills. This opens the door for a longitudinal study whereby the researchers could track the long term impact of the CT model for these students as they progress through their secondary education.

Recommendations for secondary schools following the study

Secondary school-aged students benefit from a group conversation framework that incorporates critical thinking skills.

A framework such as the one designed for this study should be taught to all Year 9 students so that the nature of the interactions that foster deeper and more complex discussions using critical thinking skills become habitual by NCEA or Cambridge. The framework could be taught alongside the vignettes.

The framework should be used as follows:

- Students think on their own
- Students engage in group discussions using the Respect framework
- Students engage in reflecting on their views following the group discussions
- Students write down their ideas following the group discussion

The question or provocation was extremely important to the students, so we suggest that the students come up with their own questions. As they are adolescents, many will be reluctant to share their own views, so a way of doing this would be to ask the students to write down their question:

> "If you could ask only one question to the wisest man or woman in the world about …..(insert topic students are learning)….what would it be?

Teachers can read the students questions and integrate in to the context of learning. A useful guide is to use Mortimer Adlers six great ideas – "Liberty, equality and justice are ideas we live by. Truth, goodness, and beauty are ideas by how we judge by."

Next steps for scaling up the intervention / sharing the model

The findings of this study have been presented at the American Educational Research Association (AERA) annual meeting in New York on 13th April 2018 as part of an international symposium on classroom talk.

The findings will also be presented at the University of Auckland and to the schools who participated in the study.

The findings will be pursued with the Ministry of Education in light of changes to policy around the use of critical thinking in both primary and secondary school.

Thank you once again to the trustees of Cognition Education Trust for your support of this important work. You have made a difference to the participating students who were encouraged to find and use their voice and potentially you will make a difference to generations of future learners by allowing the testing of this critical thinking skills framework as this study could contribute to policy changes around group discussions and the use of critical thinking in schools.

![THE UNIVERSITY OF AUCKLAND - Te Whare Wānanga o Tāmaki Makaurau - NEW ZEALAND]

FOR MORE INFORMATION PLEASE CONTACT:

DR MAREE DAVIES
Faculty of Education and Social Work
The University of Auckland
Telephone: +64 9 373 7999 ext 48628 **Email:** mj.davies@auckland.ac.nz

KAREN MILLER, DEVELOPMENT MANAGER
Faculty of Education and Social Work
The University of Auckland
Mobile: 027 398 6555 **Email:** karen.miller@auckland.ac.nz

University House, 19a Princes Street, Private Bag 92019,
Victoria Street West, Auckland 1142, New Zealand

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