

Exploring the Relationship between Relatedness, Growth and Existence in Electrical and Electronic Engineering Lab

¹Nur Asfahani Ismail, ²Fatimah Khairiah Abd Hamid, ³Siti Aminah Nordin, ⁴Nor Affida M.Zin, ⁵Zakiah Mohd Yusoff, ⁶Nurul Nadia Mohammad, ⁷Mohamad Taghi Ahmadi, ⁸Zeeshan Ahmad Arfeen, ⁹Abdelrahim A. Sourab

^{1,2,3,4,5,6}Electrical Engineering Studies, College of Engineering, Universiti Teknologi MARA Johor Branch Pasir Gudang Campus, ⁷Urmia University, Azarbijan Province, Urmia City, 11th km of Sero Road, 5756151818, Iran, ⁸Electrical Engineering Department, The Islamia University of Bahawalpur (IUB), Pakistan, ⁹Department of Electrical Engineering, College of Engineering, King Khalid University, Abha Saudi Arabia

Email: asfahani9303@uitm.edu.my, sitia181@uitm.edu.my, affida0253@uitm.edu.my, zakiah9018@uitm.edu.my, nurulnadia@uitm.edu.my, mt.ahmadi@urmia.ac.ir, zeeshan.arfeen@iub.edu.pk, asorab@kku.edu.sa

Corresponding Author Email: fatimahkhairiah@uitm.edu.my

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Abstract

In engineering courses, the connection between relatedness, growth, and existence is an important factor that determines learning motivation, influencing both academic accomplishment and student well-being. Understanding these components is critical for designing educational environments that encourage effective learning. Relatedness highlights the need for humans to communicate, contribute, and form meaningful relationships, which has a substantial impact on motivation and engagement. Growth relates to students' cognitive, social, and emotional development, whereas existence refers to their basic needs and sense of purpose within the educational environment. This study uses a quantitative survey approach to analyse learners' opinions of their usage of learning strategies, as well as the relationship between relatedness, growth, and existence in the context of learning motivation in engineering students. The survey instrument has four sections: demographic profile, relatedness, growth, and existence. A purposive sample of 159 students enrolled in the Diploma of Electrical and Electronic Engineering at UITM Pasir Gudang completed the survey. The survey was distributed over WhatsApp, and responses were recorded. The results show substantial correlations between relatedness, growth, and existence, emphasizing the interdependence of these categories in creating learning motivation. The findings indicate significant relationships between relatedness, growth, and existence, highlighting the interconnectedness of these constructs in shaping learning motivation. The study's

implications suggest that educators should balance intrinsic and extrinsic motivation strategies, enhance self-efficacy, manage burnout, and foster relatedness through collaborative learning and culturally relevant materials to improve student outcomes and well-being. Future study could build on these findings by performing longitudinal studies that look at the long-term impacts of relatedness, growth, and presence on learning motivation. Furthermore, investigating varied educational environments, using qualitative methodologies, and developing focused treatments may provide more insight into how these factors influence student motivation across settings and across time.

Keywords: Relatedness, Motivation, Growth, Existence.

Introduction

Background of Study

The interaction among relatedness, growth, and existence in engineering courses is an important component that determines learning motivation. Gaining a complete understanding of these components serves as the foundation for creating ideal educational environments that effectively promote both academic accomplishment and student well-being. Relatedness refers to the connection that people have with one another, which fosters a sense of belonging and support that is essential for learning. It emphasizes the human urge to communicate, contribute, and build meaningful relationships, which can greatly affect motivation and engagement in the learning process. Meanwhile, growth refers to the cognitive, social, and emotional growth of learners. It comprises the development of information, skills, self-awareness, and the ability to apply learning in new settings. In educational contexts, growth is frequently a fundamental goal, with the concept that education should assist the ongoing expansion of a learner's abilities and understanding. Existence in this context refers to the learners' basic necessities, as well as their feeling of self and purpose in their educational environment. It involves recognizing and addressing these essential requirements in order to establish a basis for learners' academic and personal development. Exploring the relationship between relatedness, growth, and existence is particularly relevant in engineering courses in Malaysia for various reasons. Learning in Electrical and Electronic Engineering Laboratory can help the electrical engineering students to prepare themselves with the need of Fourth Industrial Revolution (4IR) which in line with Ministry of Higher Education Blueprint as illustrated in Figure 1.0. Malaysian engineering programs can enhance relatedness by promoting teamwork and collaboration. Given Malaysia's complex cultural background, relatedness in this context can also imply accepting variety and using it to stimulate innovation in engineering solutions. Encourage students to participate in group projects, organizations, groups, or industry partnerships to assist enhance their interpersonal skills and create networks that are crucial in the professional world (Adnan et al., 2021). Growth in Malaysian engineering courses entails not just teaching students technical abilities, but also promoting critical thinking, creativity, and adaptability. The enthusiasm to embrace Industry 4.0 in Malaysia needs that student be not just proficient in current technologies, but also capable of learning and applying new ones rapidly. STEM education is seen as a cornerstone for achieving Industry 4.0 in Malaysia, emphasizing the necessity for a strong educational foundation that encourages continual personal and professional progress (Hadibarata et al., 2023). Addressing the existential part of Malaysian engineering education may involve developing a sense of purpose and applying one's work to societal demands. Engineering courses can incorporate local environmental and societal concerns into their curriculum, such as sustainability in environmental management. This

allows students to witness the immediate impact of their education and future career on their communities and country, which strengthens their sense of belonging and purpose in the engineering sector (Mahmod et al., 2021).

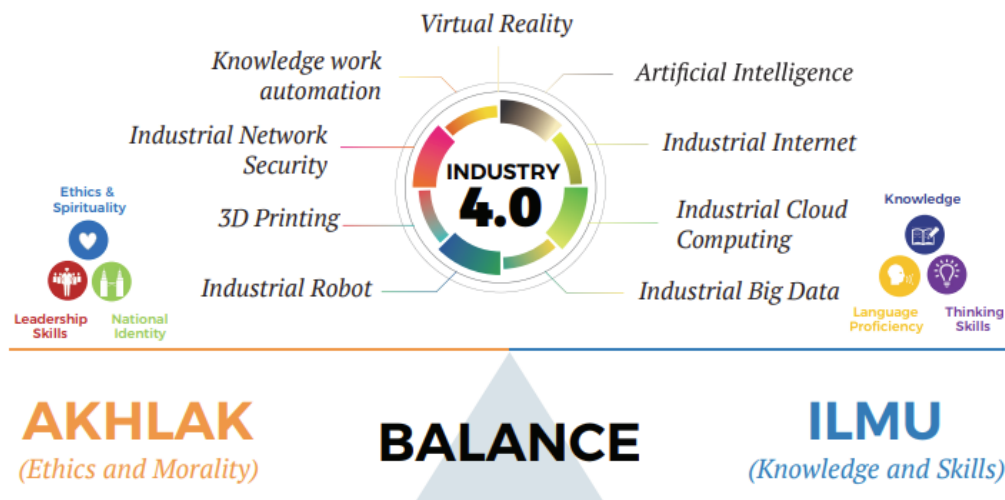


Figure 1.0: Framing Malaysian Higher Education 4.0
(Source: www.jpt.mohe.my)

Statement of Problem

Learning motivation can be understood in the context of Alderfer's ERG theory where human needs are divided into three core areas: existence, relatedness and growth (Alderfer, 1969). Ismail et al (2023), has explored learner's motivation among the postgraduate student in the Faculty of Administrative Science and Policy studies (UiTM) based on Alderfer's Theory. Based on the findings, they discovered that learners feel a sense of existence, growth and relatedness in postgraduate studies. Besides, Harith et al (2022), also has investigated classroom motivations of undergraduate students using similar motivation theory. The study found significant relationships between the dimensions of existence, relatedness, and growth, indicating that these factors are crucial for sustaining classroom motivation. However, inadequate research has been carried out to demonstrate the relationship between existence, relatedness, and growth for learning motivation in an engineering course. Learning motivations and challenges in engineering lab may not similar to the classroom due to the nature of engineering course involved with hand-on session where the assessment majorly assessed based on psychomotor domain. Thus, the result may different, hence, it is essential to explore the relationship between relatedness, growth and existence in electrical and electronic engineering lab in producing student with problem-solving and technical skills to meet demand of Industry 4.0 in Malaysia.

Objective of the Study and Research Questions

This study is done to explore perception of learners on their use of learning strategies. Specifically, this study is performed to answer the following questions;

- How do learners perceive relatedness in learning?
- How do learners perceive growth in learning?
- How do learners perceive existence in learning?
- Is there a relationship between existence, relatedness, and growth?

Literature Review

Motivating factors in Learning

Learning motivation is influenced by a combination of internal and external elements that stimulate involvement, perseverance, and achievement (Alamri et al., 2020; Filgona et al., 2020; Morris et al., 2022). Intrinsic motivation is characterised by internal factors such as curiosity and a sincere interest in the topic, which result in increased involvement and a heightened aspiration for mastery. Conversely, extrinsic motivation is dependent on external incentives Halif et al (2020), such as grades, certificates, or promotions, which can influence behaviour but may not maintain long-term engagement. Optimal learning settings achieve a harmonious equilibrium between intrinsic and extrinsic motivation Morris et al (2022), by establishing a clear sense of relevance and purpose, thereby bridging the gap between learning and practical applications as well as personal aspirations. Additionally, these environments foster autonomy, empowering learners to assume responsibility over their educational trajectory. Collaborative initiatives and peer support in social relationships boost motivation by cultivating a sense of community and offering encouragement. Recognition and a feeling of proficiency additionally enhance motivation, as learners derive confidence from attaining significant achievements and obtaining affirmative feedback. By incorporating these stimulating elements, educators and organisations can develop educational encounters that not only captivate but also stimulate ongoing development and ingenuity.

Causes of Learning Burnout

Learning burnout among university students is a multidimensional problem caused by a variety of reasons. Academic pressure, a lack of social support, and poor time management are all risk factors for burnout. Academic pressure, including high expectations and a severe homework, can cause emotional weariness and cynicism (Xu et al., 2021). Lack of social support, especially in solitary academic settings, can worsen feelings of loneliness, despair, and anxiety (Lovell et al., 2024). Poor time management can lead to procrastination, missed deadlines, and excessive stress, which all contribute to burnout (Smith et al., 2022). Additionally, burnout is influenced by psychological characteristics like as self-efficacy, anxiety, and personality qualities such as neuroticism and extraversion (Pham et al., 2024; Xu et al., 2021). Understanding these elements is critical for establishing effective treatments to promote student well-being and academic success.

Past Studies on Motivating factors in Learning

Previous studies on learning motivational variables have investigated a variety of factors that support student engagement, academic success, and persistence. Scholars have examined both extrinsic and intrinsic factors, recognizing that desire plays a critical role in academic success. The facilities and techniques of instruction, particularly in laboratory courses, have a significant impact on students' willingness to study. Online learning has become a more demanding platform since the COVID-19 pandemic. Accordingly, the research conducted by (Adanır et al., 2024; Diwakar et al., 2023; Edris Kamtor Al Hassan, 2016; Faris and Dwikoranto, 2021) concentrated on the motivation of students when they were enrolled in virtual labs or laboratory courses. The purpose of the study is to determine which motivational factors affect how well virtual laboratories teach tasks and skills in the laboratory. Furthermore, the part that educators play in. Furthermore, the contribution of educators on raising students' motivation for virtual laboratories laboratory experiments is investigated. The research findings indicate that educators have a significant impact on

students' drive to do laboratory experiments using virtual laboratories. Students' performance in the lab is positively impacted by longer virtual laboratory sessions or many repetitions of the experiments. The study in (Mulyani Endang Susilowati et al., 2019) investigates the connection between high school students' learning outcomes, motivation, and laboratory facilities. According to the study's findings, motivation and laboratory amenities have a big impact on how well students learn. To enhance learning results in science education, schools should guarantee student access to well-equipped laboratories and encourage their enthusiasm. The author of Ali et al (2023), investigates how students' learning outcomes are affected by supervised laboratory instruction. Author Ali et al (2023), examines how students' conceptual understanding is affected by supervised laboratory teaching. A mixed-methods study combining quantitative and qualitative methods was carried out to investigate the effects of experimental and control lessons. According to their results, the experimental group significantly understands concepts better and is more motivated to learn about the subject. These studies emphasize how important it is for students' performance and outcomes in a variety of educational contexts to be influenced by elements including motivation, resource accessibility, and instructional styles.

Past Studies on Learning Burnout

Previous study indicates that perceived stress, social support, and personality characteristics significantly effect student burnout. (Pham et al., 2024; Xu et al., 2021). For example, Wang et al. discovered that perceived stress had a favorable effect on burnout and was the best predictor of learning burnout (Wang et al., 2022). Besides, he found that social support had a favorable influence on emotional burnout but a negative effect on low professional efficacy. The finding also shown that poor time management can result in procrastination, missed deadlines, and excessive stress, all of which contribute to burnout. The result also indicates that neuroticism had a beneficial effect on emotional fatigue, whereas extraversion and conscientiousness had a negative impact on low professional efficacy. Furthermore, poor time management can lead to procrastination, resulting in missed deadlines and undue stress. This research implies that resolving learning burnout necessitates a multifaceted approach that involves lowering perceived stress, increasing social support, and cultivating personality qualities like extraversion and conscientiousness.

Many research has thoroughly investigated the relationship between relatedness, growth, and existence in learning motivation (Kamarulzaman et al., 2023; Yusof et al., 2023; Mansour et al., 2021). According to research, these three requirements are interrelated and influence one another in intricate ways. For example, Kamarulzaman et al (2023), examined the relationship between existence, relatedness, and growth in online learning motivation. The researchers aim to investigate how these three elements influence students' motivation to learn online. The study surveyed 93 respondents from the Universiti Teknologi MARA (UiTM) Foundation of Science and Engineering program in Dengkil, Selangor, Malaysia. The researchers used a quantitative survey instrument that comprised four main sections: demographic data, expectancy, value, and social support. The study found a positive relationship between existence, relatedness, and growth with online learning motivation. The findings suggest that students who experience a sense of connection, possess autonomy in their learning, and recognize possibilities for personal development are more likely to be motivated to learn online. The study highlights the importance of understanding the interplay

between existence, relatedness, and growth in online learning motivation. The findings suggest that educators and policymakers should focus on creating a supportive learning environment that fosters students' intrinsic motivation and reduces burnout.

Another study by Yusuf et al (2019), explored the perception of students' motivation, burnout, and reasons for dropout in higher education institutions. The researchers aim to investigate the factors that influence students' motivation and burnout, as well as the reasons why students drop out of their studies. The study surveyed 200 students from three universities in Malaysia. The researchers used a survey instrument to collect data from the students. The survey consisted of questions related to students' motivation, burnout, and reasons for dropout. The study found that students' motivation is influenced by various factors, including academic performance, social support, and personal interests. The researchers also found that burnout is a significant predictor of dropout, and that students who experience burnout are more likely to drop out of their studies. Additionally, the study found that students who are motivated by intrinsic factors (e.g., personal interest, enjoyment) are more likely to persist in their studies. The study highlights the importance of understanding the factors that influence students' motivation and burnout. The findings suggest that educators and policymakers should focus on creating a supportive learning environment that fosters students' intrinsic motivation and reduces burnout. The study also emphasizes the need for early intervention strategies to identify and support students who are at risk of dropping out.

Additionally, research by Mansur et al (2021), has identified the students' intrinsic and extrinsic motivations and its impact on students' engagement and learning outcomes. The study surveyed 67 students from three classes in an online learning environment. The researchers used a survey instrument in the form of a Google Form to collect data from the students. The study found that both intrinsic and extrinsic motivations play a significant role in students' engagement and learning outcomes in online learning environments. The results showed that students are motivated by both internal factors (e.g., personal interest, enjoyment) and external factors (e.g., grades, awards, recognition). The study also found that students who are intrinsically motivated tend to be more engaged and have better learning outcomes compared to those who are extrinsically motivated. The study highlights the importance of understanding the motivations that drive students' engagement and learning outcomes in online learning environments. The findings suggest that instructors should consider both intrinsic and extrinsic motivations when designing online courses and learning activities. Additionally, the study emphasizes the need for instructors to provide opportunities for students to develop their intrinsic motivation, such as through autonomy, self-directed learning, and meaningful learning experiences.

Overall, the literature suggests that understanding the relationship between relatedness, growth, and existence is crucial for developing effective strategies to enhance learning motivation and improve academic outcomes.

Conceptual Framework

The primary objective of the study, as indicated in the conceptual framework in Figure 1 is to investigate the relationship between motivational constructs and the causes of burnout in a learning environment, with Alderfer's ERG theory serving as a fundamental model. One important motivator for any type of learning is the environment (Rahmat et al.,2021). The learning environment will determine whether the learners' need at met for successful learning. According to Alderfer's theory, the learning environment has a significant impact on learners' needs by either promoting or impeding the fulfilment of Existence, Relatedness, and Growth needs (Alderfer's et al.,1969). The needs proposed by Alderfer in 1969 are incorporated into the motivational constructs developed by Pintrich & DeGroot in 1990, and the causes of burnout identified by Campos et al in 2011. A framework was devised by Pintrich and DeGroot (1990) to assess the motivational orientations of students. This framework comprises three components: value (intrinsic and extrinsic objectives, task value); expectancy (self-efficacy and control beliefs); and affective (test anxiety). These motivational elements are associated with the academic performance and self-regulated learning strategies of students. Two primary factors that have been identified by Campos et al (2011), as contributing to student burnout are exhaustion and disengagement. Exhaustion is a state characterised by a sense of being mentally and physically drained and overworked. Meanwhile, disengagement pertains to involvement, enthusiasm, or connection with academic tasks. These elements are presented in Figure 1 below.

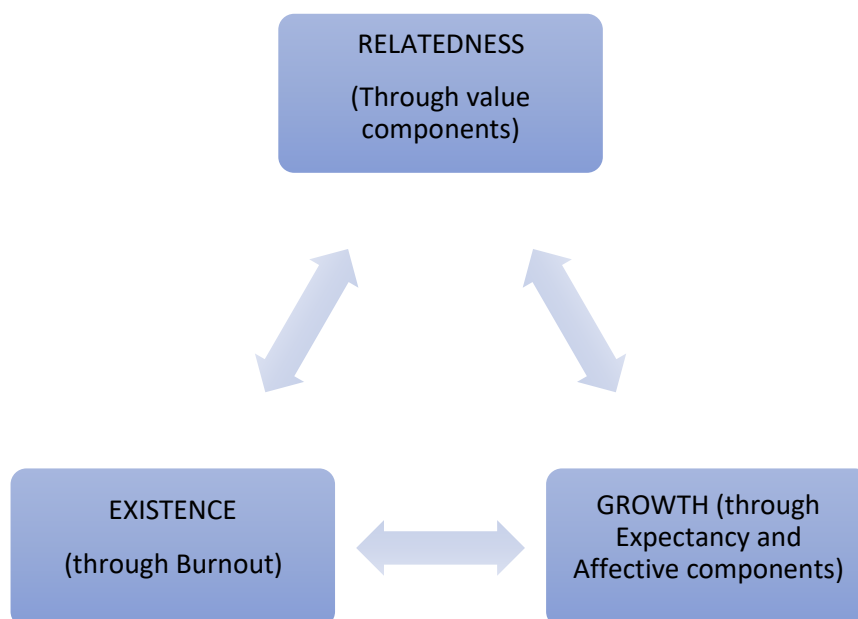


Figure 1- Conceptual Framework of the Study Relationship between Relatedness, Growth and Existence in Learning

Methodology

This quantitative study is done to explore motivation factors for learning among undergraduates. A purposive sample of 159 participants responded to the survey. The instrument used is a 5 Likert-scale survey and is rooted from Alderfer (1969), Pintrich and DeGroot (1990), and Campos et al (2011), to reveal the variables in Table 1 below. The survey has 4 sections. Section A has items on demographic profile. Section B has 12 items on relatedness. Section C has 12 items on growth. Section D has 16 items on existence.

Table 1

Distribution of Items in the Survey

SECT	ERG THEORY (Alderfer, 1969)	CONSTRUCT		VARIABLE	No Of Items	Total Items
B	RELATEDNESS (R)	VALUE COMPONENTS (Pintrich & DeGroot (1990)	(i)	Intrinsic Goal Orientation	4	12
			(ii)	Extrinsic Goal Orientation	3	
			(iii)	Task Value Beliefs	5	
C	GROWTH (G)	EXPECTANCY COMPONENT	(i)	Students' Perception of Self- Efficacy	5	7
			(ii)	Control Beliefs for Learning	2	
		AFFECTIVE COMPONENTS				5
D	EXISTENCE (E)	BURNOUT (Campos, et.al.,2011)		Exhaustion		8
				Disengagement		8
				TOTAL NO OF ITEMS		40

Table 2 shows the reliability of the survey. Data was collected online using Google form. The analysis shows a Cronbach alpha of 0.875 for Relatedness, a Cronbach alpha of 0.881 for Growth, a Cronbach alpha of 0.841 for 16; thus, the average Cronbach alpha revealing a good reliability of the instrument chosen/used. Further analysis using SPSS is done to present findings to answer the research questions for this study.

Table
Reliability of Survey

Parameters	Values			
	Relatedness €	Growth (G)	Existence €	Total (R, G, E)
No of items	12	12	16	40
Cronbach's Alpha	0.875	0.881	0.841	0.929

Findings

Findings for Demographic Profile

This quantitative research was performed on respondents enrolled Diploma of Electrical and Electronic Engineering, at UITM Pasir Gudang and registered for the Electrical-Electronic Engineering Lab. The image depicts Table 2, which exhibits the percentage distribution of students categorised by gender. Based on the data presented in the table, it can be observed that 24% of the students are male, and the remaining 76% are female. The gender distribution indicates that female students are more eager to participate in the survey as compared to male students.

Table 2

Percentage for Gender

	Gender	Percentage
1	Male	24%
2	Female	76%

Table 3 displays the age distribution of the student respondents who took part in the survey. 81% of the respondents belong to the age range of 19-20 years old, which represents the majority. This age range generally refers to students who are in their third year of diploma programme. The subsequent age group comprises those aged 21-22, constituting 7% of the participants which also comes from the third year of diploma programme. In addition, 12% of the participants fall between the age range of 17-18 years, which could indicate that they are the first-year of diploma programme.

Table 3

Percentage for Age Group

	Age group	Percentage
1	17-18 years old	12%
2	19-20 years old	81%
3	21-22 years old	7%

Table 4 provides the percentage distribution of student respondents across two academic disciplines include Electrical Engineering and Electronic Engineering. According to the data, 61% of the respondents are from the Electrical Engineering discipline, forming the majority. Meanwhile, 39% of the respondents belong to the Electronic Engineering discipline. This breakdown of respondents by academic discipline is vital to consider when analysing and interpreting survey findings. Students from various engineering disciplines may have differing viewpoints, experiences, and educational backgrounds, which may influence their responses to survey questions.

Table 4

Percentage for Discipline

	Course	Percentage
1	Electrical Engineering	61%
2	Electronic Engineering	39%

Findings for Relatedness

This section presents data to answer research question 1 – How do learners perceive relatedness in learning? In the context of this study, relatedness is measured by value components. Value components are sub-categorised into (i) intrinsic goal orientation, (ii) extrinsic goal orientation, and (iii) task value beliefs.

Table 6

Mean for (i) INTRINSIC GOAL ORIENTATION (4 items)

Survey Statements based on Intrinsic Goal Orientation	Mean
MSVCQ1 In this program, I prefer class work that is challenging so I can learn new things.	3.8
MSVCQ2 In the courses of a program like this, I prefer course materials that arouse my curiosity, even if they are difficult to learn.	3.8
MSVCQ 3 The most satisfying thing for me in this program is trying to understand the content of the courses	3.9
MSVCQ 4 When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade.	3.8

Table 6 shows the mean for intrinsic goal orientation measured based on 4 statements: (1) Choosing challenging classwork to learn new things, (2) Favouring course materials that arouse curiosity even difficult, (3) Finding satisfaction in trying to deeply understand course content and (4) Choosing assignments for learning over just getting a good grade. The results suggest that the average level of satisfaction in attempting to gain a thorough understanding of course content is 3.9, which is the highest average compared to other claims. Overall, students concurred that intrinsic goal orientation is strongly correlated with these four claims, especially in regards to learning and understanding the material of the course.

Table 7

Mean for (ii) EXTRINSIC GOAL ORIENTATION (3 items)

Survey Statements based on Extrinsic Goal Orientation	Mean
MSEGQ1 Getting a good grade in the classes is the most satisfying thing for me right now.	4.4
MSEGQ 2 The most important thing for me right now is improving my overall grade point average, so my main concern in this program is getting a good grade.	4.4
MSEGQ 3 I want to do well in the classes because it is important to show my ability to my family, friends, or others.	4.3

The three survey statements listed in Table 7 measure students' extrinsic motivations and goals related to academic performance. The relatively high mean at 4.4 indicate most of students also agreed that learners perceive relatedness in learning due to extrinsic goal orientations focused on external factors like grades and GPA. While some students agreed that perception from others contributed to learning motivation with mean is slightly lower at 4.3.

Table 8

Mean for (iii) TASK VALUE BELIEFS (5 items)

Survey Statements based on task value beliefs	Mean
MSTVQ1 I think I will be able to transfer what I learn from one course to other courses in this program.	3.8
MSTVQ2 It is important for me to learn the course materials in the courses.	4.2
MSTVQ3 I think the course material in the courses of this program is useful for me to learn	4.2
MSTVQ4 I like the subject matter of the courses.	4
MSTVQ5 Understanding the subject matter of the courses is very important to me.	4.3

Task value refers to students' perceptions and engagement on learning task or activity provided through the course material. Table 8 shows the mean for task value beliefs measured based on 5 survey statements. The highest mean of 4.3 is for the statement understanding the subject matter of the course. The next highest mean of 4.2 are for the statements highlighted the important to learn the course material and the usefulness of the course material. The statement of the student like the subject matter has a mean of 4.0. The lowest mean of 3.8 is for the statement of student able to transfer the knowledge from one course to another courses. The mean values indicates that the participants highly appreciated the course material, enjoy the subject matter, and looking for potential knowledge transfer.

Findings for Growth

This section presents data to answer research question 2 –How do learners perceive growth in learning? In the context of this study, growth is measured by expectancy and affective components. Expectancy components are sub-categorised into (i) students' perception of self-efficacy, and (iii) control beliefs for learning.

Table 9

Mean for (i) STUDENTS 'PERCEPTION OF SELF-EFFICACY (5 items)

Survey Statements based on students' perception of self-efficacy	Mean
ECSEQ1 I believe I will receive excellent grades in the classes.	3.8
ECSEQ2 I'm confident I can understand the most complex materials presented by the instructors in the courses.	3.5
ECSEQ3 I'm confident I can do an excellent job on the assignments and tests in this program.	3.7
ECSEQ4 I'm certain I can master the skills being taught in the classes.	3.8
ECSEQ5 Considering the difficulty of the courses, the teachers, and my skills, I think I will do well in the classes.	3.8

Self-efficacy is the belief that an individual has in their ability to successfully carry out actions or tasks necessary to accomplish specified goals or desired outcomes. Self-efficacy refers to the belief in one's capacity to effectively influence their own motivation, actions, and surroundings in order to achieve success in a certain circumstance. Table 9 shows the mean for students' perception of self-efficacy measured based on 5 survey statements. The highest mean of 3.8 are for the statements that students believe they will receive excellent grade, master the skills being taught in the classes and can do well based on teacher and their skills. The next highest mean of 3.7 is for the statements that the students can do excellent job on the assignment and tests in the registered course. The minimum means of 3.5 is for the statements that students can understand the most complex material presented by the instructors in the courses. The mean values indicates that the participants agreed that students must have self-efficacy to perceive growth in learning.

Table 10

mean for (ii) CONTROL BELIEFS FOR LEARNING (2 items)

Survey Statements based on Control Beliefs for learning	Mean
ECCBQ1 If I study in appropriate ways, then I will be able to learn the material in the courses of this program	4.2
ECCBQ 2 If I try hard enough, then I will understand the course materials.	4.4

Table 10 shows the mean for control believed for learning measured based on 2 survey statements. The highest mean of 4.4 is for the statement that students need to put an extra effort to understanding the course material. The next highest mean of 4.2 is for the statements highlighted study in appropriate way to learn the course material. The mean values indicates that the participants agreed that students must have control beliefs for learning to perceive growth in learning.

Table 11

Mean for AFFECTIVE COMPONENT -reversing (5 items)

Survey Statements based on affective component	Mean
ACQ1 When I take a test, I think about how poorly I am doing compared with other students.	3.4
ACQ2 When I take a test, I think about items on other parts of the test I can't answer	3.2
ACQ3 When I take tests I think of the consequences of failing.	2.9
ACQ4 I have an uneasy, upset feeling when I take an exam.	3.2
ACQ5 I feel my heart beating fast when I take an exam.	3.2

Table 11 shows the mean for affective component based on 5 survey statements. The highest mean of 3.4 is for the statement that students think they doing bad compared to other students in test. The next highest mean shared by 3 statements such as students tend to think about items that they couldn't answer, upset felling and heart beating fast when taking an exam. The lowest mean of 2.9 is for the statement when they take test, they will think of the consequence of failing such as need to extend the semester to repeat the same subject. These results indicate most of the students always compare their capabilities with others and think negatively about themselves when taking the exam. Only some of student think about

consequence of failing when taking the exam. The results also show that the student have strong affective component and it can help them to perceive growth in learning.

Findings for Existence

This section presents data to answer research question 3 –How do learners perceive existence in learning? In the context of this study, existence is measured by cause of burnout and they are (i) exhaustion and (ii) disengagement.

Table 12

Mean for (i) EXHAUSTION

	Mean
EQ1 There are days when I feel tired before the day begins	3.4
EQ2 After classes, I tend to need more time than in the past in order to relax and feel better	3.7
EQ3 I can tolerate the pressure of my studies very well	3.7
EQ4 During classes, I often feel emotionally drained	2.9
EQ5 After classes, I have enough energy for my leisure activities	3.6
EQ6 After classes, I usually feel energized	3.3
EQ7 After my classes, I usually feel worn out and weary	3.1
EQ8 Usually, I can manage the amount of my work well	3.6

Table 12 shows the mean for exhaustion based on 8 survey statements. The highest mean of 3.7 are for the statement the students need more time to relax after the classes and can tolerate the pressure of their studies very well. The next highest mean shared by 3 statements such as students tend to think about items that they couldn't answer, upset feeling and heart beating fast when taking an exam. The lowest mean of 2.9 is for the statement when they take test, they will think of the consequence of failing such as need to extend the semester to repeat the same subject. These results indicate most of the students always compare their capabilities with others and think negatively about themselves when taking the exam. Only some of student think about consequence of failing when taking the exam. The results also show that the students could handle and tolerate with pressure to perceive growth in learning.

Table 13

Mean for DISENGAGEMENT

	Mean
DQ1I always find new and interesting aspects in my study	3.9
DQ2It happens more and more often that I talk about my studies in a negative way	2.9
DQ3Lately, I tend to think less during classes and attend classes almost mechanically	3.1
DQ4 I find my studies to be positive challenging	3.9
DQ5 Over time, students can become disconnected from this type of routine	3.4
DQ6 This is only thing (studying) that I can imagine myself doing now	3.5
DQ7I feel more and more engaged in my studies	3.7
DQ8 Sometimes I feel sickened by my study tasks	3.1

Table 13 shows the mean for disengagement component based on 8 survey statements. The highest mean of 3.9 is for the statements that students find that the subject is new and interesting aspects in their studies and positive challenging. The next highest mean of 3.7 is for the statement that students feel more and more engaged in their studies. The mean of 3.5 is for the statements that students think studying is the only thing that they can imagine currently. The third lowest mean of 3.4 is the statement that students can become disconnected from learning routine over time. The second lowest mean of 3.1 is shared by 2 statements such as students feel sickened by their study tasks and tend to think less during classes and attend classes almost mechanically. The lowest mean of 2.9 is the statement that students often talk their studies in a negative way. These findings indicate that the majority of students have engaged with the subject matter, even if they sometimes get sickened by the tasks in order to perceive growth in learning.

Findings for Relationship between all factors in learning

This section presents data to answer research question 4 – Is there a relationship between all factors in learning? To determine if there is a significant association in the mean scores between all factors in learning, data is analysed using SPSS for correlations. Results are presented separately in tables 14, 15 and 16 below.

Table 14

Correlation between Relatedness and Growth

		RELATEDNES S	GROWTH
RELATEDNESS	Pearson Correlation	1	.628**
	Sig. (2-tailed)		.000
	N	159	159
GROWTH	Pearson Correlation	.628**	1
	Sig. (2-tailed)	.000	
	N	159	159

** . Correlation is significant at the 0.01 level (2-tailed).

Table 14 shows there is an association between relatedness and growth. Correlation analysis shows that there is a high significant association between relatedness and growth ($r=.628^{**}$) and ($p=.000$). According to Jackson (2015), coefficient is significant at the .05 level and positive correlation is measured on a 0.1 to 1.0 scale. Weak positive correlation would be in the range of 0.1 to 0.3, moderate positive correlation from 0.3 to 0.5, and strong positive correlation from 0.5 to 1.0. This means that there is also a strong positive relationship between relatedness and growth.

Table 15
 Correlation between Growth and Existence

		GROWTH	EXISTENCE
GROWTH	Pearson Correlation	1	.633**
	Sig. (2-tailed)		.000
	N	159	159
EXISTENCE	Pearson Correlation	.633**	1
	Sig. (2-tailed)	.000	
	N	159	159

** . Correlation is significant at the 0.01 level (2-tailed).

Table 15 shows there is an association between growth and existence. Correlation analysis shows that there is a high significant association between growth and existence ($r=.633^{**}$) and ($p=.000$). According to Jackson (2015), coefficient is significant at the .05 level and positive correlation is measured on a 0.1 to 1.0 scale. Weak positive correlation would be in the range of 0.1 to 0.3, moderate positive correlation from 0.3 to 0.5, and strong positive correlation from 0.5 to 1.0. This means that there is also a strong positive relationship between growth and existence.

Table 16
 Correlation between Existence and Relatedness

		EXISTENCE	RELATEDNES S
EXISTENCE	Pearson Correlation	1	.457**
	Sig. (2-tailed)		.000
	N	159	159
RELATEDNESS	Pearson Correlation	.457**	1
	Sig. (2-tailed)	.000	
	N	159	159

** . Correlation is significant at the 0.01 level (2-tailed).

Table 16 shows there is an association between existence and relatedness. Correlation analysis shows that there is a moderate significant association between existence and relatedness ($r=.457^{**}$) and ($p=.000$). According to Jackson (2015), coefficient is significant at the .05 level and positive correlation is measured on a 0.1 to 1.0 scale. Weak positive correlation would be in the range of 0.1 to 0.3, moderate positive correlation from 0.3 to 0.5, and strong positive correlation from 0.5 to 1.0. This means that there is also a moderate positive relationship between existence and relatedness.

Conclusion

Summary of Findings and Discussions

Learners perceive relatedness through intrinsic goal orientation, extrinsic goal orientation, and task value beliefs. The study revealed that students prefer challenging coursework that stimulates curiosity and fosters a deep understanding of the content, reflecting strong intrinsic motivations. Additionally, extrinsic motivations, such as the importance of grades and GPA, were significant for students. Task value beliefs showed that students highly value the relevance, usefulness, and potential for knowledge transfer of their course material. The findings indicate that both intrinsic and extrinsic factors significantly influence students' perception of relatedness in learning. Students are motivated by a combination of internal satisfaction from learning and external validation through grades, which together enhance their engagement and connection to the learning material. These findings align with previous research by Alamri et al (2020), and Filgona et al (2020), who highlighted the importance of balancing intrinsic and extrinsic motivations. Halif et al (2020), also noted that extrinsic factors, such as grades, play a crucial role in motivating students. Morris et al (2022), emphasized that the perceived value of learning tasks significantly enhances motivation, supporting the current study's findings on task value beliefs.

Growth is perceived through self-efficacy, control beliefs, and affective components. Students generally believed in their ability to achieve good grades, master course skills, and perform well academically, though confidence in understanding complex materials was lower. Control beliefs emphasized the importance of effort and appropriate study methods. Affective components showed that students often experienced anxiety and negative thoughts during tests. Learners perceive growth as a multifaceted construct involving self-confidence in their academic abilities, the belief that effort leads to understanding, and managing test-related anxieties. Enhancing self-efficacy and providing strategies to improve control beliefs can foster students' perception of growth. These findings are consistent with Pintrich and DeGroot (1990), who highlighted the significance of self-efficacy in academic performance. Rahmat et al (2021), and Harith et al (2022), also found that self-efficacy is crucial for student motivation and engagement. Morris et al (2022), emphasized the role of autonomy and control beliefs in motivating students, reinforcing the current study's conclusions.

Existence is perceived through the dimensions of exhaustion and disengagement. Students reported feeling tired and emotionally drained but generally managed their workload and tolerated academic pressures well. While some students experienced mechanical attendance and negative feelings, many found their studies interesting and engaging. Students' perception of existence in learning is complex, balancing between managing exhaustion and maintaining engagement. Addressing factors that contribute to burnout, such as providing adequate support and promoting work-life balance, is essential for sustaining students' sense of existence and well-being. The findings are supported by Xu et al (2021), and Lovell et al. (2024), who identified academic pressure and lack of social support as key factors in student burnout. Campos et al (2011), and Wang et al (2022), highlighted the role of exhaustion and disengagement in burnout. Pham et al. (2024) and Smith et al (2022), emphasized the importance of time management and social support in mitigating burnout, consistent with the current study's findings.

The study found significant positive correlations between relatedness and growth, growth and existence, and a moderate positive relationship between existence and relatedness. These findings support Alderfer's ERG theory (1969), which posits that existence, relatedness, and growth needs are interconnected and essential for motivation. Kamarulzaman et al (2023), and Mansur et al (2021), also emphasized the interplay between these factors in motivating students. Rahmat et al (2021), and Ismail et al (2023), highlighted the importance of a supportive learning environment in fostering motivation and reducing burnout, which supported the results of the current research.

This study highlights the critical roles of relatedness, growth, and existence in shaping learning motivation among engineering students. Both intrinsic and extrinsic motivations, along with self-efficacy and control beliefs, are key to students' engagement and success. Managing exhaustion and disengagement is essential for maintaining students' well-being. The interrelatedness of these constructs suggests that a comprehensive approach, addressing all three aspects, can significantly enhance student motivation and learning outcomes. These conclusions are consistent with past studies and theoretical frameworks, suggesting that educators and policymakers should focus on creating supportive, motivating, and balanced learning environments to improve student outcomes and well-being. Future research should continue exploring these dynamics in different educational settings to develop targeted interventions that support student motivation and reduce burnout.

Pedagogical Implications and Suggestions for Future Research

The findings of this study have several pedagogical implications that can enhance student motivation and learning outcomes. Educators should balance intrinsic and extrinsic motivation strategies by designing course materials that stimulate curiosity and provide opportunities for external validation through clear grading criteria and regular feedback. Enhancing self-efficacy is crucial and can be achieved by creating a supportive classroom environment, providing constructive feedback, and offering workshops focused on study skills and stress management. To manage burnout, institutions should promote a healthy work-life balance, offer access to counselling and support services, and encourage peer support programs. Fostering relatedness through collaborative learning and culturally relevant materials can also enhance students' sense of belonging and engagement. Future research should explore the long-term impact of these factors through longitudinal studies, investigate their applicability in diverse educational contexts, and design interventions aimed at enhancing relatedness, growth, and existence. Additionally, studying the impact of technological integration in educational settings using qualitative methodologies and developing focused treatments can provide further insights into effective strategies for motivating students and improving their academic outcomes.

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