



Research Article

Bridging the Gap: The Impact Project-Based Contextualization has on the Motivation of Junior Technology Students

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Abstract

This study seeks to improve learning motivation of Year 10 Technology students at a secondary school in South Auckland. Despite the emphasis in New Zealand schools on university education, the majority of students in low-decile schools do not follow this pathway. The emphasis on higher education decreases student motivation in the classroom and highlights economic, qualification, and occupational inequities in low socio-economic communities. This study aims to help students make informed choices for career pathways after school, with an emphasis on trade apprenticeships as an alternative to the traditional university pathway. This research seeks to understand how contextualising the Technology curriculum through a project-based assignment affects motivation in the classroom. It also seeks to understand how exposing students to opportunities in the construction industry affects career aspirations. Students participated in visits to industry worksites while working in groups to design and construct seating projects for a stakeholder in their school community. This project mirrored a real-world inquiry project, with students acting as professionals in the college environment while also being exposed to industry workplaces. This helped them to make connections between classroom learning and the workplaces. In doing so, they learned both subject knowledge and *how to apply* that knowledge to different concepts and contexts outside the classroom. Qualitative and quantitative data was collected in the form of journal reflections, surveys, and observations before and after the intervention to measure the change in student motivations and aspirations. The data was evaluated using Ajzen's (1991) motivation theory framework to analyse the factors of self-efficacy, social pressures, task-value, and the added factor of cost. The findings from the data showed that contextualising classwork with industry exposure increased student motivation and impacted career aspirations.

Introduction

Making career decisions is a significant yet necessary pressure for young people in Aotearoa. Thoughtful consideration is required to weigh up such decisions considering what they will cost. Many students have great difficulty making career decisions for a lack of readiness, lack of information, or inconsistent information (Kırdök & Harman, 2018). Previous research suggests that while the age of 15 seems too young for students to be making career decisions, their future pathways are already being impacted by choices made for NCEA (Medina & Sutcliffe, 2021). Therefore, schools have an obligation to be adequately preparing students and their whānau to be making these choices. This research project is an inquiry into how industry exposure and contextualised project work in school can bridge the gap between the classroom and the workforce. The rationale behind it is to more adequately prepare students to make informed decisions regarding career pathways, and therefore increase student motivation for learning in the classroom. Project-based contextualisation is teaching content in the form of a project that has real-world application, rather than abstract or theoretical concepts disconnected from reality. In this case, real-world applications are discussed in relation to industry and the workforce.

Context

The New Zealand school curriculum is a system that favours higher education pathways for school leavers. In tension with this emphasis are the opportunity and economic disparities across socio-economic areas (Pannekoek et al., 2019). Only 14.8% of school leavers in the decile 2 school being researched enrolled in Bachelors and above qualifications in 2019, compared to 52.7% of decile 9-10 school leavers (Education Counts, 2021). For economic and social reasons, many students are unable to attend higher education; all students are capable, however not all have the same opportunities. This highlights the economic, qualification, and occupational inequities in Aotearoa, which are the wider contextual issues that will be addressed in this study. The data shows that there is a very clear correlation between the socio-economic climate of schools, and the percentage of school leavers who gain a Level 2 NCEA qualification or higher. Data from the Ministry of Education (2021) found that in 2019, 91.3% of students in high decile schools were leaving college with Level 2 or above, while only 64.9% of students from decile 1 and 2 schools graduated with the same.

This research was conducted at a decile 2 secondary school in South Auckland. Achievement at the school for Design and Visual Communication (DVC) Standards was 67.1% from 2019 to 2020, which is significantly lower than the 81.7% achievement of DVC classes in the same decile group (NZQA, 2020). The department sustains

achievement rates across the three subject areas, however, it is a common trend that a minimal percentage of students attain grades higher than the minimum assessment requirements.

Literature Review

A great amount of research has gone into the possible influencing factors of motivation to promote academic performance (Buzdar et al., 2017; Dweck, 2000; Eccles & Wigfield, 2002; Vansteenkiste et al., 2006), all of which find that the theory of motivation in the classroom is an increasingly complex issue. Motivation is student-specific, subject to environment, culture, and background. As its root *motive* suggests, it is what drives people towards something; it is a reason, rationale, or incentive to behave in a certain way. Afzal et al. (2010) defined motivation as that which pushes students' attitudes to progress in learning opportunities.

In his seminal work into behavioural psychology, Ajzen (1991) suggested that the attitudes of people's beliefs can predict their subsequent behaviours by three main factors - their attitudes towards the behaviour and subjective social pressures, and their perception of behavioural control. Translating this theory to a New Zealand secondary school context, Walkey et al. (2013) found that student aspirations and their subsequent achievement are influenced by (1) the value the student places on the achievement opportunity, (2) the amount of control the student perceives they have over their own achievement, and (3) the social pressure on the student to achieve. In support of this, Hynds et al. (2017) identified that sustained school success for Māori students is dependent on three factors - how positively students identified with academic achievement, the extent to which students felt they belonged at school, and whether or not the students believed they could achieve. It is notable that all three factors correspond with other leading motivation theories. Another term used is expectancy-value models (Harun et al., 2012), which run in the same vein as Ajzen's theory of planned behaviour. Biggs and Tang (2011) also stated that students are motivated to aspire for educational achievement when the outcome is of value to them, and when they perceive they have an attainable opportunity for success.

Some researchers, however, argue that there is one more crucial factor that affects student motivation - *cost*. Eccles and Wigfield (2002) and Jiang et al. (2018) tested an expectancy-value model with the added factor of cost. Cost is commonly described in relation to the negative results of engaging in a particular learning activity including the cost of time, fear of failure, effort expended on tasks, and the general hard work needed to grow in a certain area. However, it is important to note that cost also has external considerations such as the loss of engaging in alternative

opportunities (Eccles et al., 1983). Any choice to pursue a subject in school requires multiple lost possibilities for the sake of one learning opportunity. A broader view of the factor of cost involves the cost for students engaging in other simultaneous learning opportunities and the effect that they will have on the “new” opportunity (Flake et al., 2015). For example, the added stress of studying for an exam may occupy a student’s mind and time when they are engaging with another subject. Alternatively, if students were required to spend more time on one area of learning, this would cost them time out of school to catch up on other subjects.

Research has shown that if the cost outweighs the perceived benefits, students will not engage in learning opportunities (Flake et al., 2015). These studies suggest that academic outcomes can be lifted by greater quantities of motivation. However, in contention with this view is Deci and Ryan's self-determination theory (SDT) (1985), which claims that higher achievement outcomes are caused by qualitative factors of motivation, rather than quantitative amounts (Vansteenkiste et al., 2009). Qualitative studies emphasise students’ autonomy, relatedness, and competence. Expectancy-value models operate more like an equation that works out the degree to which students are willing to engage. For example, a student with quantitative factors of motivation is someone who displays a high level of self-efficacy and who perceives a low level of cost to engage in the learning opportunity.

Two important forms of motivation affect students in the classroom – intrinsic and extrinsic. While intrinsically oriented students find value in the learning itself, extrinsically oriented students seek learning to an end because of an external pressure or regulation. Considerable research has been undertaken into the effectiveness of intrinsic and extrinsic motivations for learning (Buzdar et al., 2017; Zacccone et al., 2019), and it is commonly agreed that intrinsic motivations are more effective for learning because they employ personal commitment and long-term, deeper-level interest in a subject (Afzal et al., 2010; Vansteenkiste et al., 2009; Zacccone et al., 2019). Intrinsically motivated students are also more likely to persevere when faced with adversity than those who are extrinsically motivated (Afzal et al., 2010).

External reasons for achievement can also be powerful motivators, an example being when the learning facilitates or leads to valuable future goals like career aspirations or simply higher grades, even if the task in itself is not particularly enjoyable (Eccles & Wigfield, 2002). While many researchers found that negative academic performance is associated with external motivators, Jovanovic and Matejevic (2014) and Rehman and Haider (2013) agree that there are particular forms of external incentives that complement intrinsic motivations and produce greater effectiveness of learning in the classroom. The question that arises from the literature around forms of

motivation is this: How do educators, as external facilitators, foster and grow internal motivations in students, while applying external incentives positively?

Rationale

Students who do not gain minimal qualifications are more socially and economically disadvantaged (Honigmann, 2017; Strathdee, 2016). Education Counts (2021) shows that 33.5% of students from decile 1-2 schools like the college in this study enrol in Level 1-7 (non-degree - certificates and diplomas) pathways. This data suggests that, compared to the 14.8% heading to higher education, the non-degree pathways are much more deserving of our focus. There is an argument for increasing higher education opportunities for students in lower decile school contexts. However, the argument of this paper is that higher education is not the only option available, contrary to the emphasis in our schools.

Project Aim and Questions

The research investigated how project-based contextualisation in the form of integrated client-based design projects and industry exposure would affect student motivation for learning in the classroom, and subsequently, their future aspirations beyond college. It studied student comprehension of the classwork in relation to real-world contexts and analysed the factors of Ajzen's expectancy-value model for planned behaviour. My research question was: What impact can project-based contextualisation have on the motivation for learning of Year 10 Technology students? Additionally, my sub research question was: What impact can project-based contextualisation have on the future aspirations of Year 10 Technology students?

Methodology

To investigate the impact that project-based contextualisation has on student motivation over time, a mixed-method approach was taken. The methodology of concurrent triangulation (Creswell et al., 2003) was chosen because it allows both qualitative and quantitative data collection simultaneously, and uses each data set to help validate the other, thus leading to holistic results. This approach is suitable as the participant group are a small number of students. Therefore, while the data is not quantitatively rich, the quantitative findings validate the rich qualitative results, and together are helpful to provide a more meaningful data set. This research design also helps to increase reliability of data by collecting it in multiple forms. Figure 1 displays this form of methodology (Atif et al., 2013).

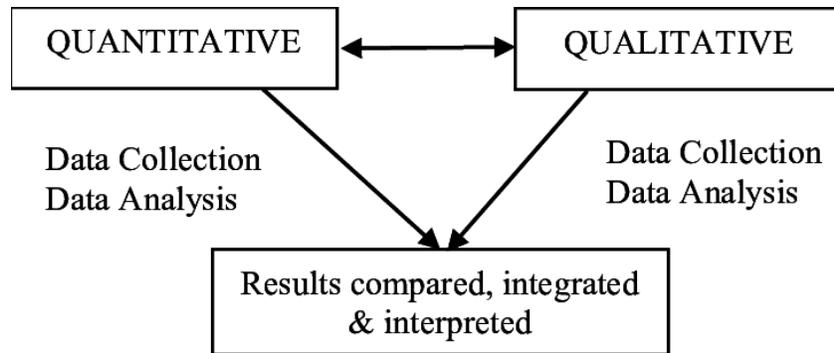


Figure 1. Diagram of concurrent triangulation

The study consisted of 12 Technology students who participated in the project and data collection, with an average age of 15. The class of 25 students was presented with the opportunity to take part in the research, and from that class 12 students volunteered. Students filled out online journal reflections, surveys, and were observed over a period of 22 weeks (two school terms). The 22 weeks were divided into two phases of 11 weeks each (see Table 1). The surveys were distributed before, during, and after the intervention to measure change in students’ motivation over time. The students wrote online journal reflections after each of the intervention’s three organised activities. Insider-researcher observation notes were written over the duration of the project, with the specific focus on how students reacted to the intervention.

Project Structure

The project was divided into two key Phases (see Table 1), which consisted of the Industry Exposure Phase and the Stakeholder Project phase. These were the two key components designed to work together - contextualisation and project-based learning.

Phase One: Industry Exposure			
#	What We Did	Activities & Learning Involved	Data Collection Methods
1	Past student & Air NZ engineer visit to speak to the students	-Showed students some of the projects he worked on in order to get into the training course -Talked to the class about potential pathways in the engineering and aircraft industry -Talked to the class about potential career pathways from Technology subjects	-Observations
2	EOTC Trip #1: Lloyd Stevenson Boat builders in East Tamaki	-Initial case study into the boat building and marine composites industry -Tour around the workshop to see the current builds in progress	-Student online reflection journals -Surveys

3	EOTC Trip #2: Linear Homes building site in Botany	-Initial case study into the construction industry complete induction for HazardCo app for safety on entering worksites -All students sign -Tour around the building site -On-site apprentices shared their experiences on the job and the pathways they each took to get there -On-site group activity: Build a chair for the team's lunch area	-Student online reflection journals -Surveys
Phase Two: Stakeholder Projects			
#	What We Did	Activities & Learning Involved	Data Collection Methods
1	Initial group seating construction project: Breakfast Bar stools	-Health & Safety induction -Individually learning how to use tools and equipment in the workshop -Individually learning how to create a range of woodwork joints -Working in groups to create breakfast bar stool from the plans in preparation for the Stakeholder Projects	-Surveys -Observations
2	Stakeholder Projects: Design and construct a form of seating furniture for a client in the school community	-Working in groups to interview clients, research seating, ergonomics, durability etc., design the project for a client, create a CAD model & plans (computer-aided design) -Work in groups to construct Stakeholder Projects	-Student online reflection journals -Surveys
3	Stakeholder Project Exhibition	-Exhibition after-school to display Stakeholder Projects along with graphic CAD drawings -All whānau, teachers, and peers invited	-Student online reflection journals

Table 1. Research Structure and Project Phases

Surveys

The research surveys were based on Icek Ajzen's (1991) theory of planned behaviour and adapted to include the factor of cost (Eccles & Wigfield, 2002). The Baseline, Midpoint, and Endpoint surveys consisted of 12 questions with five-point Likert scale questions; three questions for each of the four sections - expectancy, value, social, and cost.

Each section ended with an open-ended question, and at the end of each survey were two general open-ended questions asking students to describe what increased and decreased their motivation in class. Additionally, the questions and sections were asked in a random order for greater reliability of data. Students were given 20 minutes at the end of class for checkpoints in May, July, and October, and filled the surveys out anonymously. See Table 2 for the survey structure and the measures for why each question was relevant.

Self-efficacy (Expectation)	Measure	Survey Question Number
1. How good are your woodwork skills in Technology class for making the Stakeholder project?	Perception of own understanding	2
2. How good do you think your Stakeholder project will be?	Perception of own ability	6
3. I know that I'll be able to learn the skills needed for our stakeholder projects	Confidence of ability to learn	10
Task Value (Value)	Measure	Survey Question Number
1. How much do you enjoy Hard Materials Technology?	Intrinsic value of the task	5
2. Do you think you will be able to use the practical skills in Technology in other places?	Perception of the task's 'utility value'	9
3. How important is Technology class to you?	Extrinsic value of the task	1
Social Pressures (Social)	Measure	Survey Question Number
1. Others would be disappointed if I didn't do well in Technology	Negative social pressures as motivators	7
2. I enjoy working with my peers in Technology	Peer affiliation	3
3. My teacher cares about my learning and helps me to do my best in Technology Hard Materials	Teacher affiliation	11
Negative Consequences of Engagement (Cost)	Measure	Survey Question Number
1. How hard are you willing to work in this subject?	Effort expended	4
2. How stressful do you find Technology?	Stress caused	8
3. How likely would you be to attend lunch or after school opportunities to work on your Stakeholder project?	Sacrifice of time	12
Open-ended Questions (General)	Measure	Survey Question Number
1. In the space below, please list specific things that INCREASE your motivation to learn in your Technology class	Subjectivity	13
2. In the space below, please list specific things that DECREASE your motivation to learn in your Technology class	Subjectivity	14

Table 2. Expectancy-Value-Social-Cost Model (EVSC) Survey Questions

Figure 2 below demonstrates the way in which this data was analysed against Ajzen (1991) and Walkey’s (2013) research considering value, self-efficacy, social pressures, and cost. Because motivation is complex, it was helpful to analyse the data holistically to avoid misinterpretation. The graphs below convey the extent to which each of the measured aspects affected students’ motivation in the classroom at the baseline checkpoint.

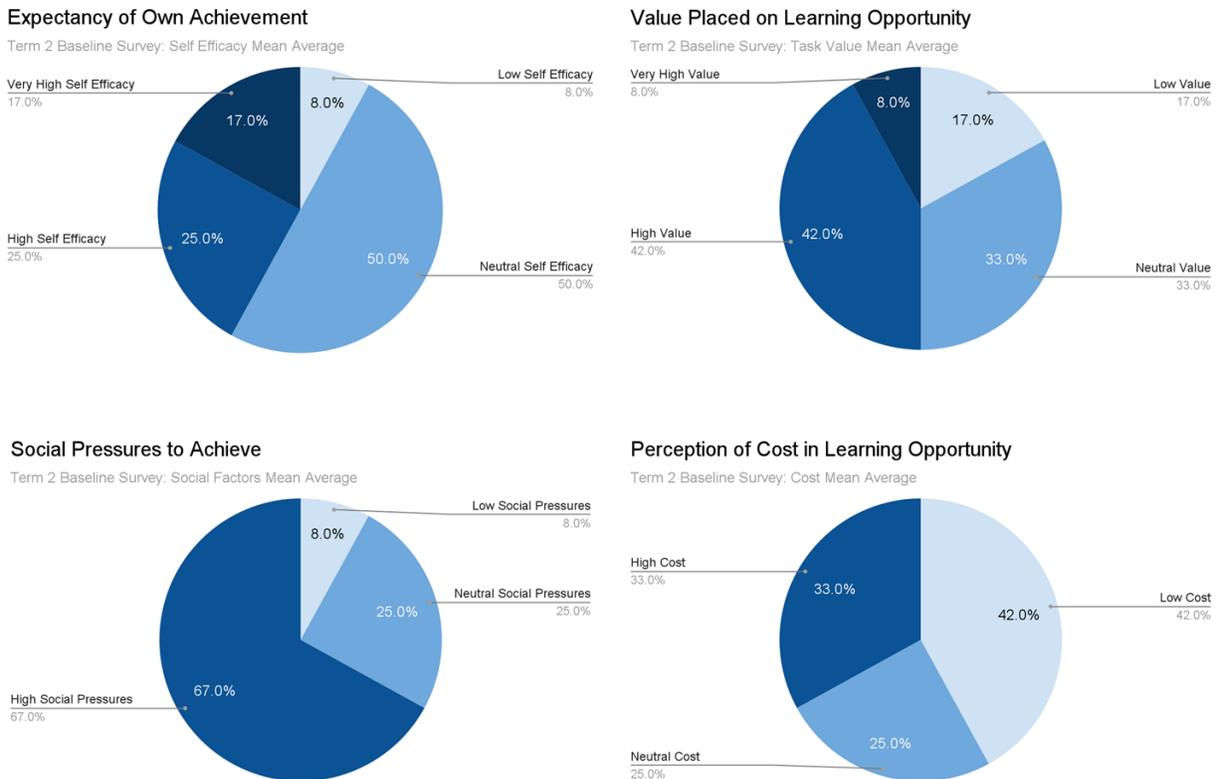


Figure 2. Expectancy Value Social Cost Model of Motivation

Online Journal Reflections and Observation Notes

Students filled out online journal reflections after each of the three organised activities in Phase 1 (see Table 1), which were given to them in the form of a Google Slides template (see Appendix 1). The templates consisted of three open-ended questions and three 10-point Likert scale questions. Observation notes were collected in an online folder.

Data Analysis

The present research aimed to understand what underlying ideas were beneath the data and let the data determine the themes for itself. A latent inductive approach

was therefore used for the data analysis, a method developed from Braun and Clarke's (2006) thematic analysis which was originally developed for psychology. A coding system (Glaser & Holton, 1967) was used to identify different themes, similar phrases, and patterns that emerged. From these, themes were generated and reviewed. At the end of data collection, quantitative findings were used to validate reviewed qualitative findings. Upon final data collection, students were grouped into three distinct categories (see Table 3) based on the themes in the data and their attitudes toward the learning. This grouping system is based on previous research (Walkey et al., 2013), which identified student goal orientations based on the theory of planned behaviour in a similar way (Ajzen, 1991). The premise of these orientations is that they are predictive of student achievement outcomes.

Group A - Doing My Best

<p>Strong engagement Intrinsically and extrinsically motivated High self-efficacy High perseverance Motivated by practical work Motivated after seeing career opportunities for the first time Working with peers is motivating</p>	<p>Negative social pressure from peers is demotivating Willing to sacrifice own time for achievement Low perception of cost Learning new things is motivating Social pressures are very influential on other factors of expectancy, value, and cost</p>
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Group B - Doing Just Enough

<p>Moderate engagement Strong positive social pressure from teacher to achieve Low perceived value of achievement in the subject Moderate self-efficacy High perception of cost required for achievement</p>	<p>Unwillingness to sacrifice own time for achievement Challenge is perceived as demotivating Motivated when the learning is fun and enjoyable Social pressures are very influential on other factors of expectancy, value, and co</p>
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Group C - Don't Care

<p>Low self-efficacy Little engagement Low perceived social pressure from teacher to achieve High perception of cost required for achievement</p>	<p>Unwillingness to sacrifice own time for achievement Challenge is perceived as demotivating High perception of cost required for achievement Little to no motivation to achieve in class</p>
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Table 3. Themes in Different Groups of Students in their Attitudes toward the Learning

Results and Analysis

The research found that giving students new opportunities lifts motivation in the classroom. This was done in the present research by exposing students to career

pathways they had not previously known much about. Students who were able to see the tangible reality of what schoolwork was preparing them for indicated that they were more motivated in class. Take for example the statement below from one of the student's survey answers.

"...It [contextualised learning] motivates me as I know what I'm doing in class can become a job, and if it's a subject I enjoy and I know I can get a job in the area, I would want to work harder..."

The findings convey that for students to be able to make responsible, informed decisions about subjects and careers, educators need to be providing a more in-depth look at the different avenues to which their subjects lead. It also highlights the need for a more experiential view of career opportunities.

Preparing for the Future Early

When asked whether they knew boat building was an available career pathway, 71% of the class did not. In the case studies into the construction industry, the collective group knew of only eight careers out of the possible 15 construction pathways (BCITO, n.d). Furthermore, students were unanimous that the unique opportunities in Technology this year helped them to make subject decisions, and all but one indicated that the opportunities had helped them in their future career decisions. One of the key arguments of this research is the need for educators to be preparing students and their whānau for future pathways as early as the age of 15 (Medina & Sutcliffe, 2021). Every industry contact over the course of the project supported the premise that 15 is not too early to be considering future careers. An example of this position is shared below in a statement addressed to the class. During Phase One of the project, an Air New Zealand engineering apprentice and ex-pupil of the school visited the college to share his experiences.

"...I know you're just in Year 10, but your time at school goes so fast, and very soon you're going to be walking out of here and thinking, 'what am I going to do next?' So, it is really important that you are thinking about the future - where am I going to be in the next five years? Your plans might change too. Mine did. I wanted to be an accountant, remember? Now I am doing something completely different. It's alright if your plans change. But what's important is that you *do* have a plan..."

This reinforces the proposal that conducting EOTC visits to subject-related workplaces as early as junior high school is not merely a fun excursion, but helps

students to focus on the future and begin to formulate a post-school plan for themselves. Encouraging a future-focused mindset will help students make the most of the time they have at school. Such opportunities also give students career aspirations to work toward, which in turn fosters motivation in the classroom.

Future Career Aspirations

As students were exposed to various industry pathways and contextualised learning in the classroom, their interest in apprenticeships increased. Figure 3 displays how interest in apprenticeship pathways changed over the course of the project. Students were presented with an unbiased selection of pathways available in the construction industry, including trade certificates, diplomas, and university level qualifications such as Engineering and Architecture. The data revealed that by the end of the project, many students' interest in apprenticeships as a potential pathway had grown. This is significant because it reinforces the value of project-based contextualisation as something that has begun to have an impact on the futures of young people. In addition to this, students' interest in university pathways also grew throughout the year, some aiming for a Technology-related degree, and others elsewhere.

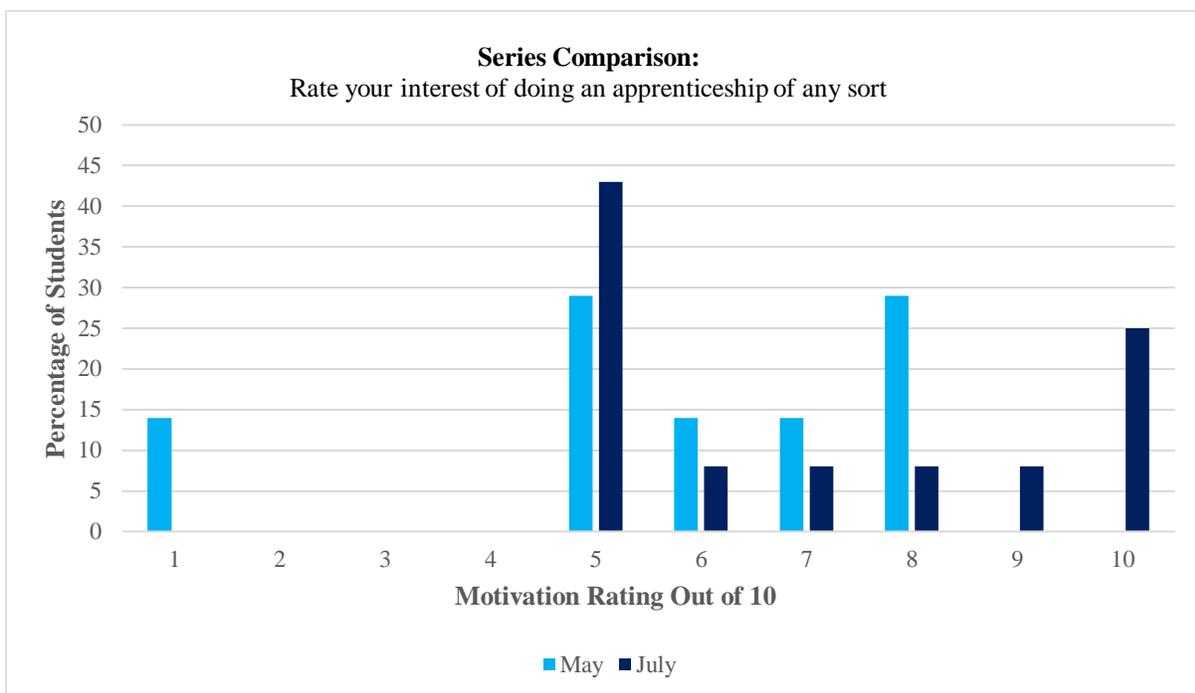


Figure 3. Series comparison: Students interest in doing an apprenticeship

EOTC Trips, Aspirations and Motivation

There is a direct correlation between education outside the classroom and motivation inside the classroom. All but one of the students said that the EOTC field trips to Lloyd Stevenson Boat Builders and the Linear Homes building site had motivated them more in their classwork. This was broadly due to a deeper level of and a developing long-term interest in the subject. Qualitative data revealed that the trips motivated students due to new or growing career aspirations in the construction industry. An example of this is shared below from one of the student's answers in the Endpoint survey.

"...Going on these trips motivated me as I can see taking this subject can be beneficial in the future as I can work toward making it my occupation and even running a business..."

Not all students were motivated for the same reasons, however. Those who did not indicate aspirations in the construction industry still reported that the field trips to LSB and the LH site motivated them for the sake of the classwork itself, even if there were no future goals for which it was preparing them. The paperwork to organise these trips is disproportionate to the amount of time spent during the visit, however this research suggests that the value of giving students opportunities they have never had is well worth it. Gaining access to industry workplaces in the community and engaging teaching staff in this model of education are two of the toughest challenges opposing contextualised learning (Beier et al., 2019). In their case study into forming tech-industry links with a low socio-economic school in New Zealand, Brunton and Coll (2005) back this up, stating that because of the time and physical resources required to invest in such a partnership, a serious and ongoing commitment from both parties is required. They did however conclude that the positive affects this had on student motivation and work ethic outweighed the costs.

Post-Trip Motivation

The increase in motivation suggests that contextualised EOTC trips are not merely a fun excursion, but a worthwhile investment. After each of the field trips, the students were asked to rate how motivated they felt towards their work in class having just been on the trip and seeing how the work in class fits into the larger picture of industry. This question sought to measure what immediate impact the intervention had on students' level of interest in a career path, and whether this would inspire a willingness to embrace a harder work ethic in order to aspire toward that career

interest. See Figure 4 for a comparison of the students' self-rated motivation over a period.

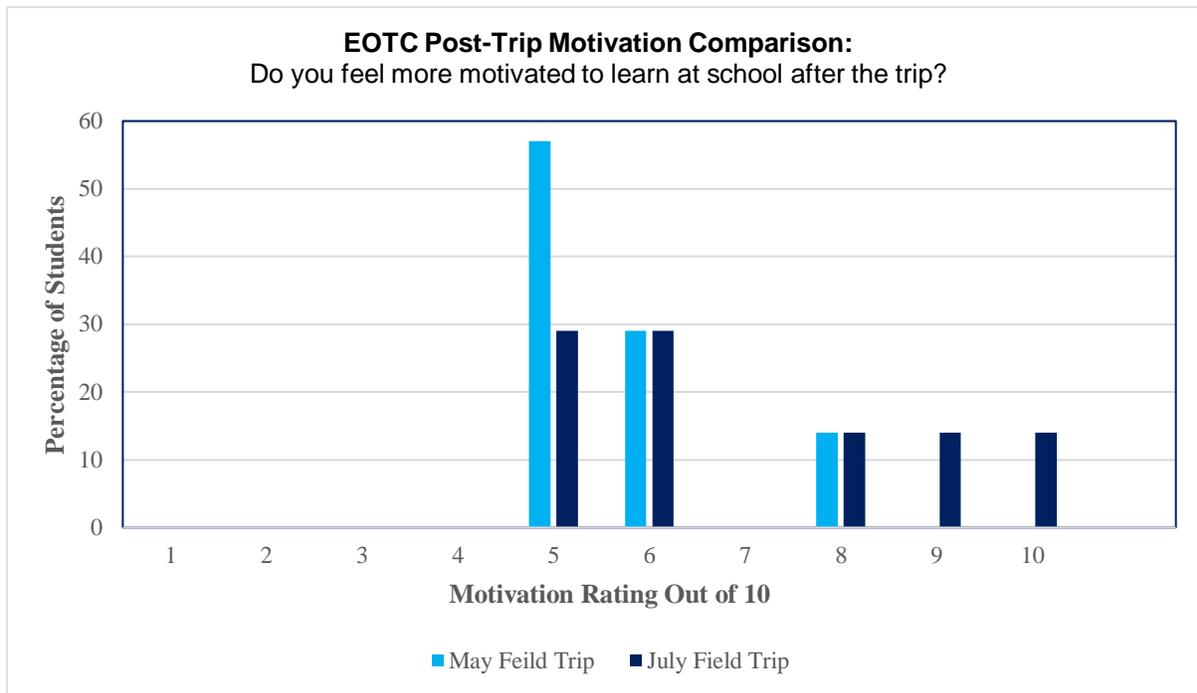


Figure 4. Series comparison: post-trip motivation rating

The results showed that there was minimal post-trip motivation in May, however after the July trip there was an increase in student motivation towards their classwork. Some of the students' reflections from the July trip (no. 2) are shared below.

Student A: "I went on the trip mainly to learn about what the trades offer, what type of work you would do on a site, and to hear about the types of experience the workers have gained."

Student B: "I went [on the trip] to have a fair idea of the trades."

Student C: "I went [on the trip] to find out more about building companies and work experience."

There are different factors that could have influenced the increase in motivation, however one of the reasons, as articulated by the students above, was that by this point the class was gaining a deeper understanding of how the theory in class related to the real world, specifically to the real possibilities in their future.

Knowledge Comprehension and Retention

One of the reasons EOTC trips lifted motivation in the classroom was that they produced a deeper level of learning and engagement. Qualitative student reflections showed that the level of knowledge comprehension and retention was far deeper after each field trip than it usually is in the classroom. Below is an example of the level of detail from a student's online journal reflection.

"...The most interesting thing was how they retained the landscape and still protected nature. It was interesting to know that there are so many regulations you have to follow when constructing houses, such as knowing what type of soil there is and using the right type of concrete for the ground... The combination of concrete and steel beams to use on walls, floors and ceilings. How the water proofing process works and how a flame is used to weld it..."

Seli et al. (2016) note that knowledge comprehension and retention of information is a strong indicator of motivation and in these cases, most students were able to give detailed accounts of their key learnings from the visits.

Stakeholder Projects

All but two students indicated that the Stakeholder Projects had also motivated them more in their learning, citing freedom of creativity, initiative, and group work. The most common reason for this increase in motivation, however, was that the projects were specifically for someone as a gift. The work, therefore, held a greater purpose outside of the students themselves. Emerging research has shown that psychological learning interventions increase classroom efficiency, productivity, persistence, and drive (Reeves et al., 2021). They suggest that this happens when students gain prosocial motivations for learning, which is the motivation to learn to have a positive impact on whānau, communities, and wider society. Although prosocial motivations were strong, social pressures from peers proved to be the most influential and defining factor.

Social Pressures from Peers

Teacher affiliation and pressures from whānau remained consistent and were not influential factors in any change in motivation. Furthermore, it was found that peer affiliation had a large impact on the students' perception of cost in the subject. Quantitative and qualitative data presented peer affiliation as the strongest predictor of behaviour in this context, which lines up with Ajzen's (1991) theory of planned behaviour. In an observation, students were asked to comment on how they found

pressures from their peers in the class affected their work. The following is a transcript from the observation notes.

Student A: "...Peers can make it fun but when people don't do the work, it makes you not want to work either. You're kinda like following the sheep..."

Student B: "...Yeah I feel like peers, like if they're pressuring you [negatively] it's not that fun. And it's more like, 'I don't really want to do the work.' But if you can get on well with them and start doing teamwork and engage in your work, it's a lot easier and it's more enjoyable..."

The group's overall self-efficacy and their perception of the teacher's support were consistent throughout the duration of the project. The trends in the data record that the greatest areas of change are the social pressures from peers, whether positive or negative, and the perceived cost of engaging in the learning, whether higher or lower. Students whose motivation dropped over the sequential periods reported that (1) their peers were a negative influence on their engagement in the learning, and (2) they perceived the cost of the learning opportunity to be greater than when they began the course. Alternatively, students whose motivation either stayed the same or increased over the series reported the opposite. These students were either listed in Group A: Doing My Best or in Group B: Doing Just Enough in Table 4. The research also showed that the social pressures on students to achieve was often deeply influential on the perceived value of the subject and of the expectations of one's own ability to achieve. Below is an example of this theme from a student's answer in the Midpoint Survey.

"...It's not the subject but the people in my surroundings that make me not enjoy it... What motivates me are people I know and am confident around..."

If students perceived their peers to be a positive influence in class and they felt they had sufficient support from their teacher, they were more likely to place a higher value on the subject. Furthermore, they also believed in their own ability to achieve.

Self-Efficacy in Mastery-Oriented Learning

Students who conveyed the highest levels of self-efficacy in the class stated that challenges and hurdles were a positive motivator in the subject. Conversely, students who displayed low levels of self-efficacy stated that challenges and difficulties in the subject were demotivating. Students who communicated this view of their own ability all expressed a general dislike of the subject and a notable aversion to any form of

challenge or problem solving. Students with a high self-efficacy needed to be challenged; it was fulfilling to grow in the subject even if it meant facing difficulty to get there. Previous research has shown that project-based learning creates motivation in the classroom through mastery-oriented curriculum (Beier et al., 2019; Harun et al., 2012; Perin, 2011). When students have positive educational experiences mastering a skill or topic, their self-efficacy increases, along with their subjective value of the learning opportunity (Beier et al., 2019). Accordingly, students reported an increase in their self-efficacy as they mastered new skills while working on the Stakeholder Projects. A reflection from a student at the end of the intervention is shared below.

“...I’ve been helping my mum with some of her projects, and learning in wood tech has made things a lot easier... I feel my self-confidence has improved as I can now work with my hands and hard materials...”

However, the opposite is also true when students have negative learning experiences in project-based learning. Educators, therefore, have a central responsibility to guide the learning and facilitate topic mastery, albeit at different paces depending on individual rate of progress.

Aspirations for Schoolwork

Project-based contextualisation has positively affected student aspirations and expectations toward their classwork in this study. One of the outcomes of motivation is students’ expectations toward the learning. The quality and degree of work students are aiming to produce at school is a strong indicator of their achievement outcomes (Ajzen, 1991; Walkey et al., 2013). In each of the surveys, students were asked to indicate what quality of work they were expecting their Stakeholder Projects to be. Figure 5 conveys the change of student expectations toward their schoolwork over time.

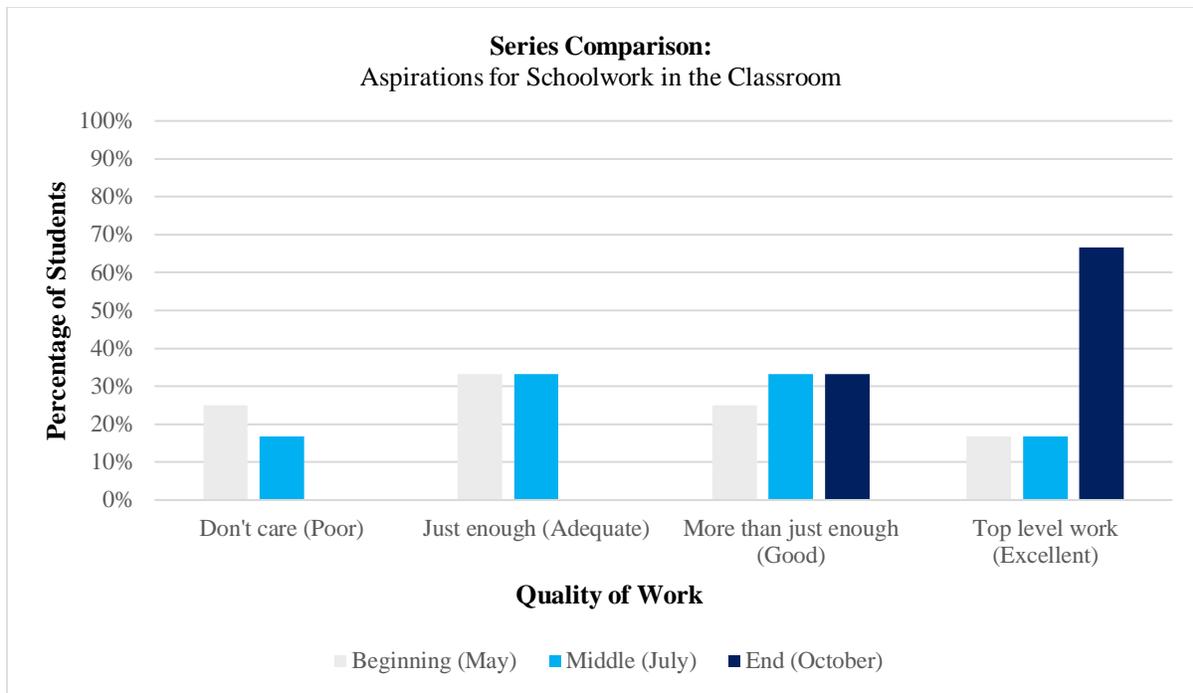


Figure 5. Series comparison: Student aspirations for quality of work

Before the intervention in May, most students were aiming to produce adequate work, an attitude toward the learning of *Doing Just Enough*. During the intervention in July, one-third of students approached the work with the same expectation and one-third were aiming for *More Than Just Enough (good quality)*. The final set of results taken from the Endpoint Survey after the intervention in October display the most noticeable change. While a third of the class indicated a *More Than Just Enough (good quality)* attitude, the majority (two-thirds) of the participants indicated they were aiming for *Top Level Work (excellent quality)*. The data suggests that the intervention lifted student aspirations in the classroom. This is significant because high expectations are strongly predictive of achievement outcomes. The need to lift student aspirations in the classroom is pertinent because of the disparities in achievement outcomes for underprivileged students. Medina and Sutcliffe (2021) found that while half of all students in their study expected to complete a degree, only a third of socio-economically disadvantaged students expected the same.

Purpose-Driven Education

One of the key qualitative findings of this research has been that motivation for learning increases when students have a larger view of its purpose. This was not reflected in Table 5, which conveys how students define success in the subject in the Baseline and Endpoint surveys.

Baseline (May)

1. Growing in knowledge and learning
2. Passing all the assessments
3. Enjoying the subject work this year
4. Engaging in meaningful work

Endpoint (October)

1. Growing in knowledge and learning *equal with*
Enjoying the subject work this year
2. Passing all the assessments
3. Engaging in meaningful work *equal with*
Having fun with my peers *and*
Enjoying the subject as a hobby

Table 4. Students' own definition of success in Technology listed in order of importance (May-October 2021)

In the table, the definition “Engaging in meaningful work” dipped from 36.1% to 16.7%, while at the same time themes in the thematic analysis suggested that a larger view of purpose increased student motivation. One possibility for this could be that the student's intrinsic enjoyment of a subject is tied up with their understanding of “meaningful work,” based on the work of Yeager et al. (2014) and Grant (2007, 2008), who found that students find enjoyment in their work *because* of the greater purpose of helping others. They found that students who had a purpose that transcended self-interest, such as a desire to help others through their future careers, displayed a far deeper level of learning and a far greater perseverance through tedious and difficult schoolwork. More extensive research on a larger scale is recommended to understand the reasons for the discrepancy in the data.

Implications

The theory of planned behaviour (Ajzen, 1991) was effective in this study, particularly for understanding how the different elements of the theory (EVSC) were affected by the intervention. The added factor of *Cost* was necessary for interpreting the data and is recommended to be included in the project's next steps. Further study is required for a deeper analysis of the data with a substantially larger cohort of participants, for quantitatively rich data to be collected and analysed. Furthermore, relationships between the school and industry contacts should be maintained over a longer period for best results. The limitations caused by COVID-19 meant that Phase 2 could not be fully carried out. There are therefore opportunities to inform future research because of the inability to complete what was intended for the present study.

Limitations

There were some key limitations to the research, namely a 10-week lockdown due to the COVID-19 pandemic, which caused a disruption to the construction component of the plan during Phase 2. This meant that data collection at the end of the project could not be based on the completion of the Stakeholder Projects or Exhibition. Data analysis, therefore, focused more on the process of the intervention, and how it impacted student motivation for learning in the classroom up until halfway through Phase Two.

Conclusion

This research aimed to measure the impact project-based contextualisation would have on student motivation in the classroom. Based on the findings, it can be concluded that real-world learning brings meaning and motivation to classwork. This study has shown the value of taking students to workplaces, both for understanding how classwork in school is meaningful, and for growing career aspirations. It can also be concluded that when learning is given a self-transcendent purpose, such as helping others through the work they do, students are most motivated and engaged. The results of this research suggest that educators should embed curriculum within real-world contexts and frame it with a purpose greater than the work itself.

This research suggests that students need to be aware of all the pathways which exist if they are to make informed career decisions. Making informed decisions starts with subject selection. Therefore, in the early years of secondary school it is of utmost importance that students are given exposure to the potential career pathways their subjects may lead to. Project-based contextualisation not only values students' academic achievement, but also their personal formation. It is when these two domains are combined that students will be fully equipped for life beyond the classroom.

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Appendix A: Google Slide Template (Online Journal Reflections)

Aim of the Journal

This is an ongoing document that will be added to throughout the year.

It is a record of targets and outcomes for your learning and to record what you have learnt or achieved.

This diary will be used to help you record your progress and how well you are able to link classwork to the workforce.

Add information in any format, written, pictures and video

EOTC Trip to Lloyd Stevenson Boatbuilders

If you attended the trip, answer the following on the next page:

1. Add any photos you took
2. Answer the following questions:
 - What was the reason you went on the trip?
 - Before the trip, how excited were you on a scale of 1-10?
 - Why?
 - Did you know boat building was an available career pathway after school?
 - Rate your interest in doing an apprenticeship of any sort on a scale of 1-10
 - Do you feel more motivated to learn at school after going on the trip? Give a number:
(1 = I am less motivated, 5 = neutral, and 10 = I am more motivated)

EOTC Trip to Linear Homes Building Site

If you attended the trip, answer the following on the next page:

1. Add any photos you took
2. Answer the following questions:
 - What was the reason you went on the trip?
 - Before the trip, how excited were you on a scale of 1-10?
 - Why?
 - Before we did the study into the construction industry, which of the 15 available career pathways were you aware of?
 - Rate your interest in doing an apprenticeship of any sort on a scale of 1-10
 - Do you feel more motivated to learn at school after going on the trip? Give a number:
(1 = I am less motivated, 5 = neutral, and 10 = I am more motivated)

Jacob H. Doak

Jacob Doak is a Hard Materials and Design Technology teacher in Hawkes Bay. His vision is to teach students foundational and traditional skill sets combined with contemporary technologies and all the creative possibilities these have to offer. While training in South Auckland, Jacob developed a passion for finding innovative ways to best prepare young people for life after school. This is reflected in his teaching style which adopts an experience-based, apprenticeship approach. To align with the school's motto, it's all about "growing good people for a changing world."



He believes that teaching in a way that honours Te Tiriti o Waitangi means to interweave a Te Ao Māori worldview into his practice. An essential part of this is anchoring the curriculum in the local context, which includes both geographical area and cultural understandings.

Along with a Bachelor of Product Design through AUT, Jacob holds a Master of Teaching and Education Leadership through Ako Mātātupu and The Mind Lab.

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