

Whāia te iti Kahurangi - in pursuit of excellence

Student efficacies, agency and achievement in early years tertiary education: an applied technology perspective

DEEPA MARAT,¹ MIRIAMA POSTLETHWAITE, NINA PELLING, ZIMING QI,
PRABHAT CHAND
Unitec Institute of Technology, Private Bag 92025, Carrington Road, Auckland, New Zealand

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A mixed-methods approach was used to assess self-efficacy, agency, and perceptions of success of cohorts of students enrolled in applied technology programs. Aligned to the Ministry's Statement of Intent 2004-2009 (Ministry of Education, 2004) "*Whāia te mātauranga hei oranga mā koutou* Seek after learning for the sake of your well-being" (p. 6), the present research project aimed to identify factors which facilitated use of learning strategies and achievement of first year tertiary students. The findings reveal the critical role of peers, teachers, and family support in student achievement and success in a bicultural and multi-cultural teaching-learning context. *Asia-Pacific Journal of Cooperative Education* 9(1), 45-58.

Keywords: Applied technology; tertiary education; self-efficacy; agency, achievement; success; New Zealand.

The present research was located in Unitec Applied Technology Institute, a tertiary institution in Auckland offering programs and courses from Certificate level to doctoral degrees. The aims of this research project are to extend and deepen understandings about efficacies, agency, and achievement with a focus on first year tertiary students. The major components of self-efficacy and agency assessed include motivation, cognition, self-regulated learning, resource management, assertiveness, and support. It is hoped that the findings from this study will provide evidential basis for government initiatives which target among other things, reducing attrition and disparities in achievement, and increasing retention and success. Further, through its theoretical links to efficacy theory and by its application within the tertiary sector, the outcomes of the research harmonizes into policy initiatives which aim at enhancing the quality of student achievement in the tertiary sector, with focus on self-management skills, sense of belonging, identity, well being, social responsibility and contribution to the community, meta-cognitive thinking, and critical and ethical thinking (Ministry of Education [MoE], 2004).

THE CONSTRUCT OF SELF EFFICACY

According to Bandura (1997) "Perceived self-efficacy is concerned with people's beliefs in their capabilities to perform in ways that give them some control over events that affect their lives" (p. 181). Efficacy influences whether people think optimistically or pessimistically; the courses of action they choose to pursue; the goals they set for themselves and their commitment to them; how much effort they put for the in given endeavors; the outcomes they expect their efforts to produce; how long they persevere in the face of obstacles; their resilience to adversity; how much stress and depression they experience in coping with taxing demands; and the accomplishments they realize (Bandura, 2006). In the present

¹ Correspondence to Deepa Marat, email: dmarat@unitec.ac.nz

research, self-efficacy is conceptualized as a multi-dimensional construct influencing cognition, emotion and behavior, and level of agency, including *personal agency*, *proxy agency* and *collective agency*. Agency is defined as an intentional act, with its key feature being the power to originate actions for given purposes (Bandura, 2001). We have attempted to assess students' efficacy and agency in the context of achievement, and perceptions of success.

THE APPLIED TECHNOLOGY PROGRAM

The Bachelor of Applied Technology

The bachelor of applied technology is a generic degree for technologists and trades-people. The degree has no 'majors', as the emphasis is on capability in applied technology and it is based on holistic and system approaches to learning and practice. Students do, however, take a coherent group of courses in one area of specialization: automotive engineering; building; electrotechnology; furniture-making; joinery; marine; and plumbing and gas-fitting. The chosen specialization provides specific knowledge and skills, and a window through which the student sees and explores the wider phenomenon of applied technology. The degree is built on Levels 5, 6 and 7 of the New Zealand Qualifications Authority framework (Unitec Institute of Technology, 2003).

The learning becomes progressively more complex as the student progresses through the program. In the first two years, students develop social and technical knowledge and skills alongside each other. These are linked through the development of capability and come together explicitly in a *technology project*. The technology project provides a possible base for the final year's exploration of innovative uses of technology. An industry project provides an opportunity to develop an industry environment for the commercialization of the new product, or for some other development of professional practice. The courses on sustainable technologies and societal context develop understandings of the frameworks in which students and practitioners work and live. Students complete their technology projects prior to starting a course on innovative uses of technology and the industry project (Qi & Cannan, 2007). All courses are designed in collaboration with industry to determine the industrial-oriented teaching and learning and independently delivered to achieve the technical bachelors degree. With traditional degree models, student projects are introduced to link the teaching and learning methodology to industry, and Year 3 students are placed in an industry for their project. The topic of research is determined by the industry which provides work-based learning, and they also make provision for the required resources. Students are co-supervised by personnel from both the industry and the tertiary institution (Qi, & Cannan, 2006). The model of delivery of the Bachelor's in Applied Technology (Electrotechnology) at Unitec is thus a tripartite agreement between students, staff and industry, pre- and post-cooperation, having unique advantages for all partners. While active researchers from chosen disciplines have been appointed as part-time staff members and have brought up-to-date knowledge and skills from the industry, full-time academic staff members have enhanced their credibility in the industry through the increased relationship with industry practitioners. This facilitates the strengthening of research links with the industry, and enables teachers to know their students better to suit employer requirements.

The Certificate in Applied Technology

The Certificate in Applied Technology is a one-year fulltime program at Level 4 certificate of 120 credits and features 7 endorsements: (a) Automotive Engineering, (b) Carpentry, (c)

Electro technology, (d) Furniture making, (e) Interior décor, (f) Joinery, and (g) Plumbing and gas fitting. Most of the participants in the present research (60%) were enrolled in the Certificate in Automotive Engineering CAT program. The CAT comprises 10 courses. Table 1 contains course details and intended graduate outcomes. The program is 30% theory based and seventy percent practical. The theoretical and practical activities are integrated in order to facilitate practical application of theoretical concepts. All courses within the program are designed to provide the student with integrated skills and resource knowledge to meet the aims and objectives of the program.

METHODOLOGY

A mixed-methods approach inclusive of quantitative and qualitative methodologies within a Kaupapa Māori framework (Smith, 1999) underpinned the present research. Approaches included some of the seven principles outlined by Mead (1997): (a) *Aroha ki te tangata*/Respect for people, (b) *He kanohi kitea*/meeting with people face to face, (c) *Manaaki ki te tangata*/caring for people, (d) *Kaua e takahia te mana o te tangata*/Do not trample the mana of people, and (e) *Kaua e mahaki*/Do not flaunt your knowledge. In the initial stages of the project, key people were identified of whom we had collegial relationships with, including heads of schools, and lecturers directly working with the student participants. This was important as *whakawhanungatanga* (making connections) (Bishop, 2003) assists both the researcher and the participant to work together with trust and respect, the research will have positive, pragmatic and innovative aims, and the outcomes useful to teaching and learning (Smith, 1999). A survey comprising 55 items to be rated on a Likert scale, and semi-structured questions, were completed by all participants. However, on an average, there was between 85-90% participation in the surveys during each class visit. Participants also consented to the researchers having access to their grades during the course of the year. Of 40 participants who volunteered for interviews, results from two interviews are discussed in the present research. The interviews were face-to-face, recorded and transcribed. Participant consent for the draft of the transcriptions was obtained prior to the analysis. The analysis of the transcripts into the themes was based on mutual consensus of the researchers, ensuring interrater reliability.

RESULTS

Quantitative Data Analyses

Quantitative data were analyzed using both descriptive and inferential measures. Cronbach's alpha was calculated to assess reliability of scales. Crosstabulations and correlation analyses were used to examine association between independent and dependent variables.

Demographic Data Analysis

Ninety-four students from the School of Applied Technology participated in the research. Fifty-six students (60%) were enrolled in the Certificate in Automotive Engineering CAT program, 16 (17%) students in the carpentry program, 16 (17%) students in the Bachelor of Applied Technology program, and 6 (6%) in the Electronic technology program. Ninety-one were male participants, and two female participants. Ethnic breakdown revealed 41.5% self-identified as Asian, 19%, Pasifika, 11% Pakeha (i.e., New Zealanders of European descent), a little over 6% Māori (i.e., who self-identify as indigenous New Zealanders), 2% mixed

ethnicity, and 20% as 'other' (African, Indian, Fiji-Indian, Bangladeshi, Arab, etc.).

TABLE 1
Course details and intended graduate outcomes

Course	Aims	Graduate outcomes
Brakes	This course is designed to give the students a generic understanding of the function and operation of a vehicle braking system.	The graduate of Automotive Engineering will:
Steering and Suspension	To provide students with a generic understanding of suspensions and steering and the basic skills to repair and service suspensions and steering.	Demonstrate a general level of trade specific technical knowledge and skills Work safely and effectively under supervision
Vehicle Operating Systems and Servicing	To give the student generic skills and understanding of vehicle servicing, positioning, security and design of bodywork.	Demonstrate written and oral communication skills Be able to communicate effectively in a multi cultural environment
Fuels	To give the student generic skills in the understanding and repair of fuel systems.	Carry out general repairs on engines, transmission, brakes, steering and suspension, fuel and electronic control systems
Automotive Ignition Systems	To give the students a generic understanding of the basic principles and concepts in automotive ignition systems and repair.	Fit and/or install automotive accessories Weld a range of vehicle components
General Engineering and Fabrication	To give the student generic skills in metal fabrication and welding.	Interpret general servicing schedules and carry out minor customer and administrative services
Transmissions	This course aims to give the students generic skills in identification and repair of transmissions, drivelines and final drives.	
Engines	To give the student a generic understanding of engines, the skills to assess the condition of an engine before repair and the practical ability to dismantle and assemble an engine.	
Automotive Electrical	To provide an introductory generic understanding of the principles of electricity and methods of repair and installation of electrical components and circuits.	
Introduction to Health, Safety and Professional Development	To provide students with an understanding of the Health and Safety in Employment Act 1992. To enable students to develop effective study skills, basic first aid, computing and communication skills.	

Sixty percent of the participants were aged 18-25 years, 21% over 25 yrs of age, and 18% between 16-18 yrs of age. Seventy percent of participants had less than two years work experience, and over 29% had more than two years experience. Forty-four percent reported being employed.

Measures of Self-efficacy and Agency

There were nine subscales comprising 55 items which focused on efficacy in use of learning strategies and related constructs which share a reciprocal relationship with self-efficacy. A five-point Likert scale ranging from 'not well at all' to 'very well' was used to assess level of self-efficacy. The cognitive-behavioral subscales included thinking, motivation, resource management, self-regulation; leisure time and extra-curricular activities, and application beyond the learning context. The emotional-behavioral constructs included expectations, self-assertiveness, and support. Agency was assessed as part of the interview schedule. A 10-point Likert scale was used to gauge level of agency, with subsequent related qualitative components.

The self-efficacy scale was assessed for reliability and the overall reliability was high at .95. Subscale alpha values, with the exception of *self assertiveness* and *support*, were greater than .70 (Table 2).

Analysis of Self-efficacy Scores

Analysis of means and standard deviations show that participants rated high levels of self-efficacy. Within subscales, highest means were for cognition/thinking, self-assertiveness, and motivation. Lower means were reported for support, expectations, leisure activities, application, and resource management (Table 3).

TABLE 2
Reliability analysis for subscales in the survey

Items	Reliability (Cronbach Alpha)
Motivation	.75
Thinking	.91
Resource Management	.79
Self regulated learning	.83
Leisure activities	.76
Expectations	.82
Self assertiveness	.65
Support	.64
Application	.78
Overall	.95

Achievement Scores²

Four out of the five participants in the electrotechnology group achieved a B grade, and one achieved an A grade in Course I. In Course II all participants achieved a B grade. In the carpentry group, for the total participant pool of 15 students, one consolidated grade was provided by the School³. Five participants achieved an A grade, eight participants a B grade, and two a C grade. In the automotive group, a total of 50 participants were graded on four courses. For Course I (Brakes) achievement data were as follows: 17 (A), 18 (B), 14 (C), and 1 (D). For Course II (General Engineering and Fabrication) the grades were 10 A, 31 B, six C, and one D. For Course III (Engines), 31 got an A, 13 a B, and six a D. For Course IV (Automotive Electrical) six participants got an A, 15 a B, 18 a C, nine a D, and two did not complete. For the Bachelor of Applied Technology program, results came from two courses for a group of 16 participants. In Course I, six participants received an A, two a B, and eight a C. For Course II, two participants received an A, eight a B, five a C, and one an E. Table 4 contains all achievement grades, and Figure 1 represents this graphically.

Qualitative Data Analyses

Qualitative data were analyzed thematically using a model reported by Miles and Huberman for data reduction (Tables 4, 5, & 6). Data display and conclusions was used to analyze the emerging themes (Rouse & Dick, 1994). Triangulation of the results based on data types, and theories of self-efficacy, agency and the tertiary education strategy was adopted in discussing the implications of the findings.

TABLE 3

Subscale means and standard deviation for applied technology students (n=87)

Item	Mean	Std. Deviation
Motivation	3.46	.626
Thinking	3.49	.576
Resource Management	3.37	.477
Self regulated learning	3.34	.621
Leisure activities	3.23	.850
Expectations	3.36	.664
Self assertiveness	3.48	.721
Support	3.13	.761
Application	3.34	.690

² The percentage of achievement grades are calculated in relation to the number of students whose grades were accessible, and not based on the total sample who participated in the survey.

³ The comprehensive results of carpentry students and related discussion are being published elsewhere.

TABLE 4
Achievement grades across applied technology courses in the study

Course	Grade				
	A (%)	B (%)	C (%)	D (%)	Did not sit (%)
Electronic Technology	80	20			
Automotive Technology					
AT Course I	34	36	28	2	
AT Course II	20	62	12	2	
AT Course III	62	26		12	
AT Course IV	12	30	36	18	4
Bachelor of Applied Technology					
BAT Course I	37.5	12.5	50		
BAT Course II	12.5	50	10	6.25	

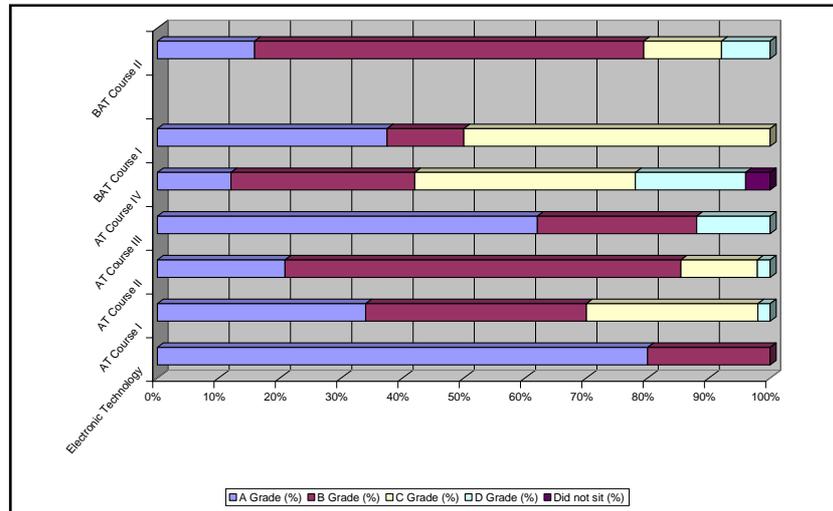


FIGURE 1
Achievement grades across programs and courses in the study

TABLE 5
Significant correlation scores between survey items and achievement

Survey Items	Correlation
<i>Carpentry</i>	
Self regulated learning: Participate in class discussions – Consolidated grade	.52
<i>Automotive Technology</i>	
Motivation – Understand complex concepts – Brakes	.31
Motivation – Understand complex concepts – Automotive Electrical	.41
Thinking – Notes and Readings – Automotive Electrical	.35
Thinking- Through a topic – Automotive Electrical	.28
Thinking – Asking self questions – Automotive Electrical	.32
Thinking – Memorize key words – Brakes	.36
Thinking- Memorize key words –General Engineering and fabrication	.33
Thinking – Memorize key words – Automotive Electrical	.32
Resource Management – Work on your own – Brakes	.47
Resource Management – work on your own –General Engineering and Fabrication	.44
Resource Management –Keep up with topics and Automotive Electrical	.30
Resource Management – Revise notes and readings – Automotive Electrical	.35
Self-regulated learning- Finish assignments on time – Automotive Electrical	.30
Self-regulated learning – Learn when there are other commitments- Automotive Electrical	.30
Self-regulated learning – Concentrate in class – Automotive Electrical	.33
Expectations – Lecturer- Brakes	.31
Expectations – Lecturer – Engines	.29
Self assertiveness – Express opinions – Brakes	.31
Self-assertiveness – Stand up to self-belief –Brakes	.40
Self-assertiveness – Stand up to self-belief –Engines-	.43
Support –From family – Engines	.29

The concept of agency was also explored in this study. Agency as defined for the purpose of this study, is the power in one’s ability to bring about a positive change to one’s personal life, that of the family, and/or the community based on the knowledge and skills one has acquired after having enrolled in a tertiary qualification program: “Whatever other factors may operate as guides and motivators, they are rooted in the core belief that one has the power to produce effects by one’s actions” (Bandura, 2001, p. 10). There are three modes of agency, personal agency, proxy agency, and collective agency (Bandura, 1999). Personal agency is exercised individually with people directing themselves and their environment to manage their lives. Personal agency also works in tandem with proxy agency, and collective agency. Proxy agency is the way an individual enables or relies on another person or people to act as agents to achieve desired goals in situations where they do not have direct control over factors that effect their lives, and thereby involves the mediation of others who have the expertise or influence to help attain the desired outcome. Collective agency refers to “people’s shared beliefs in their collective power to produce desired results” (Bandura, 2000, p. 75).

The lead statement in the interview to assess agency of the participant was, “How agentic do you feel in bringing about a positive difference to your life after enrolling in the tertiary program?” The response from participants, facilitated analysis of one of the major goals of the New Zealand Tertiary Education Strategy from a context-of-practice perspective, viz., the expected contribution of the tertiary sector in achieving “success for all New Zealanders through lifelong learning” (MoE, 2007, p. 21). According to the Ministry, “The kinds of knowledge, skills and competencies that enable people to succeed in a knowledge-based economy are increasingly similar to those that enable people to enjoy and contribute positively to their families and communities”(MoE, 2007, p. 21).

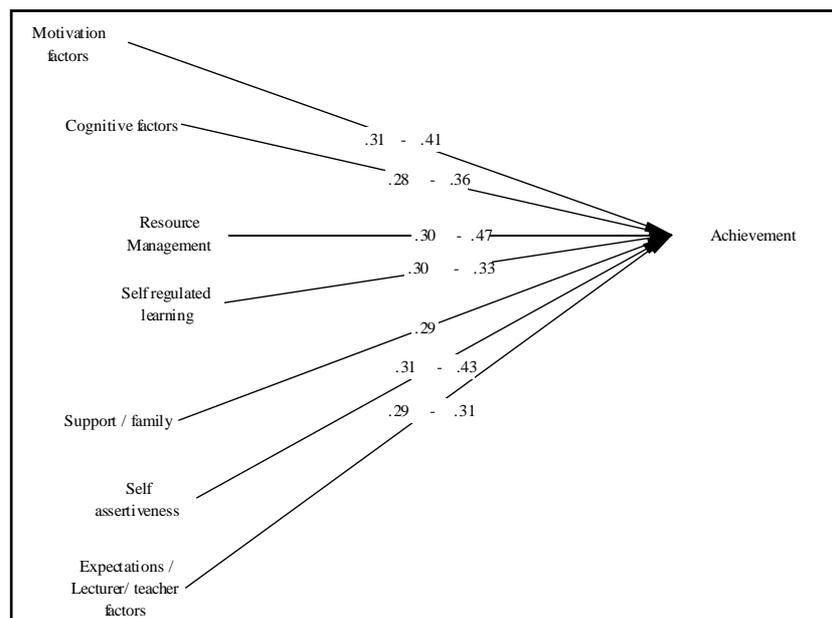


FIGURE 2
The range of significant correlations between major components of self-efficacy and achievement

Selected Comments on Agency

Personal Agency

If I really wanted to, I am quite capable of changing things. It comes down to desire. Through doing this course I want to change and gain skills in order to get out into the workforce. If I want do, I feel quite able to make positive changes in my life.

I was a person that didn't like change but now that I've done it, I'm so glad I did. I wouldn't want it any other way. That changes my attitude to change as well because I was so scared to do it and now that I have it feels more agentic. At work experience every week someone complements me for doing this, saying it is great to see a girl doing this work. People ask me to do work on their own cars and this shows that they have faith and confidence in me to do work on their car. Being a mechanic there is lots of pressure on you – if you make a mistake on the suspension or the wheels, somebody's life could be at stake. So they are showing that they do have this faith in you to work on their cars. It's not just one experience but they are ongoing. It validates it more for me. I guess in some ways it is support. Although you may never see this person again, but it makes a difference.

Community Agency

I don't think I can make much change anywhere else because I don't think anyone would listen or pay heed to me – I'm just another person. Sometimes I try but not many people listen. I've tried to change some of the bad habits of my mates but no one cares so I give up.

TABLE 6

Participants' perspectives on factors which worked well to facilitate attaining achievement goals

Factors	Frequency
<i>Theory-based Knowledge</i> Selected responses: Theory morning, practical afternoon; Welding, breaking systems, elemental knowledge of engine	4
<i>Skills Orientation</i> Selected responses: Doing practical work more than theory because I prefer hands on work; Hands on practical work then going to the class and having a discussion on what we have just done. Going back over in detail always helps; working on building our house help with what to do in the assignments	16
<i>Comprehension</i> Selected comments: More understanding; Skills & understanding; Theory morning, practical afternoon	6
<i>Peers</i> Selected responses: Getting along side peers to go over assignments; I believe it is better for me to go to the library with the boys and doing assignment; Team work; Work as small group	8
<i>Teachers</i> Selected responses: Help from tutors and peers especially after school classes; Encouragement from tutor to perform to a level of achievement; Listening to teacher and asking questions and ask for help; Repetitiveness; The lectures giving time to explain expectations; Style of teaching	11
<i>Self-regulated Learning</i> Selected responses: Time management; asking classmates if I don't understand something; the schedule of separate subjects and finishing it off in 4 weeks and not going through it all again; Organizing myself to achieve multiple tasks; Attending all classes.	19

TABLE 7
Participants' perspectives on factors which did not facilitate attaining achievement goals

Factors	Frequency
<i>Working by Oneself</i> Selected responses: Being on my own and trying to do assignments, because I lose motivation and leave things to the last minute I believe it did not work for me, when I stay home by myself doing my assignment	3
<i>Students Who Waste Time</i> Selected responses: The people around in the group that do not want to really be here. That waste time mucking around; Some students did not try to study hard also disturb other students; Other in the class, and other's attitudes; Being in a class with challenged peers that slow everyone down	5
<i>Other</i> Selected responses: Learning the theory first then practical should be other way round for me; Administration support when required for a change in the program (The International student desk); Getting what tutor explain Language problem; Support from classmates	NA

TABLE 8
Additional support mechanisms as stated by participants to achieve successfully

Mechanisms	Frequency
<i>Self-regulated Learning Skills</i> Selected responses: Understanding and knowing the right questions to ask when I need help; Organizations/Time management; I am not too good at taking notes. Have been struggling because I haven't studied in 15 years	3
<i>Teacher Orientated</i> Selected responses: People that really care, and have the time to help; More encouragement from someone who can do one on one work with me, Better managements to deal with noisy kids in class; Need tutors help	8
<i>Work-experience, Work-related</i> Selected responses: I need more work experience; I would like school can make more working choice for us; I think where work place help facilitate your achievement and success	NA

DISCUSSION

The findings reveal high levels of self-efficacy in participants, with means ranging from 3.13 to 3.49 on a four-point scale. Achievement data shows higher frequency of A grades in the electrotechnology program. In most of the courses in the Certificate in Applied Technology CAT program more students had B grades, and in Course IV, there was a higher percentage of C grades. In the CAT program, with the most participants, statistically significant

correlations between efficacy in use of learning strategies and achievement ranged between .30 -.35. Whilst cognitive strategies featured in greater number of categories inclusive of self-regulation and resource management, teacher expectations, guidance and support from teachers, peer support, and family support also emerged as crucial factors in student achievement in some courses (Table 5, Figure 2). Teacher variables also were reported by students as significant for positive achievement outcomes in the qualitative sub section of the survey (Tables 3, 4 & 6). A shift from teacher-centered approach to learner-centered approach to achieve positive student outcomes has been proposed as part of intensive staff development in tertiary education by the Ministry of Education (2005). The theoretical framework underpinning the program recommends developmental models with a change in teachers' focus from self to student, and links between teacher intentions and strategies. One student participant in the present research, in the context of the teacher reported: "People that really care, and have the time to help."

Efficacy and agency of students in different learning strategies, achievement, and success and community participation, continue to be factors not clearly articulated in strategic planning in the tertiary education sector. Cornelius-White (2007) in a meta-analysis of research on effective learner-centered teacher-student relationships comprising 119 studies, with over 350 thousand students, and about 15 thousand teachers, report a correlation of .31 between individual person-centered teacher variables and cognitive student outcomes. Critical and creative thinking and positive student outcomes had the highest correlation of .45. Positive behavioral and affective outcomes in terms of participation, initiative, satisfaction and motivation were highly associated with person-centered education. Person-centered education is also reported as more efficacious than any educational innovation with correlation of .35. Person-centered teacher variables include genuineness, empathy, respect, non-directivity, encouraging learning and thinking, and adapting to differences. With the exception of genuineness, all other variables had average positive correlations with student outcomes.

Efficacy in family support positively correlated with achievement in engines (Table 3). The role of parental expectations and involvement during transition points of students in different cultural groups has been researched (Pearce, 2006). Analyzing data on critical transitions experienced by students as they leave school and progress to University and careers, parental expectations which are clearly articulated, indirect parental involvement in educational experiences of students, a parenting style focused on strict discipline both in study and otherwise had a positive influence on educational attainment during transition points and beyond. Pearce highlighting the role of parents and schools in mediating social effects thereby facilitating positive educational outcomes, states: "As society continues to move towards a social environment that makes educational achievement possible for underachieving minority groups, it is doubly important that we foster the belief that achievement is not only possible for our children, but expected of them" (p. 96).

An important factor to be considered in the New Zealand education context is the part-time employment status of students enrolled in the tertiary sector. There is a decreasing trend in full-time full-year study; however, participation in tertiary education is high, with diversity of provision leading to greater accessibility for traditionally underrepresented groups and adults with low or no qualifications (MoE, 2006). Monitoring reports on the education sector in New Zealand show a shift by both, the Government and tertiary sector towards "increasing engagement of TEOs with the industry (relevance), and prioritizing improved

learning outcomes in quality assurance systems (quality)” (p. 136). The Monitoring Report (MoE, 2005) highlights developing skills that New Zealanders need for a knowledge-based society and emphasizes “trade and technical skills to support and maintain New Zealand’s infrastructure” (p. 2), and development of generic skills to complement development of specialist skills. Generic skills include key competencies which contribute to overall success in life and functioning in society. The 2006-2008 strategic focus across the tertiary sector continues to be on meeting skill needs of industry and increasing accessibility for underrepresented groups. There is also an emphasis in the strategic plan on continued improvement in teaching capability and learning environments focus on sustainable development of export education capability on foundations of quality teaching and pastoral care. Incorporating students’ self-efficacy, personal and collective agency in knowledge, skills, achievement, success, and community participation, within the strategy would also be important considerations.

CONCLUSIONS

The findings of the present research were shared with student participants at the end of the second semester. The students reported the results as revealing and empowering. This was also confirmation and affirmation to the tutors about the learning strategies which worked for students, thereby facilitating the goal of ‘achievement of all’. The notion of empowerment, *tino rangatiratnaga* (Goulton, 1998), strengthened and validated the teaching-learning practices of Māori pedagogy employed in classrooms of students of carpentry. This was a positive outcome. In collaboration with the tutor, a co-authored publication of the implications of the findings from the carpentry course is to follow later in the year. The results of the research have clarified for students their capabilities and the strategies to achieve their goals. Teaching staff have also become aware of student-centered teaching-learning practices which integrates strategies in the classroom context. The emerging findings have led to a further positive outcome, in terms of the creation of model as a guide for the carpentry program student support sessions facilitated by the Māori Development Centre of the Institute. *Whanungatanga* has ensured a *whanau* environment of care, collaboration and benefits for all participants. *Tino rangatiranga* will enable all to play a special role at every phase of the research project, a shared leadership and ownership strategy in a collaborative pursuit of excellence, wellbeing and social responsibility.

Human wellbeing and attainments require an optimistic and resilient sense of efficacy. This is because the usual daily realities are strewn with difficulties. They are full of frustrations, conflicts, impediments, inequities, adversities, failures, and setbacks. These are the price of progress. People must have a strong belief in their efficacy to sustain the perseverant effort needed to succeed ...optimism that one can beat those odds through self development and perseverant effort (Bandura, 2006).

REFERENCES

- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: WH Freeman.
- Bandura, A. (1999). Social cognitive theory: An agentic perspective. *Asian Journal of Social Psychology*, 2, 21-41.
- Bandura, A. (2000). Exercise of human agency through collective efficacy. *American Psychological Society*, 9 (3), 75-78.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1-26

- Bandura, A. (2006). Going global with social cognitive theory: From prospect to paydirt. In S.I. Donaldson, D.E. Berger, & K. Pezdek (Eds.), *Applied psychology: New frontiers and rewarding careers* (pp. 53-79). Philadelphia, PA: Lawrence Erlbaum.
- Bishop, R. (2003). Changing power relations in education: Kaupapa Māori messages for 'mainstream' education in Aotearoa/New Zealand. *Comparative Education*, 39(2), 221-238.
- Cornelius-White, J. (2007). Learner-centred teacher-student relationships are effective: A meta-analysis. *Review of Educational Research*, 77(1), 113-143.
- Goulton, F. (1998, July). *He Huarahi Ako: Pathways to learning*. Paper presented at the *Te Oru Rangahau* conference. Palmerston North, New Zealand.
- Rivers, J. (Ed.). (2005). *Academic staff development: A summary of synthesis of research on the impact of academic staff development programs on student outcomes in undergraduate tertiary study*. Wellington, New Zealand : Ministry of Education.
- Mead, L. (1997). *Nga Aho o Te kakahu Matauranga*. The multiple layers of struggle by Māori in education. Unpublished PhD thesis, University of Auckland.
- Ministry of Education. (2004). *Statement of intent 2004-2009*. Wellington, New Zealand: MoE.
- Ministry of Education. (2005). *The system in change tertiary education strategy monitoring report 2005*. Wellington, New Zealand: MoE.
- Ministry of Education. (2006). *OECD thematic review of tertiary education*. Wellington, New Zealand: MoE.
- Ministry of Education. (2007). *Tertiary education strategy 2007-2012*. Wellington, New Zealand: MoE.
- Pearce, R.R. (2006). Effects of cultural and social structural factors on the achievement of white and Chinese American students at school transition points. *American Educational Research Journal*, 4(1), 75-101.
- Rouse, A., & Dick, M. (1994). The use of NUDIST, a computerized analytical tool, to support qualitative information systems research. *Information Technology & People*, 7(3), 50-62.
- Smith, L.T. (1999). *Decolonizing methodologies: Research and indigenous peoples*. London: Zed Books.
- Unitec Institute of Technology. (2003). *Bachelor of Applied Technology Part A: The program*. Auckland, New Zealand: Unitec.
- Qi, Z., & Cannan, J. (2006, April). Student/Industry project in industrial oriented Undergraduate Degree in Electro-technology. Paper presented at the annual conference of the New Zealand Association for Cooperative Education. Queenstown, New Zealand.
- Qi, Z., & Cannan, J. (2007, June). An industrial oriented and multi-discipline undergraduate degree. Paper presented at the 15th World Conference on Cooperative Education. Singapore.
- Qi, Z., & Cannan, J. (2007a, April). The changing role of the lecturer in industry orientated education. Paper presented at the annual conference of the New Zealand Association for Cooperative Education. Rotorua, New Zealand.

ABOUT THE JOURNAL

The Asia-Pacific Journal of Cooperative education (APJCE) arose from a desire to produce an international forum for discussion of cooperative education issues for practitioners in the Asia-Pacific region and is intended to provide a mechanism for the dissemination of research, best practice and innovation in work-integrated learning. The journal maintains close links to the biennial Asia-Pacific regional conferences conducted by the World Association for Cooperative Education. In recognition of international trends in information technology, APJCE is produced solely in electronic form. Published papers are available as PDF files from the website, and manuscript submission, reviewing and publication is electronically based.

Cooperative education in the journal is taken to be work-based learning in which the time spent in the workplace forms an integrated part of an academic program of study. Essentially, cooperative education is a partnership between education and work, in which enhancement of student learning is a key outcome. More specifically, cooperative education can be described as a strategy of applied learning which is a structured program, developed and supervised either by an educational institution in collaboration with an employer or industry grouping, or by an employer or industry grouping in collaboration with an educational institution. An essential feature is that relevant, productive work is conducted as an integral part of a student's regular program, and the final assessment contains a work-based component. Cooperative education programs are commonly highly structured and possess formal (academic and employer) supervision and assessment. The work is productive, in that the student undertakes meaningful work that has economic value or definable benefit to the employer. The work should have clear linkages with, or add to, the knowledge and skill base of the academic program.

INSTRUCTIONS FOR CONTRIBUTORS

The editorial board welcomes contributions from authors with an interest in cooperative education. Manuscripts should comprise reports of relevant research, or essays that discuss innovative programs, reviews of literature, or other matters of interest to researchers or practitioners. Manuscripts should be written in a formal, scholarly manner and avoid the use of sexist or other terminology that reinforces stereotypes. The excessive use of abbreviations and acronyms should be avoided. All manuscripts are reviewed by two members of the editorial board. APJCE is produced in web-only form and published articles are available as PDF files accessible from the website <http://www.apjce.org>.

Research reports should contain; an introduction that describes relevant literature and sets the context of the inquiry, a description and justification for the methodology employed, a description of the research findings-tabulated as appropriate, a discussion of the importance of the findings including their significance for practitioners, and a conclusion preferably incorporating suggestions for further research. Essays should contain a clear statement of the topic or issue under discussion, reference to, and discussion of, relevant literature, and a discussion of the importance of the topic for other researchers and practitioners. The final manuscript for both research reports and essay articles should include an abstract (word limit 300 words), and a list of keywords, one of which should be the national context for the study.

Manuscripts and cover sheets (available from the website) should be forwarded electronically to the Editor-in-Chief directly from the website. In order to ensure integrity of the review process authors' names should not appear on manuscripts. Manuscripts should include pagination, be double-spaced with ample margins in times new-roman 12-point font and follow the style of the Publication Manual of the American Psychological Association in citations, referencing, tables and figures (see also, <http://www.apa.org/journals/faq.html>). The intended location of figures and diagrams, provided separately as high-quality files (e.g., JPG, TIFF or PICT), should be indicated in the manuscript. Figure and table captions, listed on a separate page at the end of the document, should be clear and concise and be understood without reference to the text.

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