The motivation to study: an analysis of the factors that motivate undergraduate engineering students

The motivation to study: An analysis of the factors that motivate undergraduate engineering students

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The link between motivation and success is well documented; however, there is still room to problematise motivation in regards to the individual and contextual levels. This study looks at motivation in relation to students studying undergraduate engineering courses at a The University of the West Indies, St Augustine and seeks to discover the factors that motivate them to study and the factors that keep them motivated. An online questionnaire was constructed using 19 Likert-type questions and five questions that allowed for open-ended qualitative responses. The findings reveal that participants tended to be motivated by the increased possibility of desired future careers and tended to stay motivated by a combination of goal-orientation and family support. It is recommended that departments, faculties and institutions deliberate on shared and contextually constructed understandings of why students choose to enrol in particular university courses.

Keywords: motivation, engineering students, Caribbean university, intrinsic, extrinsic

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Introduction

Student perception of success in university education is both a subjective and objective construct and is impacted by factors such as values, histories, socio-economics and goals (Williams, 2002; Wohlgemuth, Whalen, Sullivan, Nading, Shelley & Wang, 2007). One of the factors that can influence an individual's ability to achieve (perceived) success is motivation (Liu, Bridgeman & Adler, 2012) which Mangal (2007, p.138) reports 'must be considered a necessary and sufficient condition for learning'. The link between motivation and success is well documented (Harackiewicz, Barron, Tauer, & Elliot, 2002; Dupeyrat & Mariné, 2005; Husman & Lens, 1999; Deci & Ryan, 2000); however, there is still room to problematise motivation in regards to the individual and contextual levels. Deci and Ryan (2000) report that motivation is prompted by a combination of external and internal factors – a perspective that engages with the notion of students' perceptions of success and one that might see motivation to succeed as being simultaneously 'owned' by the student and 'imposed' upon them.

This study looks at motivation in relation to students studying undergraduate engineering courses at a Caribbean university and seeks to discover the factors that lie behind student motivation in this context. Through identifying motivating factors, a better understanding of students' approaches to learning may be discerned and measures can be put in place to facilitate a more satisfactory learning experience. This is not to say that lecturers should be led solely by a concern to satisfy student motivational factors but merely to suggest that having a better understanding of what drives individuals to learn may help practitioners engage with their students at a pragmatic level.

Adams and Blair (2014) report that engineering students in the Caribbean are motivated to learn if they feel inspired by the learning experiences they encounter;

however, learning experiences are both subjectively and objectively orientated. So whilst the locus of the desire to learn may be internal (Lijun, 2011) motivation in engineering students can also be linked to expectancy-related constructs such as future careers (Jones, Paretti, Hein & Knott, 2000). This study seeks to expand the existing research base on student motivation for university study by adopting a context-specific approach within an interpretivist paradigm. The perspectives of students enrolled on an engineering course at a Caribbean university are examined in order to gain the participant viewpoint. The study aimed to discover the factors that motivate students to study. Here, there are two overarching research questions:

1. *What do students report as their motivation for attending university?*
2. *What do students report as affecting their motivation once enrolled?*

Understanding motivation

In the context of education, motivation may be considered as a measure of how willing a student is to participate in their learning (Martin, 2008). Motivation is what drives an individual's effort to stay on task in the face of challenge and their attempt to improve their current status by adopting behaviours that they consider meaningful to their development (Deci & Ryan, 2000). Motivation may come in a number of forms and these forms tend to fall under two umbrella terms: 'intrinsic motivation' and 'extrinsic motivation'. A student who is intrinsically motivated, makes effort because they *own* their learning; their desire to learn is internal, and outcomes are understood at a personal level. On the other hand, a student who is extrinsically motivated, learns in order to achieve a reward (whether it be a teacher's praise or a better job in the future) or to avoid some unpleasant outcome (such as parental disappointment over a failed exam). However this dualistic, either/or depiction

of intrinsic and extrinsic motivation is somewhat over-simplified and it is more likely that students move between the two modes depending on their situation and what they perceive to be their most pressing needs (Savage, Birch & Noussi, 2011).

A large body of literature has demonstrated the role of motivation in shaping an individual's approach to learning and overall performance (Lijun, 2011; Howell & Buro, 2009; Zajacova, Lynch & Espenshade, 2005), suggesting that what motivates us also shapes how we learn. For instance, intrinsically motivated students tend to seek out more challenging tasks and adopt more effortful learning strategies that facilitate deeper comprehension, whereas extrinsically motivated students seek tasks that are less difficult and desire to expend minimal effort for maximum success (Lepper, 1988). The more a student holds, and values, some future goal, and perceives their current efforts as a means of achieving that goal, the greater their motivation and persistence (Husman & Lens, 1999).

Understanding motivation involves examining beliefs regarding the nature of intelligence. Those who believe intelligence is a fixed trait, entity theorists, may view an educational setback as an sign of personal incompetence and may be more likely to give up in the face of failure. However, those who view intelligence as malleable and developed through effort, incremental theorists, may perceive the same setback as indicating an unsuccessful strategy and thus persist, using a different strategy (Teunissen & Bok, 2013). A study of university students in California showed that entity theorists were more likely to experience a decline in self-esteem through their university years, whereas incremental theorists experienced greater self-esteem, and were more likely to feel enthusiastic and determined (Robins & Pals, 2002). The belief that intelligence is a fixed trait is associated with a performance goal orientation where an individual aims to win positive judgements

and avoid negative judgements of their competence. Individuals with this orientation tend to avoid difficult tasks, adopt superficial learning strategies, and give up easily in the face of challenge. Conversely, those that believe intelligence is developed through effort, tend to adopt a mastery (or learning) goal orientation and are likely to expend more effort and adopt deeper learning strategies (Dupeyrat & Mariné, 2005). Students have also been found to adopt more superficial learning strategies when the course load is perceived as too heavy or when the course assessments do not require the genuine comprehension of ideas (Ramsden, 1992; Lizzio, Wilson & Simons, 2002), whereas deeper learning strategies may be correlated with a perceived higher quality of teaching (Watkins, 2009).

Mamaril, Usher, Economy and Kennedy (2013), in determining if motivation affected learning outcomes in engineering service courses, found that there was a positive relationship between engineering self-efficacy and academic achievement. Law, Sandnes, Jian and Huang (2009) investigated the relationships between learning approaches and motivating factors among engineering students and found that extrinsic factors (pulling forces, group pressure, and learning approaches) have a motivating effect but that intrinsic factors (individual attitudes and expectations) have the highest effect. These results indicate that students' motivation can be promoted by providing pulling forces (rewards, achievements, clear goals) and a cooperative group based learning environment to facilitate group pressure. Motivational constructs can be thought of as expectancy-related and value-related. Expectancy-related constructs include self-efficacy and expectancy for success, and value-related constructs include identification with the topic being studied, achievement, and career plans. In examining the relationships among motivation constructs for first-year engineering students, Jones, Paretti and Knott (2010) found that expectancy-related constructs predicted achievement better than value-related constructs.

Archer (1994) argued that the majority of university students show some preference towards mastery or performance orientations and found that those with a mastery orientation tended to take charge of their learning process - seeking feedback from tutors and looking for guidance on how to improve, while those with a performance orientation tended to adopt surface learning strategies – completing tasks but rarely understanding the worth of their learning. An individual's beliefs about intelligence and self-efficacy; their attitude towards success and failure, and their reflection on their previous learning experiences influence their motivation and study strategies, and impact upon resulting academic performance (Richardson, Abraham & Bond, 2012). A number of studies have demonstrated the impact of students' learning experience and context on their study behaviours (Ning & Downing, 2012; Pintrich & Schunk, 2002; Harackiewicz, Barron, Tauer & Elliot, 2002). In particular, the socioeconomic context has considerable bearing on motivation among university students who see education as a means towards better job prospects and, within such a dynamic, the motivation to learn intrinsically may be being undermined (Winn, 2002). This is likely to be heightened in the context of a developing nation (Beckles, Perry & Whiteley, 2002; Schweisfurth, 2011; Blair, 2012) where the governmental drive to develop the economy may promote a perspective that embraces extrinsic success - such that education is seen as a means of achieving financial security.

From this review of the literature it would appear that, when trying to understand motivation there needs to be a problematisation of the balance between push and pull factors and how this balance may be individualised based on constructs such as values, persistence and self-efficacy. Further an individual's approach to learning; socio-economic

status, and level of goal-orientation need to be considered as such factors are likely to have some influence on their motivation.

Methodology

The study aimed to discover the factors that motivate students to study by examining two overarching research questions: *What do students report as their motivation for attending university?* And *what do students report as affecting their motivation once enrolled?* In order to facilitate answering these questions, an online questionnaire was constructed using 19 Likert-type questions and five questions that allowed for open-ended qualitative responses. The participants were undergraduate students enrolled in the Department of Mechanical and Manufacturing Engineering at The University of the West Indies, St Augustine. An initial search of the literature identified a number of key themes and the questions were derived from these themes.

A pilot study allowed the research team to assess the user-friendliness of the tool and also allowed for checks on internal validity through inter-rater verification. After this, a second iteration of the questionnaire was constructed. Undergraduate engineering students were told about the questionnaire and were asked if they would complete it. They were given full disclosure regarding the research; it was made clear that completing the questionnaire was optional; that their choice whether to take part (or not) in no way affected their course grades, and that all data would be anonymised. In the end 58 of the 411 students completed the questionnaire. Since completion was through self-selection and participants were not asked for biographical data, this study does not claim to be

representative. However, as just over 14% of the students in the department completed the survey, this adds some weight to their responses.

In reporting and examining the data, the quantitative questions were grouped under four explanatory headings: Future focus; Motivation to study, Distractions from study, and Facing challenge. These headings were developed through inter-rater analysis of the responses to a pilot of the questionnaire. The questionnaire that the participants completed did not show these groupings as this might have led to some bias. Instead these groupings were applied after the data was collected. There is tension at play in the ordering of any set of research questions (Schuman & Presser, 1996) but the iterative development of the questionnaire meant that the questions were asked in what was hoped to be a meaningful order.

Using Grounded Theory Methodology (GTM), the qualitative data developed in the pilot was examined so as to identify emergent themes. Developing Grounded Theory (Corbin & Strauss, 2014) involves three stages: open coding; axial coding, and selective coding. Open coding involves discovering codes that are derived from the text (emergent codes). During axial coding categories are related to subcategories to help develop a detailed explanation (Corbin & Strauss, 2014), and during selective coding a central concept is drawn from an overview of the various categories until an 'analytic gestalt' allows the theory to emerge. In applying all three stages of GTM, the data was first coded and areas of significance highlighted. Then these highlighted areas were cross-related and key categories were developed. After reflection and scrutiny (selective coding) three key concepts were identified as the factors underpinning student motivation: self-improvement; the learning environment, and workload. These three factors were then used as template codes to elucidate the 'meaning' within the qualitative data of the study.

Data and data analysis

The data here is discussed in two parts. Firstly the quantitative data is examined under the four explanatory headings. Then the qualitative data is analysed under the three template headings developed from the coding procedure.

Quantitative data

Future focus

The participants tended to show that much of their motivation to attend university was goal orientated. Although almost all (56 of 58) participants reported that they tried to do well so as to make their family proud, there was tendency for them to report their studies as a means to an ends – where good grades would lead to employment. The participants reported reasonable high levels of efficacy, with 32 of the 58 participants agreeing or strongly agreeing that they were a good judge of how they performed in exams before the results came out. Nine disagreed or strongly disagreed and 17 gave a neutral response. Table 1 shows the responses to the 'future focus' questions. The responses suggest that the majority of the respondents have their end objective(s) in mind.

Table 1. Responses to future focus related questions

n=58	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
If I get good grades I will do well in my future career	20	25	6	6	1
I try to get the best grades I can on each course in order to keep my GPA high	31	16	9	1	1
What I am learning in my programme is relevant to my future career	18	26	12	1	1

Motivation to study

When it came to motivation, there was an even spread of results: 27 of the 58 participants suggested that they were often or very often motivated to study; 12 were hardly ever or not often motivated and 17 responded that they were only 'sometimes' motived. Table 2 shows the responses to the questions related to the factors that helped students study and the factors that distracted them from their studies. The responses suggest that competition amongst fellow students was not a strong factor in determining drive to do better. However, a large majority of students seem to rely on encouragement from others to work harder: sadly, the participants reported that they did not get such encouragement from the lecturers. There is a slight discrepancy here as Table 1 suggests that the participants had a goal-orientated tendency but Table 2 suggests that participants did not seem particularly intrinsically driven to study. Dupeyrat and Mariné (2005) reported that goal orientation and effort were likely to work in tandem but there is little evidence of that here.

Table 2. Responses to study driver related questions

n=58	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I enjoy competing with other students on tests	8	11	22	9	8
I work harder when I'm encouraged by others	24	24	5	3	2
The lecturers/instructors help me to remain motivated	4	17	19	11	7

It might be inferred from this that there is a need for an increase in the levels of motivation and that students may benefit from both general and specific initiatives that might address this area. It should also be noted that the main reported sources of

motivation for attending university were future income, career goals, competency, and making the family proud. And that the main factors that participants felt contributed to academic success were personal goals, focus, motivation, determination, time/stress management and discipline. Also, support from classmates, friends and family, competent, approachable, and encouraging teachers, religiosity, perseverance, a realistic student work-load were reported as factors that helped establish a firm foundation for self-stimulus.

Distractions from study

Participant responses regarding distractions from study cover two areas: the teaching environment and the social environment. Almost half of the respondents reported that they were sometimes distracted when listening to the teacher. The main reported ways that things could be improved in the classroom in order to help participants be more attentive were more interaction between the lecturers and students; more enthusiastic, motivating, and captivating lecturers; more practice and exam-related questions with solutions; more comfortable classrooms (air conditioning, seating, functioning microphone/speaker system, board visibility); breaks during two and three hour classes; clear linkages between course content and the world of work; greater use of videos; clearer identification of the learning objectives for each session, and less extraneous noise from outside and inside the classroom.

The main factors that participants felt made studying difficult were the lack of a quiet environment in which to study; thinking about financial and personal problems; not understanding the course content; obligations outside of school life; lack of motivation and drive; bad time management; late lectures; time taken for group projects; large volume of work in each course; short attention span; procrastination; low self-esteem; fatigue, and

distracting social media. Only four of the 58 respondents found their studies were often or very often affected by relationship problems. Overall, these results do not seem outside what might be expected and also suggest that, despite these myriad distractions, participants were able to persist in their studies.

Facing challenge

Whilst 45 of the participants agreed or strongly agreed that they liked what they were studying on the engineering programme and 40 agreed or strongly agreed that they were able to work hard to get a good grade even when they didn't like a course, exactly half of the respondents felt that they had certain personal limitations that prevented them from getting good grades. The key reported limitations were poor attention span and memory. Other limitations cited but with less frequency included health issues, bad time management, and perceived lower intellect. These reported limitations cover both internal and external factors – with an emphasis on the internal. Only three of the 58 participants indicated that they often or very often spoke with a lecturer/tutor to find out why they had not done well in an assessment.

These combined factors – an internalisation of the 'reasons' for low grades and unwillingness to seek guidance from academic staff – might suggest that this group of participants are akin to entity theorists and that they might be avoiding 'difficult' conversations with lecturers as they don't feel that they can do much to improve the situation. Law et al. (2009) report that intrinsic factors, such as self-perception, have a large effect on motivation in engineering students and it would seem that the students in this instance have internalised the factors that prevent them from achieving good grades and that this has reduced their motivation to seek guidance. Instead, they may be relying

on their own personal reflections or they may be glossing over their past performance. Either way, without adequate scrutiny of previous errors, a learning opportunity may be being missed.

Twenty-one of the participants agreed or strongly agreed that they could or would rely on their fellow classmates for support in understanding course content and 29 reported that there were specific factors that encourage them to stay motivated on their programme of study. These factors included the personalisation of learning; improvements in course logistics; an increase in classroom interaction, and rewards for good performance. Once again we see a mixture of internal and external factors affecting students' motivation to address challenge, supporting Savage, Birch and Noussi's (2011) contention that motivation in engineering students involves balancing a number of intrinsic and extrinsic factors and that, in an attempt to bring balance, the challenge is 'to stimulate our students' intrinsic motivation by providing them with opportunities for independent, self-developmental learning' (p.45).

Qualitative data

The three key concepts that were drawn from the analysis of the pilot data were applied to the collated qualitative data generated from the 58 participants. In doing so a number of factors emerged. The results arising from thematic coding using these key concepts are discussed in more detail in the following sub-sections.

Self-improvement

There was no clear evidence that students felt motivated by self-improvement per se. There were 15 aspects of data coded as showing that the students felt the furtherance of

their education was their motivation for attending university - with responses such as ‘Education is the gateway to becoming a qualified individual’. However, these intrinsically-fixed perspectives were countered with an approximately equal number of responses that alluded to financial incentives being the motivation - with typical responses such as ‘need to get a job’ and ‘to get a job with a really good pay’. The aforementioned suggest that there are some students who link education to financial gain, but there is the possibility that this extrinsic driver may be changed based on new information that the student receives. The data coded as showing self-improvement as a driver in itself suggests that these particular students had a more fluid idea of intelligence and felt that they could improve themselves through effort. This outlook is aligned with that of incremental theorists and those who hold this position tend to be more resilient; have greater self-esteem, and be more motivated to address challenges (Robins & Pals, 2002).

The second group, those who felt that improvement would come with future careers and future wealth, seemed motivated to learn if they feel that the learning is likely to impact on their future socio-economic status. Such a perspective is common in developing nations where, for many, there is a clear need to train students so that they may take up roles in the workforce. Therefore the drive to improve and become ‘modern’ is linked to the notion of having a good job, a good home and being able to support ones family - although, Blair (2012, p.71) reports that such an approach ‘may fill jobs but may also limit future development through overlooking the benefits of fostering independent thinkers’. In all, the data coded in relation to self-improvement suggests that there is a balance between participant perspectives that regard motivation for self-improvement to be intrinsic and perspectives that see such motivation as extrinsically located.

Learning environment

Data regarding the role of the learning environment in relation to motivation to learn were the most commonly coded. Codings relating to technical difficulties in the classroom and students' desire to have a more interactive learning experience were coded 63 times in total. Typical responses with regard to technical difficulties include 'mic not working, projector not working' and 'some classrooms are not comfortable and have poor acoustics'. With respect to the nature of activity within the learning environment typical responses included a call for 'more interactive class sessions' and 'less talking, more activities, more practicals'. These responses place the source of motivation within the immediate learning environment.

In developing countries there are usually developing facilities, developing technologies and developing pedagogies. Such factors are important to student development (Earthman, 2004; Brooks, 2011; Hattie, 2013) and a poor learning environment might stifle development. This might be one of the reasons that this aspect was so highly coded. So, whilst a student's own socio-economic status may have some bearing on whether they see education as a means of personal growth or as a means of accessing a better life, the socio-economic status of a university is also likely to influence students epistemologically and ontologically. Earthman (2004, p.18) reports that there is 'sufficient research to state without equivocation that the building in which students spends a good deal of their time learning does in fact influence how well they learn' and the high number of codings in relation to the influence of the learning environment on student motivation seems to support this.

Workload

Thirty-four responses were coded as showing the impact of workload on students. The data coded either suggested that participants felt 'the volume of work in each course is sometimes discouraging' and that 'a realistic workload would be conducive to learning' or that participants focussed on the work-life balance and how 'obligations outside school life' impacted upon their studies. Nine aspects of data highlighted the impact of distractions such as social media and four called for the university to offer greater support in helping students manage their studies. In 29 of the 34 aspects of data coded as showing the relevance of workload the participants betray a modality where the locus on control is externalised. Although the students recognised the role of hard work and dedication, they felt that external factors were responsible for their distractions and they felt that remedial action should be taken by the university/department. Ramsden (1992) reported that when students feel their workload is too high they are more likely to engage with surface learning approaches. And Lizzio, Wilson and Simons (2002) found that surface learning approaches generally led to poor learning outcomes and lower levels of course satisfaction.

There is a something of a tradition of surface learning in the Caribbean (Jennings, 2001: Roberts, 2003) where rote learning is still evident in the primary and secondary schools, so, perhaps the inclination of students to embrace this approach is a response with cultural and contextual resonance. When students externalise control and adopt surface learning approaches, they tend to have low levels of motivation (Vansteenkiste, Simons, Lens, Soenens, Matos & Lacante, 2004). In such a scenario, short, medium and long-term incentives lose their power and students might focus more on the task than on the outcomes. In all, the data coded in relation to workload paints a pretty bleak picture

and suggests that whilst students are aware of the effort required of them, they are demotivated by perceived high levels of work.

Discussion

Whilst motivation may be intrinsic and/or extrinsic, Savage, Birch and Noussi (2011) report that students are not likely to favour one form over another but, instead, move between the two forms depending on the context they find themselves in and their perceptions of need. This study found little evidence of such movement nor did it find evidence that the participating undergraduate engineering students were intrinsically motivated. A large majority of students seem to rely on encouragement from others as a means of being motivated - sadly, they also reported that they did not get much encouragement from their lecturers. In all, there was no clear evidence that students felt motivated by self-improvement per se rather that they located motivation externally. Such a result may be contextually positioned by both the course content and the geo-political location of the university. Jones, Paretti, Hein and Knott (2000) suggest that engineering students are typically motivated by external factors such as future careers and future earnings and there is some evidence to support the argument that this was the case in this study. This can be further supplemented by Winn's (2002) position that students studying in areas of low socio-economic activity are more likely to be externally motivated – something that is especially pertinent in developing Caribbean nations (Beckles, Perry & Whiteley, 2002; Blair, 2012). Therefore, when the students report that their motivation for attending university is predominantly goal orientated; this should be understood within certain parameters.

The prospect of proud families and future success (both external goals) were key motivational factors and the students were able to conceptualise how they could attain these outcomes. The main factors that participants reported as contributing to academic success included having personal goals, focus, motivation, determination, time management skills, stress management strategies and self-discipline – all of which involve having an internalised locus of control. Here we find an interesting conundrum: in order for the students to achieve their external goals they recognised that they needed to have internal drive. Mamaril, Usher, Economy and Kennedy (2013) found that there was a positive relationship between self-efficacy in engineering students and academic achievement; therefore, for the students to remain motivated throughout their studies, it is important for them to know themselves; their strengths and their limitations. Such a scenario is fine when students are content with their studies and grades but when they encounter particular issues they may over-react and consider that they are the reason for their own 'failure' rather than consider that there could be improvements in the teaching, materials, resources, topic etc. Despite data regarding the role of the learning environment in relation to students' motivation there is little here to say that such factors carry any real weight – particularly if students have internalised conceptions of their own abilities. There was some evidence of this as half of the participants reported that they had personal limitations that prevented them from getting good grades and these seemed to be a fixed condition that could not be addressed through motivation.

Whilst workload was recognised as an issue, this was also perceived as if it were a fixed commodity and that there was little students could do to address this. Students raised issues with regard to what they felt was an excessive workload but very few of them saw this as a matter for them to deal with personally – even when they recognised that

some of their distractions involved social media and activities that were unrelated to their university studies. Evidence of students' perceptions of the fixed nature of learning and workload can be seen in their comments on the improvement that could be made to enhance their learning. Whilst students reported that they would like to see more interaction between lecturers and students they only offered comments regarding what the lecturer could do to address this and did not offer any comments about how they might help resolve this issue.

There was a mixture of internal and external factors affecting the students' motivation; however internal factors were mainly thought of as ways to achieve students' main external objectives. Since the data suggest that the majority of students showed behaviours akin to entity theorists, any hiccups in their progress towards these outcomes are likely to lead to major setbacks where students may feel that they have let down their family or jeopardised their future. Further, an internalisation of the 'reasons' for low grades and an unwillingness to seek guidance from academic staff may result in the students not arriving at the root causes for low grades – thus entering a rather negative spiral. Conversely, if the students do well they might put this down to natural ability – something that motivation can do little to change. In either case, if motivation to enrol and study at university is mainly built on external factors, then personal success is always precariously positioned.

Conclusion

Individual student motivation is based on constructs such as values, persistence and self-efficacy. Motivation is a core driver in achieving success (Liu, Bridgeman & Adler, 2012) and students' approaches to learning are shaped by the factors (both push and pull) that

motivate them. Therefore, gaining a clearer understanding of what motivates students can help practitioners develop pragmatic support systems. It is noted that a more intrinsically motivated student may adopt more effortful learning strategies with associated persistence. The student who might be labelled as an incremental theorist will persist in the face of a setback. An example of a setback might be a classroom with a poorly working microphone. An incremental theorist may find a solution to this setback by moving towards the front of the class where the lecturer can be heard well. However the results suggest that the majority of students in this study were akin to entity theorists where a particular setback led to a negative spiral of setbacks that resulted in eventual poor performance.

This study found that participants were mainly motivated to attend university by the increased likelihood of future career success. It was also found that this future focus and the encouragement from others, particularly family, helped the participants to stay motivated once enrolled. Since this paper has tried to problematise motivation at the contextual level – within engineering courses and within the Caribbean university – it is important to consider how pragmatic support can be offered to address the concept of student motivation. In attempting to outline how such support might materialise two perspectives need to be considered: the goals of the student and the goals of higher education. Neither of these perspectives is clearly defined but this does not mean that they should not be pondered. The literature suggests that engineering students tend to be focussed on future success and this study supports this position in relation to Caribbean engineering students. The issue that emerges from these findings is whether an engineering department at a Caribbean university should therefore seek to reimagine itself so that it too becomes future focussed – with a stronger employability aspect and clearer links to the world of work. The dilemma here is whether a Caribbean university can do this

in a way that maintains the rigour required of a higher education institution. A second issue emerging from this problematisation is whether, instead, interventions be put in place to try to develop a student population with a greater level of mastery orientation who see learning as intrinsically worthwhile. The answers are probably in the grey areas between.

This study set out to expand the existing research base by examining context-specific aspects of motivation. Practitioners cannot disentangle themselves from their context nor can they separate themselves from the academy at large. Pragmatic support must take sufficient account of contextual factors and be aware of the drivers of student motivation and this should then be balanced against the goals of the individual university and the rigour of higher education. Departments, faculties and institutions are, therefore, encouraged to deliberate on their shared and contextually constructed understanding of why students choose to enrol in particular university departments. Through a greater understanding of course-specific goals and context-specific orientation the academy may be better able to (re)conceptualise the role of the university in relation to student motivation.

References

Adams, R. & Blair, E. (2014). The learner-generated podcast: Engaging postgraduate engineering students in a mathematics-intensive course. *Research in Post-Compulsory Education* 19 (2): 132-146.

Archer, J. (1994). Achievement goals as a measure of motivation in university students. *Contemporary Educational Psychology* 19: 430-446.

Beckles, H., Perry, A.M. & Whiteley, P. (2002). *The brain train: Quality higher education and Caribbean development*. Mona, Jamaica: The University of the West Indies press.

Blair, E. (2012). The relationship between 'employability' and the Scholarship of Teaching and Learning in Caribbean university education. *Caribbean Teaching Scholar 2* (1): 69-75

Brooks, D. C. (2011). Space matters: The impact of formal learning environments on student learning. *British Journal of Educational Technology, 42* (5): 719-726.

Chan, Y.M. (2010). Video instructions as support for beyond classroom learning. *Procedia Social and Behavioral Sciences 9*: 1313-1318.

Corbin, J. & Strauss, A. (2014). *Basics of qualitative research: Techniques and procedures for developing Grounded Theory.* Thousand Oaks, CA: Sage Publications

Deci, E.L. & Ryan, R.M. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry 11*: 227–68

Dupeyrat, C. & C. Mariné (2005). Implicit theories of intelligence, goal orientation, cognitive engagement, and achievement: a test of Dweck's model with returning to school adults. *Contemporary Educational Psychology 30* (1): 43-59.

Earthman, G. I. (2004). *Prioritization of 31 criteria for school building adequacy.* Baltimore, MD: American Civil Liberties Union Foundation of Maryland.

Harackiewicz, J. M., Barron, K. E., Tauer, J. M., & Elliot, A. J. (2002). Predicting success in college: A longitudinal study of achievement goals and ability measures as predictors of interest and performance from freshman year through graduation. *Journal of Educational Psychology* 94, 562–575.

Hattie, J. (2013). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement.* Abingdon: Routledge.

Howell, A. J. & Buro, K. (2009). Implicit beliefs, achievement goals, and procrastination: A meditational analysis. *Learning and Individual Differences 19:*151–154.

Husman, J. & Lens, W. (1999). The role of the future in student motivation. *Educational Psychologist* 34 (2): 113-125.

Jennings, Z. (2001). Teacher education in selected countries in the commonwealth Caribbean: the ideal of policy versus the reality of practice. *Comparative Education 37*, 107–134.

Jones, B. D., Paretti, M.C., Hein, S.F. & Knott, T.W. (2010). An analysis of motivation constructs with first-year engineering students: relationships among expectancies, values, achievement, and career plans. *Journal of Engineering Education 99* (4): 319-336.

Law, K.M.Y., Sandnes, F.E., Jian, H-L. & Huang Y-P. (2009). A comparative study of learning motivation among engineering students in South East Asia and beyond. *International Journal of Engineering Education 25* (1): 144-151.

Lepper, M. R. (1988). Motivational considerations in the study of instruction. *Cognition and Instruction 5* (4): 289-309.

Lijun, Y. (2011). The investigation of learning motivation and strategy in the normal undergraduates. *Cross-cultural communication 7* (3): 126-131.

Liu, O. L., Bridgeman, B., & Adler, R. M. (2012). Measuring learning outcomes in higher education motivation matters. *Educational Researcher 41*(9): 352-362.

Lizzio, A., Wilson, K., & Simons, R. (2002). University students' perceptions of the learning environment and academic outcomes: implications for theory and practice. *Studies in Higher Education 27* (1), 27-52.

Mamaril, N.A., Usher, E.L., Economy, D.R. & Kennedy, M.S. (2013). An examination of students' motivation in engineering service courses. Frontiers in Education Conference. Oklahoma City, OK, IEEE: 1825 – 1827.

Mangal, S. K. (2007). *An introduction to psychology*. New Delhi: Sterling Publishers.

Martin, A. J. (2008). Enhancing student motivation and engagement: The effects of a multidimensional intervention. *Contemporary Educational Psychology 33*: 239–269.

Ning, H.K. & Downing, K. (2012). Influence of student learning experience on academic performance: the mediator and moderator effects of self-regulation and motivation. *British Educational Research Journal 38* (2): 219-237.

Pintrich, P.R. & Schunk, D.H. (2002). *Motivation in education: Theory, research, and applications.* Upper Saddle River NJ: Prentice Hall.

Ramsden, P. (1992). *Learning to teach in higher education*. London: Routledge.

Richardson, M., Abraham, C. & Bond, R. (2012) Psychological correlates of university students' academic performance: a systematic review and meta-analysis. *Psychological Bulletin 138* (2): 353-387.

Roberts, V. (2003). *The shaping of tertiary education in the anglophone Caribbean: Forces, forms and functions*. London: Commonwealth Secretariat, UK.

Robins, R. W. & Pals, J.L. (2002). Self and identity implicit self theories in the academic domain: implications for goal orientation, attributions, affect, and self esteem change. *Self Identity 1*: 313-336

Savage, N., Birch, R. & Noussi, E. (2011). Motivation of engineering students in higher education. *Engineering Education* 6 (2): 39-46.

Schuman, H. & Presser. P. (1996). *Questions and answers in attitude surveys: Experiments in question form, wording and context*. New York: Academic Press.

Teunissen, P. W. & Bok , H.G.J. (2013). Believing is seeing: how people's beliefs influence goals, emotions and behaviour. *Medical Education 47* (11): 1064-1072.

Schweisfurth, M. (2011). Learner-centred education in developing country contexts: From solution to problem? *International Journal of Educational Development 31* (5): 425-432.

Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., Matos, L., & Lacante, M. (2004). Less is sometimes more: Goal content matters. *Journal of Educational Psychology 96* (4), 755-764.

Watkins, D. (2001). Correlates of approaches to learning: a cross-cultural meta-analysis. In R.J. Sternberg & L-F.Zhang (Eds.), *Perspectives on thinking, learning, and cognitive styles.* Mahwah, NJ: Erlbaum Associates.

Williams, T. E. (2002). Challenges in supporting student learning and success through student services. In T. H. Bers & H. D. Calhoun (Eds.), *Next steps for the community college*. San Francisco: Jossey-Bass.

Winn, S. (2002). Student motivation: A socio-economic perspective. *Studies in Higher Education 27* (4): 445-457.

Wohlgemuth, D., Whalen, D., Sullivan, J., Nading, C., Shelley, M., & Wang, Y. (2007). Financial, academic, and environmental influences on the retention and graduation of students. *Journal of College Student Retention: Research, Theory and Practice* 8(4): 457-475.

Zajacova, A., Lynch, S. M., & Espenshade, T. J. (2005). Self-efficacy, stress, and academic success in college. *Research in Higher Education 46*: 677–706.