

Undergraduate Engagement and Motivation toward Theoretical Disciplines: An Empirical Investigation at Universiti Teknologi Mara Cawangan Terengganu, Kampus Kuala Terengganu

Najdah Binti Abd Aziz, Syahrul Hezrin Bin Mahmud*

Faculty of Business and Management, Universiti Teknologi MARA Cawangan Terengganu
Kampus Kuala Terengganu, Terengganu, Malaysia

*Corresponding Author Email: syahr400@uitm.edu.my

DOI Link: <http://dx.doi.org/10.6007/IJARPED/v15-i4/29226>

Published Online: 20 October 2026

Abstract

Students' interest in theory-based subjects is an important factor that may influence their motivation and engagement in the learning process. However, maintaining students' interest in these subjects can be challenging, particularly among students from Science and Technology streams who may have different learning preferences. This study aims to examine the factors influencing interest in theory-based subjects among Science and Technology stream students at Universiti Teknologi MARA Cawangan Terengganu, Kampus Kuala Terengganu (UiTMCTKKT). Specifically, the study investigates the influence of perceived complexity, pedagogical resources and self-competence on students' interest in theory-based subjects. A quantitative research design was employed, involving 105 students from the Science and Technology stream. Data was analysed using the Statistical Package for the Social Sciences (SPSS) version 30.0. Correlation analysis was conducted to determine the strength and direction between variables, while multiple regression analysis was used to determine how independent variables predict or explain variation in a dependent variable. The findings show that perceived complexity and pedagogical resources do not significantly predict students' interest in theory-based subjects. Meanwhile self-competence shows a significant positive relationship with students' interest in those types of subjects. The findings are expected to provide insights into the factors associated with students' interest in theory-based subjects and contribute to the improvement of teaching and learning practices in higher education. The study may assist educators in developing more engaging teaching approaches, enhancing the perceived relevance of theoretical content, addressing students' learning difficulties, and providing effective learning materials.

Keywords: Interest in Theory-based Subject, Perceived Complexity, Pedagogical Resources, Self-Competence, Science and Technology Stream

Introduction

Students' interest is an important aspect of the teaching and learning process in higher education, as it influences their motivation, classroom engagement, and willingness to acquire new knowledge. Interest in a subject can encourage students to participate actively in learning activities, explore concepts more deeply, and develop a better understanding of the subject matter. Therefore, understanding the factors that influence students' interest is essential for educators seeking to improve the quality of teaching and learning in higher education institutions.

Theory-based subjects play an important role in higher education because they provide students with fundamental concepts, principles, frameworks, and knowledge that support their academic and professional development. However, these subjects may require students to engage in substantial reading, conceptual understanding, critical thinking, and the interpretation of abstract ideas. Students who prefer practical or hands-on learning experiences may find theory-based subjects less engaging, particularly when the connections between theoretical concepts and real-life applications are not clearly established.

Recent research highlights the importance of subject relevance and perceived difficulty in shaping students' interest in academic learning. Lloyd-Lewis et al. (2024), for example, found that undergraduate students perceived research-based psychology subjects as less interesting and valuable than other psychology subjects. Students' explanations included concerns about subject difficulty, the skills required, and the perceived lack of relevance to their future studies and careers. These findings suggest that students' perceptions of difficulty and the practical value of a subject may be important considerations when examining academic interest. However, the findings relate specifically to psychology subjects and should not automatically be generalized to all theory-based subjects.

In addition, pedagogical resources may contribute to students' understanding and interest by providing accessible explanations, relevant examples, and opportunities for independent learning. Well-structured lecture notes, textbooks, digital resources, and supplementary materials can help students clarify difficult concepts and reinforce classroom learning. When learning materials are relevant, comprehensible, and appropriately organized, they may support students in developing greater confidence in understanding theoretical content. Nevertheless, the influence of pedagogical resources may depend on how students use them and how effectively the materials complement classroom instruction.

Despite the importance of theory-based subjects in higher education, students' interest may vary according to their academic background, learning preferences, and perceptions of the subject. This issue is particularly relevant to Science and Technology stream students, who's programmed may place considerable emphasis on technical knowledge and practical applications. Examining their interest in theory-based subjects may provide useful insights into whether teaching methods, perceived relevance, perceived difficulty, and learning materials are associated with their willingness to engage with theoretical content.

Research Objective

- To examine the significant relationship between perceived complexity and students' interest in theory-based subjects

- To examine the significant relationship between pedagogical resources and students' interest in theory-based subjects
- To examine the significant relationship between students' self-competence and students' interest in theory-based subjects
- To determine the most significant predictor of students' interest in theory-based subjects

Research Problem

Globally, education systems such as those in Finland and Singapore have recognized declining or uneven academic performance as a concern and have responded by shifting from purely theoretical instruction toward experiential and learner-centered approaches (Tan & Koh, 2019; Sahlberg, 2021). Similarly, studies in the United States and parts of Europe have documented attempts to improve academic outcomes by integrating real-life teaching approaches with traditional methods (Thomas, 2020). Teachers often face constraints related to limited technological resources, inconsistent internet connectivity, and varying levels of student readiness (Kormos, 2024). Thus, it affects students' engagement during the class session. Reports from the Second Congressional Commission on Education (2023) highlight that many schools continue to rely heavily on theoretical teaching methods, which may contribute to learners' limited mastery of concepts and difficulty in applying knowledge to real-life situations.

Literature Review

Theory-based Subjects

Ayuno and Galache (2026) examined the influence of theory-based and real-life teaching on the academic performance of Senior High School students. The study was conducted in selected senior high schools within the Governor Generoso North District under the supervision of the Department of Education in Davao Oriental, Philippines. A total of 309 respondents from four senior high school, with 103 from each school were chosen in this study. Stratified random sampling was used to ensure proportional and systematic representation. The findings revealed that, though only theoretically based teaching significantly influences academic performance, not real-life-based teaching, their influence is statistically significant, partially supporting the Experiential Learning Theory, which posits that learning is most effective when learners actively engage in concrete experience, reflective observation, and active experimentation.

Nakawala et al. (2025) investigated the relationship between Candidates' performance in theory and practical papers. The study employed both qualitative and quantitative approaches. Examination results of first- & second-year students who sat from 2017 to 2019 were retrieved from UBTEB data base/information system. The findings of this study retrieved that there is a statistically weak positive relationship between candidates' theory and practical examination scores from 2017 to 2019. This simply implies that an improvement in the performance of a student in one paper (theory or practical), is associated with a slight improvement in performance in another paper (practical or theory). This means that the knowledge of one aspect has little effect on the other.

Perceived Complexity

Perceived task complexity is widely regarded as a crucial prior factor influencing the formation of cognitive load within specific task contexts. Thus, Yu & Wang (2026) investigate the impact of perceived task complexity on cognitive load among university students in Jiangxi Province, China. A set questionnaire was distributed among 800 students through online survey. This will reduce the cost of printing and mailing and 735 valid questionnaires meeting the study requirements. The questionnaire validity rate was 91.875%. The finding showed a significant positive correlation with perceived task complexity and the cognitive load. The more complex the task is, the higher the cognitive load is perceived by individuals, and it significantly and positively influences students' achievement.

Ines et al. (2024) examine the effects of task complexity on university students' performance in Germany. 98 graduate and ungraduated university students are respondents in this study and the self-report questionnaire using five-point Likert scale were distributed. The results showed that participants engaging with consistently high complexity tasks demonstrated faster problem-solving than those exposed to gradually increasing complexity conditions. It also highlights that consistently high complexity tasks can improve academic performance among students. Thus, perceived complexity in academic tasks influences study to study smart and puts high effort into their learning.

Pedagogical Resources

Filiz, K. and Sila, A. C. (2026) aims to identify the variables that best predict student outcomes across different teaching modes. In total, 21,063 students (eight countries), 15,004 teachers (10 countries), and 1,581 principals (11 countries) completed questionnaires via online platform. The student data were initially divided by the authors into three groups based on the teaching modes implemented during the pandemic (survey item IT1G03A): online (computer-based), hybrid (computer- and non-computer based), and offline (non-computer based). The study utilized REDS data items from the teacher and student surveys, which were merged using IEA'S International Database Analyzer (IDB) program. The results highlighted the adaptive nature of student learning across different teaching modes, with varying significance of certain factors depending on the mode. While access to learning resources and feedback was essential to all modes, the structure of learning, e.g., teacher collaboration, individualized activities, and curriculum components— differed notably between modes. Recap, these findings highlight the need for adaptive strategies in teaching to enhance student engagement, learning, and attendance towards the subjects.

Paul and James (2024) investigated how effective the pedagogical approaches employed by the teacher towards student learning engagement in science course. In this study, pedagogical approaches encompass a variety of teaching methods and strategies that educators utilize to facilitate learning, significantly influencing students' motivation and interest in science. Students from three specific programs: Bachelor of Science in Education (BSE) majoring in Science, Bachelor of Science in Environmental Sciences, and Bachelor of Science in Biology were chosen as respondents and Pearson's correlation coefficient was utilized in analyzing the data. The results show strong positive correlation between pedagogical approaches and student engagement. When teachers utilize diverse and engaging instructional methods, students are more likely to participate actively, develop emotional connections to the subject matter, and engage in deeper cognitive processes. This

underscores the importance of effective teaching practices in enhancing student learning outcomes in science education.

Self-Competence

Lukackova and Subokova (2026) investigated the effects of critical thinking skills and dispositions on academic success, focusing on academic locus of control, self-competence, and intrinsic motivation as sequential mediating mechanisms. The sample consisted of 263 university students aged 18–28 years. Data was collected between September and October 2025, using an online platform using convenience sampling. The findings show self-competence significantly influences academic satisfaction. The more students believe in their control and competence in the academic environment, the more positively they perceive themselves in the present and future. Higher internal control and self-competence may promote a more interactive study environment, increase learning engagement, and facilitate adaptation to higher education.

Jiayin (2025) conducts a comprehensive analysis of how self-competence affects educational achievement. Self-reporting scales are the most common tool used for assessing self-competence. Besides, the interview method is also used to get information by asking questions in a well-designed way. Specifically, it involves using a planned or rather casual form of communication to delve deeply into an individual's perception and understanding of their own abilities. This research approach can gather more detailed and specific first-hand information. From this study, it is found that self-competence has a significant impact on students' learning motivation, learning strategy choice, learning engagement, and academic performance, because students with strong learning motivation often have higher self-competence. They can use more effective learning strategies and devote more effort to learning, resulting in better academic performance.

Conceptual Framework

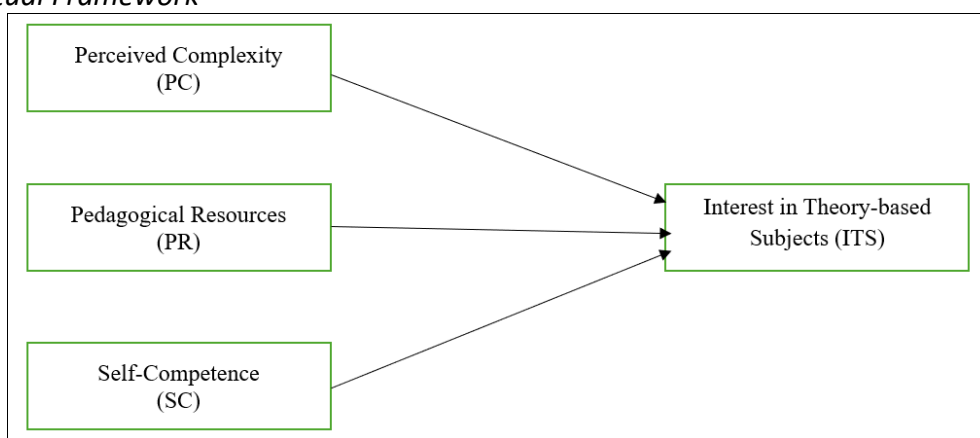


Figure 1 Conceptual Framework

Hypotheses Development

H1: There is a positive relationship between perceived complexity (PC) with students' interest in theory-based subjects (ITS)

H2: There is a positive relationship between pedagogical resources (PR) with students' interest in theory-based subjects (ITS)

H3: There is a positive relationship between self-competence (SC) with students' interest in theory-based subjects (ITS)

Methodology

Sample and Sample size

This study was conducted in Universiti Teknologi MARA Cawangan Terengganu, Kampus Kuala Terengganu (UiTMCTKKT). 105 students of science and technology from two faculty: Bachelor of Computer Science (Hons) Mobile Computing (CDCS/CS270); Bachelor of Information System (Hons) Business Computing (CDCS/CS264) were involved in this study using purposive sampling. Edmonds and Kennedy (2017) stated that purposive sampling is suitable used in selecting participants who meet specific, predefined criteria directly related to the research objectives. Thus, the respondents of this study are students who have studied theory-based subjects.

Data Collection

5 Likert Scale questionnaires were used in collecting through online platforms. Böckenholt (2017) suggested that a measuring scale with five or more items would produce more accurate results than one with fewer elements. The data then were analyzed using statistical analytic techniques; SPSS version 30 to test correlation and multiple regression of variables.

Results and Discussion

Mean and Instrument Development

This study also used descriptive statistics analysis to identify the value of each construct through the central tendency by using the mean scores. The researcher adapted the measurements developed by Pallant (2007) and by following his suggestion and using a 5-point Likert-type scale, it was grouped the values into three categories: low, middle, and high, the ranges for which were 1.00 - 2.33, 2.34 – 3.66 and 3.67 – 5.00, respectively.

Table 1

Mean Scores

Dimension	Item	Mean	Interpretation
ITS (Interest in Theory-based Subjects)	6	4.27	High
PC (Perceived Complexity)	5	3.84	High
PR (Pedagogical Resources)	6	4.14	High
SC (Self-Competence)	6	4.10	High

Table 1 presents the mean scores for the four dimensions examined in this study. Overall, all dimensions recorded high mean scores, ranging from 3.84 to 4.27. Interest in theory-based subjects has the highest mean score (4.27), indicating that respondents generally demonstrated a high level of interest in theory-based subjects. Perceive complexity recorded the lowest mean score (3.84); however, it remained within the high category, indicating that students generally perceive theory-based subjects as relatively complex.

Table 2

Descriptive Analysis

No	Profile	Description	Response	Percent
1	Gender	Male	43	40.9
		Female	62	59.1
2	Programme	CDCS/CS270	44	41.9
		CDCS/CS264	61	58.1

The respondents of this study were undergraduate students from two programmes as shown in Table 2. 59.1 percent was predominantly female, and the rest 40.9 percent were male. Among of them 41.9 percent were CDCS/CS270 programmes 58.1 percent were CDCS/CS264 programme. Both programmes were compulsory to study the theory-based subject such as Management.

Table 3

Correlations among Variables

	IM	PC	PR	SC
Interest in Theory-based Subjects (ITS)	1.000	.136	.109	.745**
Perceived Complexity (PC)	.136	1.000	.766**	.090
Pedagogical Resources (PR)	.109	.766**	1.000	.057
Self-Competence (SC)	.745**	.090	.057	1.000

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

Correlation measured using a coefficient r , ranging from -1 to +1. Table 3 shows the relationship between independent variables (Perceived Complexity, Pedagogical Resources, Self-competence) and dependent variables (Interest in Theory-based Subject). Based on the table above, the relationship between independent variables (Perceived Complexity ($r = 0.766$), Pedagogical Resources ($r = 0.766$) and Self-competence ($r = 0.745$)) shows a strong positive relationship with the dependent variable (Interest in Theory-based Subject) respectively. All relationships were significant with a p-value of 0.01 significance level.

Table 4

R-Square Value

Summary	Anova		
R	R ²	F	sig
.748 ^a	0.560	42.829	0.001

Dependent Variable: Interest in Theory-based Subjects

Regression Analysis or Multiple Linear Regression Analysis is used to develop a model in predicting the factor for interest in Theory-based Subjects that involves three variables namely as Perceived Complexity, Pedagogical Resources, and Self-Competence among science technology-based students. The results show that the R^2 is 0.560, indicating that 56.0 percent of the changes in the dependent variable can be explained by the independent variables. The remaining 0.44 or 44.0 percent can be explained by other unknown variables or factors.

Table 5

Regression Analysis

		Standardized Coefficients			
Model		Std. Error	Beta	t	Sig.
1	(Constant)	.327		4.200	<.001
	Mean_PC	.073	.045	.434	.665
	Mean_PR	.088	.033	.319	.750
	Mean_SC	.059	.739	11.145	<.001

Table 5 shows the beta (B) value, represents the unique contribution of each predictor variable while controlling for other variables. It ranges from 0 to 1 or 0 to -1. The closer the value is to 1 or -1, the stronger the relationship. The table shows that there was not statistically significant positive relationship between Perceived Complexity and the Interest in Theory-based Subjects because their p-values were 0.665 at a 0.01 significance level. Therefore, H1 is rejected. Therefore, Perceived Complexity does not significantly predict students' interest in theory-based subjects. One possible explanation is that students may remain interested in a subject even when they find difficult, particularly if they are motivated or confident in their ability to learn. This result is in line with Yu & Wang (2026) showed a significant positive correlation with perceived task complexity and the cognitive load. The more complex the task is, the higher the cognitive load is perceived by individuals, and it significantly and positively influences students' achievement.

In addition, Pedagogical Resources shows that there was not statistically significant positive relationship with Interest in Theory-based Subjects where the p-value was 0.750, greater than the 0.01 significance level. Accordingly, H2 is rejected. This does not necessarily mean pedagogical resources are unimportant. Students may rely on lecturer's explanations, classroom discussions, digital resources, or independent study strategies rather than the materials alone. This result is opposed with Paul and James (2024), which it shows strong positive correlation between pedagogical approaches and student engagement. When teachers utilize diverse and engaging instructional methods, students are more likely to participate actively, develop emotional connections to the subject matter, and engage in deeper cognitive processes

Meanwhile Self-competence shows a significant positive relationship with students' interest where the p-value was 0.001 at a 0.01 significance level. In other words, when self-competence increases, students' interest tends to increase, assuming the other variables remain constant. Thus, H3 is supported. This suggests that students who feel more confident in their ability to understand theoretical concepts tend to report greater interest in the subjects. The findings show self-competence significantly influences academic satisfaction. This is in line with Lukackova and Subokova (2026), the more students believe in their control and competence in the academic environment, the more positively they perceive themselves in the present and future.

Recap, Self-competence ($b = 0.739$) be the most factor influence science and technology stream students' interest to theory-based subjects at UiTMKKT. This suggests that students who have greater competence in their ability to understand and learn theoretical concepts tend to demonstrate higher levels of interest in these subjects.

Table 6

Summary of Hypotheses

Research Objectives	Hypothesis Statement/ Research Question	Decision
RO1: To examine the significant relationship between perceived complexity and students' interest in theory-based subjects	H1 - There is a positive relationship between perceived complexity (PC) with students' interest in theory-based subjects (ITS)	Not Supported
RO2: To examine the significant relationship between pedagogical resources and students' interest in theory-based subjects	H2 There is a positive relationship between pedagogical resources (PR) with students' interest in theory-based subjects (ITS)	Not Supported
RO3: To examine the significant relationship between students' self-competence and students' interest in theory-based subjects	H3 - There is a positive relationship between self-competence (SC) with students' interest in theory-based subjects (ITS)	Supported
RO4: To determine the most significant predictor of students' interest in theory-based subjects	What is the most significant predictor of students' interest in theory-based subjects?	Self-competence

Conclusion and Recommendation

This study examined the factors influencing interest in theory-based subjects among Science and Technology stream students at UiTMCTKKT. Based on mean score, although perceived complexity recorded a relatively high (3.84), indicating that students generally perceived theory-based subjects as complex, the regression analysis revealed that perceived complexity did not significantly predict students' interest in theory-based subjects ($p=0.665$). This suggests that although students perceived the subjects as relatively complex, such perceptions did not significantly explain differences in their level of interest when other variables in the model were controlled. This is an interesting finding rather than a problem. Students can think the subjects are difficult but still be interested in them. The most important is their high competency in studying these subjects and it proved with Beta (0.739) values which self-competence is the most significant predictor of students, interest in theory-based subjects. Thus, it is recommended that future study should involve students from different academic programmes and other higher learning institutions to determine whether the findings can be generalized to a wider population. Besides, additional variables such as teaching effectiveness, intrinsic motivation, prior academic achievement and other related teaching and learning should be studied.

Contribution of the Study

This study contributes to theory by identifying the relationships between perceived complexity, pedagogical resources and self-competence with students' interest in theory-based subjects. The results show that self-competence is strong predictor of students' interest in theory-based subjects. Thus, educators may consider strategies that support

students' confidence, such as providing clear explanations, constructive feedback, opportunities for classroom participation, and activities that allow students to apply theoretical concepts. These may assist educators in developing more engaging teaching approaches, enhancing the perceived relevance of theoretical content, addressing students' learning difficulties, and providing effective learning materials. Besides, this study provides useful evidence for policy makers and academic administrators in developing policies and initiatives aimed at improving students' engagement with theory-based subjects. They may use these findings to encourage the development of student-centered teaching practices, academic support programmes, mentoring initiatives and curriculum guidelines that encourage lecturers to connect theoretical concepts with practical and real-life applications.

Limitation of the Study

The study was conducted at a single campus of Universiti Teknologi MARA (UiTM) Kuala Terengganu and involved students from only two academic programmes. Therefore, it may not fully represent the interest in theory-based subjects among students from other programmes, campuses, or higher education institutions. Besides, the study focused on three independent variables: perceived complexity, pedagogical resources, and students' self-competence, it may not capture all the factors that influence students' interest in theory-based subjects.

References

- Ayuno, B.J.S., & Galache, A.S. (2026). Theoretical-based and real-life teaching approaches as determinants of academic performance of senior high school students. *European Journal of Arts, Humanities and Social Sciences*, 3(4), 26-32.
- Böckenholt, U. (2017). Measuring response styles in Likert items. *Psychological methods*, 22(1), 69-83.
- Edmonds, W., & Kennedy, T. (2017). *An applied guide to research designs* (2nd ed.). Sage.
- Filiz, K. and Sila, A. C. (2026). Investigating student engagement, learning, and attendance during the COVID-19 disruption: A machine learning analysis of online, hybrid, and offline learning modes. *Large-scale Assessments in Education*, 14:16, pp. 2 -28.
- Ines, Z. A, Joerg, Z. A, Judith, S. (2024). Complexity affects performance, cognitive load, and awareness. *Learning and Instruction*, 94 (2024).
- Jiayin, H. (2025). Research on the role of self-efficacy in educational achievement. *Journal of Education, Humanities and Social Sciences*, Volume 59, pp. 110 – 117.
- Krause, A. E. (2024). Against all odds: Students' interest in, and perceived value of research and non-researched psychology subjects. *Psychology Learning & Teaching*, 23(1), 65–89.
- Lloyd-Lewis, B. L., Miller, D. J., & Krause, A. E. (2024). Against all odds: Students' interest in, and perceived value of, research and non-research psychology subjects. *Psychology Learning & Teaching*, 23(1), 65-89.
- Lukackova, E. and Sebkova, G. (2026). Enhancing academic success in higher education: The predictive role of critical thinking through sequential mediation of academic control, self efficacy, and intrinsic motivation. *Front. Psychol.*
- Nakawala, L., Muwumba, A. M., Ogwang, S. P., Nahamya, W. K., Oyesigye, O. (2025). Correlational analysis between students' performance in theory and practical summative examinations. *International Journal of Vocational Education and Training Research*, 11(1), 7-20.

- Pallant, J. (2007). SPSS survival manual—A step by step guide to data analysis using SPSS for windows (3rd ed.). Maidenhead: Open University Press.
- Paul, E. G. P. and James, L. P. (2024). Pedagogical approaches on students learning engagement in science. *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 6, pp. 197-201, 2024.
- Sahlberg, P. (2021). Finnish educational reforms and the transition toward experiential learning. *European Journal of Education*, 56(1), 12–25.
- Second Congressional Commission on Education (EDCOM II). (2023, October). *Learning crisis in Philippine education: An overview* (Policy Note No. 2023-17).
- Tan, S. Y., & Soo, S. H. J. (2019). Service-learning and the development of student teachers in Singapore. *Asia Pacific Journal of Education*, 40(2), 263–276.
- Thomas, T. G. (2020). Place-based inquiry in a university course abroad: Lessons about education for sustainability in the urban outdoors. *International Journal of Sustainability in Higher Education*, 21(5), 89–910.
- Yu, X., Zhao, Z., & Wang, H.-P. (2026). Cognitive load management as influenced by perceived task complexity among university students in Jiangxi province, China. *Veredas Do Direito*, 23(5).
- International Journal of Academic Research in Progressive Education and Development (IJARPED)