
Students' Experience in Modular Learning and Motivation to Achieve Academically: The Mediating Effect of Pedagogical Content Knowledge of Teachers

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ABSTRACT: This study investigated the mediating role of perceived pedagogical content knowledge of teachers on the relationship between students' experiences in modular learning and their motivation to succeed academically. The study was conducted using a quantitative study design with 300 junior and senior high school students selected using stratified sampling technique in the Island Garden City of Samal. Data was gathered using three sets of modified standardized survey questionnaires. Tests on the content validity and reliability of these instruments were conducted. The Mean, Pearson r Correlation Coefficient, and Path Analysis were used to analyze the data. The findings demonstrated high levels of motivation to achieve academically, very high level of pedagogical content knowledge, and high level of modular learning experience. The association between students' experience in modular learning and motivation to achieve academically, motivation to achieve academically and pedagogical content knowledge and students' experience in modular learning and pedagogical content knowledge were all statistically significant. Additionally, the current study demonstrated a partial mediation of pedagogical content knowledge on the relationship between students' experience in modular learning and motivation to achieve academically.

KEYWORDS: education, pedagogical content knowledge content, modular learning of students, academic motivation, Mediation, Philippines

1. INTRODUCTION

The nature of motivation, especially academics, is said to be a huge issue. According to Steinmayr, Weidinger, and Schwinger (2023), procedural motivation relates to expectations for one's capability in specific subjects and the resultant performance. If students are unsure of themselves in some aspect, this eliminates the drive to excel academically and lack appreciation of how intrinsic motivation and extrinsic motivation influence learner's performance. From the extrinsic motivation, which encompasses both the tangible reward and perceived competence, the tangible motivation to learn more deeply has been provided. However, many students need help to establish the link between what they are learning in the classroom and the world they live in, saying that they get bored, leading to losing interest in whatever they are doing (Smith & Johnson, 2024). Conversely, extrinsic motivation, which includes the setting up of external stimuli to include grades and praising, might make the students work harder only with the view of wanting to be awarded what has been set aside for the purpose without building up the proper morale of learning as aptly pointed by Brown and Lee (2024).

Academic motivation as a factor for academic achievement has been a focus of many research studies. According to Johansen, Sather, and Jorgensen (2024), students who demonstrate self-motivation have higher and more positive attitudes toward their performances. Incorporation of motivational factors in education systems can benefit not only the academic performances of the learners but also their valuable life performance in their future lives (Meng & Hu, 2022). Consequently, educational practitioners and policymakers are called upon to facilitate both types of motivation to improve students' achievement.

The relationship between prior experience in the context of modular learning and teacher knowledge referred to as Pedagogical Content Knowledge (PCK) is a major theme in recent educational research. From Cao, Chen, and Liu (2024) study, modular learning which enables different learning styles and sequences improves the teachers' pedagogical content knowledge because teachers have to select various teaching approaches according to the learners' needs and progress. It promotes the component interface of content knowledge and teaching practices, thereby improving teacher effectiveness through instruction more closely aligned with preferred student learning styles. These are proven ways teachers gain experience using modular learning frameworks to help them teach students while having better control of classroom processes. It is through such alignment of

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experience and PCK that student achievement is enhanced, and, at the same time, educators are provided with the knowledge to foster the improvement of their teaching practice continuously (Sulla & Rollo, 2024).

2. METHOD

2.1 Research Respondents

The study was conducted in the Samal District's secondary schools in the Island Garden City of Samal. The area has 2,086 secondary students, and a sample of 300 junior and senior high school students participated in the research. The respondents included 48 male and 59 female junior high school students and 102 male and 91 female senior high school students, all aged between 18 and 20.

A stratified random sampling design was used to determine the respondents. The researcher wanted to know the effect of pedagogical content knowledge on the relationship between experience in modular learning and academic motivation to achieve academically. This is the best-fit sampling to ensure the characteristics or attributes that might influence the mediating effects (Nguyen et al., 2021). The number of individuals chosen complied with the standard analysis sample size recommendation of 300–499, as Tabacknick and Fidell (1996) and Comney and Lee (1992) suggested. Therefore, the 300-person sample size for this study would be sufficient for analysis.

The study focused only on the abovementioned respondents, who were junior and senior high school students enrolled in public schools; thus, the exclusion of teachers, students from private schools, and substitute public teachers was observed. Moreover, respondents who withdrew their participation were not penalized, and their choices and decisions were respected.

2.2 Materials and Instrument

Survey questionnaires were employed to gather the data for the study. The questionnaires comprised three (3) parts: students' experience with modular learning (teaching, assessment and learning, feedback on your tutor and the module overall), and the instrument is adapted from the learning and teaching innovation portfolio of the Open University in the United Kingdom. Part 2 contained the statements from the instrument on motivation to achieve academically (striving for excellence, desire to learn, and personal incentives) adapted from Njiru (2003). Lastly, it contained the statements about teachers' pedagogical content knowledge adapted from Halim, Meerah, Zakaria, Abdullah, and Tambychik (2012).

The responses on experience in modular learning, academic motivation to achieve academically, and pedagogical content knowledge were analyzed using the scale based on the range of mean with its descriptive level and interpretation. The very high descriptive level with the range of mean 4.20-5.00 which means measures of experience in modular learning, academic motivation to achieve academically, and pedagogical content knowledge are always manifested or always evident, high descriptive level with a range of mean 3.40 – 4.29 which means measures on experience in modular learning, academic motivation to achieve academically, and pedagogical content knowledge are oftentimes manifested/evident, moderate descriptive level with a range of mean of 2.60-3.39 which means measures on experience in modular learning, academic motivation to achieve academically, and pedagogical content knowledge are sometimes manifested/evident, low descriptive level with a range of mean 1.80 – 2.59 which means measures on experience in modular learning, academic motivation to achieve academically, and pedagogical content knowledge are seldom manifested/evident, and very low descriptive level with a range of mean 1.00 – 1.79 which means measures on experience in modular learning, academic motivation to achieve academically, and pedagogical content knowledge are almost never manifested/evident.

The pre-testing process involved conducting a pilot test, which yielded a Cronbach's alpha of 0.84, indicating that the items in the instrument are reliable. A panel of experts also reviewed the draft instruments to assess their face and content validity. This evaluation resulted in an overall mean score of 4.3, which is very good.

2.3 Design and Procedure

The research uses a non-experimental quantitative research design to observe and describe phenomena without manipulating variables. It does not include intervention or control groups but focuses on measuring variables as they naturally occur. The primary aim is to establish relationships or correlations between variables rather than determining causal relationships (Jones, 2023). The research design was utilized in this study because it deals with the significant relationship between students experience in modular learning and motivation to achieve academically with the mediating effect of pedagogical content knowledge of teachers as the mediating variable that is measured of how students view the effectiveness of using the materials that can help teachers in achieving its learning objectives.

The study also employed a mediation approach. Mediation analysis (path analysis) within the non-experimental approach is a test that assesses whether a mediation effect is significant. Accordingly, it provides insight into the mechanism or pathway through which the independent variable influences the outcome. In this case, the independent variable affects the mediator, which involves the dependent variable, helping researchers understand indirect effects in relationships (Smith, 2023). The mediator provides a mechanism that clarifies how or why the independent variable influences the dependent variable. In a mediation model, the

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independent variable affects the mediator, which impacts the dependent variable, illustrating an indirect relationship (Johnson, 2022). Particularly, in this study, the researcher examined the relationship between students' experience of modular learning and motivation to achieve academically the mediating effect of teachers' pedagogical content knowledge.

Following the receipt of the certificate of approval, the researcher requested an endorsement from the Dean of the Professional Schools at the University of Mindanao, Davao City. The permission letter was also delivered to the IGACOS Schools Division Superintendent and was accompanied by a letter of endorsement from the university's Dean. Following approval from the Schools Division Superintendent, another permission letter with an attached approval letter from the Superintendent was sent to Samal Island's school heads. The researcher personally appeared at each school, handing in the letter requesting permission from the principal to conduct the study. After the approval, the researcher distributed and retrieved 300 survey questionnaires from September 2023 to October 2023. Lastly, after retrieving all survey questionnaires, the data underwent the statistical treatments identified in this study: Mean, Standard Deviation, Pearson Product Correlation, and Cronbach Alpha. After that, the data obtained was tallied, tabulated, and submitted to the statistician for analysis.

This section outlines the statistical tools utilized to achieve the study's objectives. Mean and standard deviation were applied to characterize students' reflective thinking skills, attitudes toward problem-solving, and mathematical resilience. Pearson Product-Moment Correlation was employed to identify significant associations between reflective thinking skills, problem-solving attitudes, and mathematical resilience to assess the relationships among these variables. Finally, the Sobel Z-test and Path Analysis were conducted to determine whether pedagogical content knowledge significantly mediates the relationship between students' experience in modular learning and their academic motivation to achieve academically.

Moreover, the researcher followed all ethical standards in the study by adhering to the protocol assessments and standard criteria established by the University of Mindanao Ethics Review Committee (UMERC) with certification number UMERC-2023-350. Throughout the study, participants were allowed to contribute willingly and at no cost. Furthermore, by the Data Privacy Act of 2012, the researcher ensured that the respondents' private information remained confidential. The researcher additionally confirmed that the information obtained from the survey questions was accurate. Overall, before, during, and after the study, the researcher followed all UMERC-established ethical guidelines.

3. RESULTS AND DISCUSSION

3.1 Students' Experience in Modular Learning

Table 1 below demonstrates the level of students' experience in modular learning. Averagely, the general average mean of the overall general indicators is 3.88, with a standard error of general deviation of 0.67. This means high performance, which shows a moderate scattering of the responses around the mean. In the data provided, the lowest mean score is for the indicator teaching, assessment, and learning; it got a mean of 3.83 and a Standard Deviation of 0.63, though it is still considered highly rated. On the other hand, the highest mean score is obtained on the module overall, which was rated high with a mean of 3.92 and a standard deviation of 0.79.

This implies that the students mostly appreciate the content of the module and allows routine offering ways to comprehend checks and assessments together with clear guidelines and acceptable tutorial attendance. This is also supported in previous modules themselves that show what the quality of the content and structure needed is (Topuz & Kinshuk, 2021); engagement (Benjamin, 2023); opportunities for peer interaction (Rajabalee & Santally, 2021); and resources to comprehend core concepts and understanding as well as check and assessment preparation through the items in the libraries (Topuz and Kinshuk, 2021).

Table 1: Level of Students' Experience in Modular Learning

Indicators	SD	Mean	Descriptive Level
Teaching, Assessment, and Learning	0.63	3.83	High
Feedback on your Tutor	0.80	3.90	High
The Module Overall	0.79	3.92	High
Overall	0.67	3.88	High

Furthermore, teaching, assessment, and learning frequently emerge, especially if it can be noted that the teacher employs the use of comprehensible instruction, interaction, and meaning-making, as well as content knowledge. These also include the idea that the assessment done by that teacher must be fair and transparent, corresponding to the learning objectives, and helpful for the students with information that they need to enhance their learning process (Schellekens et al., 2023; Curry & Gonzalez-DeJesus, 2010).

Finally, the high total result means that even with the difficulties, students often participate in this type of learning and can benefit from it. It pointed out that such experiences can significantly affect their learning achievements as well as the educational process.

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Therefore, there is an urgent need for education stakeholders to enhance and innovate the approaches to implementing modular learning to fit the learner needs (Regonel, 2024; Chaan et al., 2021; Martin et al., 2020)

3.2 Motivation to Achieve Academically

As Table 2 shows, motivation to achieve academically is reflected. The overall mean score was 4.15, which was categorized as high. The high-level result indicates that students' motivation to succeed academically is often realized. It was also found that the differences between the calculative mean scores of the indicators are all within the same category in the high index. However, among the three indications of motivation for academic achievement, personal incentives recorded the highest mean of 4.19 with a standard deviation of 0.69. Lack of enthusiasm is evident for the indicator striving for excellence, which receives a mean of 4.12, with a standard deviation of 0.71, which is considered as high.

Table 2: Level of Level of Motivation to Achieve Academically

Indicators	SD	Mean	Descriptive Level
Striving for Excellence	0.71	4.12	High
Desire to Learn	0.74	4.14	High
Personal Incentives	0.76	4.19	High
Overall	0.69	4.15	High

The result suggests that students prefer to study in order to be optimal in class, prepared to solve problems, and cultivate the social aspect of studying. Parents and teachers' encouragement of high academic performance as a form of incentive is a type of external motivation since it improves the morale of a student (Moore et al., 2019; Sun, 2021; Wright, 2012). This can motivate students to make additional effort and get improved grades, enjoyment in solving problems, and that students are encouraged and a pleasure to grapple with academics (Steinmayr et al., 2019).

Contrary to self-interest, they are inspired by extrinsic incentives and a true passion for learning new information and giving their best effort. Different works (Vu et al., 2022; Steinmayr et al., 2021; Crouzevalle et al., 2015) produced comparable outcomes. This means that in most cases, students encourage one to do one's best. They establish goals that are realistic and can be met, provided that certain qualities are put to work, including effort, practice, and perseverance. Similarly, the reported data indicates that students are focusing on the development of academic objectives that are achievable as well as difficult.

However, as a result, students are sometimes sure of passing their studies, and they have faith in their capability of getting high results in their studies. This is in consonance with the studies of Olivier et al. (2021) and of Tipon et al. (2021). In most cases, the students have the desire to excel in their scores; they are willing to go for extra notes apart from class for homework, and they feel the urge to think of the implication of a shortage of time for education. This can be explained by the data provided by Steinmayr et al. (2019) and Berestova et al. (2022). These studies highlighted that motivation, which has been broadly categorized as intrinsic and extrinsic motivation, was central to the learning processes.

3.3 Pedagogical Content Knowledge

The level of the pedagogical content knowledge as perceived by students is presented in Table 3. The total average on the scale was 4.23, and the standard deviation of 0.71 is marked as very high. The result of this study at a very high level indicates that the teacher's pedagogical content knowledge is always represented. Examining each statement closely, the statement "my teachers cope with our classroom context appropriately" got the highest mean response with a mean score of 4.43 or very high, and st. The coefficient of the standard deviation was 0.84. The statement my teacher's questions evaluate my understanding of a topic received the lowest mean score of 4.09 and, with a standard deviation of 0.99, but was described again as high.

This means that teachers are always able to maintain order and conflicts of the classroom and are always able to deal with the classroom context which is so important for learning and teaching. The study by Park and Ramirez (2022) points out that teachers' Classroom Content Coping is not only necessary for the teachers' own work satisfaction and their physical and mental health but also for the learning achievements of their students.

Table 3: Level of Pedagogical Content Knowledge

Items	SD	Mean	Descriptive Level
My teacher's tests evaluate how well I understand a topic.	0.93	4.22	Very High
My teacher's questions evaluate how well I understand a topic.	0.99	4.09	High

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My teacher's tests allow me to check how well I understand the concepts.	0.96	4.12	High
My teacher makes me clearly understand the objectives of this course.	0.95	4.20	Very High
My teacher's belief or value in teaching must be active and aggressive.	1.02	4.12	High
My teacher uses demonstrations to help explain the main concept.	0.98	4.32	Very High
My teacher identifies students' abilities and skills in learning scientific concepts.	0.97	4.22	Very High
My teacher uses various teaching approaches to teach different topics.	0.95	4.30	Very High
My teacher copes with our classroom context appropriately.	0.84	4.43	Very High
My teacher uses familiar analogies to explain concepts of the subject matter.	0.88	4.28	Very High
My teacher uses analogies with which I am familiar to help me understand science concepts.	0.91	4.26	Very High
My teacher uses students' prior knowledge about a scientific concept in making a lesson plan.	0.97	4.27	Very High
My teacher uses familiar events to describe scientific concepts.	1.01	4.20	Very High
My teacher uses real objects to help me understand science concepts.	0.98	4.26	Very High
My teacher uses familiar examples to explain scientific concepts.	0.90	4.22	Very High
My teacher prepares some additional teaching materials.	0.90	4.18	High
Overall	0.71	4.23	Very High

On the other hand, teachers tend to pose questions that seek to bring about an evaluation of the comprehension level of the students in the matter in question, and questions are used by teachers to make an assessment of perceived effectiveness in conveying topic matter to students. Questioning students in as far as it is applied as a way of addressing, assessing their knowledge, and facilitating their learning is an essential aspect of the teaching and learning process. In some ways, teachers are one of the most valuable sources controlling students' further achievements at school and in their lifetime (Burroughs et al., 2019). The analysis of the result indicates that the teachers have very high level of content knowledge regarding the manner in which they should teach their subject to the students. High PCK can enable teachers to construct lessons capable of provoking students to learn more as well as give students ways of learning that will enable them to be successful in the process (Davis, 2023).

3.4 Significance of the Relationship between Students' Experience in Modular Learning and Motivation to Achieve Academically

The significant relationship tests between students' experience in modular learning and motivation to achieve academically are shown in Table 4.1 below. The coefficient of correlation was .717; this is a high degree of correlation because the level of statistical significance is less than 0.05. Hence, the following null hypothesis was rejected: There is no relationship between students' experience in modular learning and motivation to achieve academically.

Table 4.1: Significance of the Relationship between Students' Experience in Modular Learning and Motivation to Achieve Academically

Students' Experience in Modular Learning	in	Motivation to Achieve Academically			Overall
		Striving Excellence	to Desire to Learn	Personal Incentives	
Teaching, Assessment, Learning	and	.674** .000	.569** .000	.664** .000	.682** .000

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Feedback on your Tutor	.597** .000	.473** .000	.614** .000	.602** .000
The Module Overall	.632** .000	.590** .000	.660** .000	.674** .000
Overall	.696** .000	.597** .000	.710** .000	.717** .000

In addition, all measures of the students' experience in modular learning were found to be positively related to all other measures and categories of the motivation for academic achievement. Consequently, students' experience in modular learning and motivation to achieve academically have some moderate to high correlations; this confirms that students' experience in modular learning has something or rather does relate to motivation to succeed academically. Therefore, in the event that conceptual gains in modular learning are enhanced for the students, motivational enhancements in achievement occur for the students. On the other hand, if the students' experience in modular learning is down, then the academic motivation of the students is also down.

In other words, the students' attitude towards and approaches to modular learning may positively or negatively correlate with their motivation to succeed in academe. This relationship may be affected by exposure to a variety of factors among students and parents, including learning style, parental involvement, and the student's attitude toward learning.

The results amount to the assertion of Lopez and Santos (2021) that students' experience on modular learning impacted their learning-related motivation in a very notable way, in relation to interest-enjoyment and perceived competence subconstructs. The authors recommended that organizing learning how within modular learning approaches can improve student learning and academic performance motivation.

3.5 Significance of the Relationship between Students' Experience in Modular Learning and Pedagogical Content Knowledge of Teachers

Reflected in Table 4.2 is the significant relationship between students' experience in modular learning and pedagogical content knowledge. Results yielded an overall r-value of .683 with a p-value less than 0.05; therefore, students' experience in modular learning is significantly related to the pedagogical content knowledge of teachers. Thus, the null hypothesis of no significant relationship between students' experience in modular learning and pedagogical content knowledge was therefore rejected. All three indicators of students' experience in modular learning: teaching, assessment, and learning; feedback on your tutor; and the module overall are significantly related to the pedagogical content knowledge with p-values less than 0.05, with r-values of .655, .594, and .617; respectively.

The result implies that the way students interact with and perceive modular learning can significantly affect their understanding of how it should be taught. Further, the students' experience in modular learning shows a high correlation to pedagogical content knowledge. This means that majority of the students experiences of students in modular learning enable the teachers understand how to effectively teach their subject matter to students.

Table 4.2: Significance of the Relationship between Students' Experience in Modular Learning and Pedagogical Content Knowledge

<i>Students' Experience in Modular Learning</i>	<i>Pedagogical Content Knowledge</i>
Teaching, Assessment, and Learning	.655** .000
Feedback on your Tutor	.594** .000
The Module Overall	.617** .000
Overall	.683** .000

This finding agrees with the notion of Bansilal and Naidoo (2019) that the interaction between students' experience of modular learning and the Teachers' pedagogical content knowledge is significant. However, for modular learning to be successful, teachers require adequate and efficient Pedagogical content knowledge (PCK). Expert PCK teachers know what students already know and do not know, how best to fuse prior knowledge with new knowledge, which instructional methods are effective for teaching the content, and how to give constructive feedback (Welch, 2020). A few researchers have also offered empirical support on how

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students' learning encounters in modular education can impact their pedagogical content knowledge (Al Mamun & Lawrie, 2023; Baumert & Kunter, 2013; Ball & Thames, 2008).

3.6: Significance of the Relationship between Pedagogical Content Knowledge and Motivation to Achieve Academically

In this context, the result of the overall test of the significant relationship between PCACK and MA is presented in Table 4.3. When teaching-entry content knowledge was compared to motivation to achieve academically, the result was a positive correlation with an overall r-value of .817 at $p < 0.05$. Based on the analysis done above, the two variables are positively correlated with each other. Thus, the initial hypothesis of the non-existence of a correlation between PCK and motivation to achieve academically was rejected. Further, the findings demonstrated that, in fact, PCNK has a very high positive correlation to all measures of motivation to achieve academically.

Table 4.3: Significance of the Relationship between Pedagogical Content Knowledge and Motivation to Achieve Academically

<i>Pedagogical Content Knowledge</i>	Motivation to Achieve Academically			
	Striving to Excellence	to Desire to Learn	Personal Incentives	Overall
	.782**	.699**	.802**	.817**
	.000	.000	.000	.000

This implies that pedagogical content knowledge highly influences the student's motivation to learn and perform well academically. In other words, with a good understanding of what is to be taught and how to prepare it, the teachers can encourage enhanced academic performance by the students. This study was in line with Filgona, Katsu, & Inoue (2023), which revealed that increasing teachers' PCK due to enhancement of motivation and, therefore, may be in a position to transform the learning achievement of the students. Of the related studies (Fukaya et al., 2024; Keller et al., 2017), there is information that pedagogical content knowledge is closely connected with students' motivation to achieve academic results.

3.7 Mediating Effect of Pedagogical Content Knowledge on the Relationship between Experience in Modular Learning and Academic Motivation

This data was input into the medgraph after undergoing linear regression analysis. For making the mediation assessment, the procedure that has been put forward by Baron and Kenny (1986) is that of mediation analysis which refers to the intervention of a variable to the relationship between two other variables.

According to Baron and Kenny (1986), if the third variable is to be considered as a mediator, the analysis passes through four stages. Self-learning, according to the experience of students' appraisal in modular learning, as is shown in the figure below, has a direct effect on motivation to achieve academically. Subsequently, there is a direct relationship between students' experience in modular learning and the mediator (M), which is the pedagogical content knowledge.

Table 5: Regression analysis showing the influence of overall students' experience in modular learning on motivation to achieve academically as mediated by pedagogical content knowledge

Step	Path	B	S.E.	β
1	c	.734	.041	.717***
2	a	.722	.045	.683***
3	b	.595	.041	.613***
4	c'	.305	.043	.298***

* $p < 0.05$

However, the product of the analysis reveals that, indeed, pedagogical content knowledge, in a very significant and meaningful way, correlates strongly with students' motivation in approaching academic achievements. However, further mediation testing when using medgraph is required since paths a, b, and c are identified to be associated. This type of analysis will require the Sobel z test. Complete mediation will be achieved if and only if the relationship between the independent variable and the dependent variable is found not to be statistically significant toward the end. This means that most of the time, the mediator variable is the actual mediating variable for all the effects.

Also, when the regression coefficient has reduced between independent and dependent variables and remains significant and where only partial mediation is achieved, it indicates that some aspect of students' experience in modular learning is mediated by

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PC knowledge, while other elements are either directly affected or indirectly influenced by different factors not captured in the paradigm. Moreover, what is highlighted in 'c' is the fact that students' experience in learning modes influenced motivation to achieve academically and even decreased after being mediated by pCK. With this, partial mediation was possible because the effect was determined to be significant when beneath the .05 level of significance.

Table 6: Results of statistical analysis on the presence (or absence) of mediating effect

Combination of Variables	Sobel z	p-value	Mediation
students' experience in modular learning □ pedagogical content knowledge □ motivation to achieve academically	10.764035	<0.001	Partial mediation

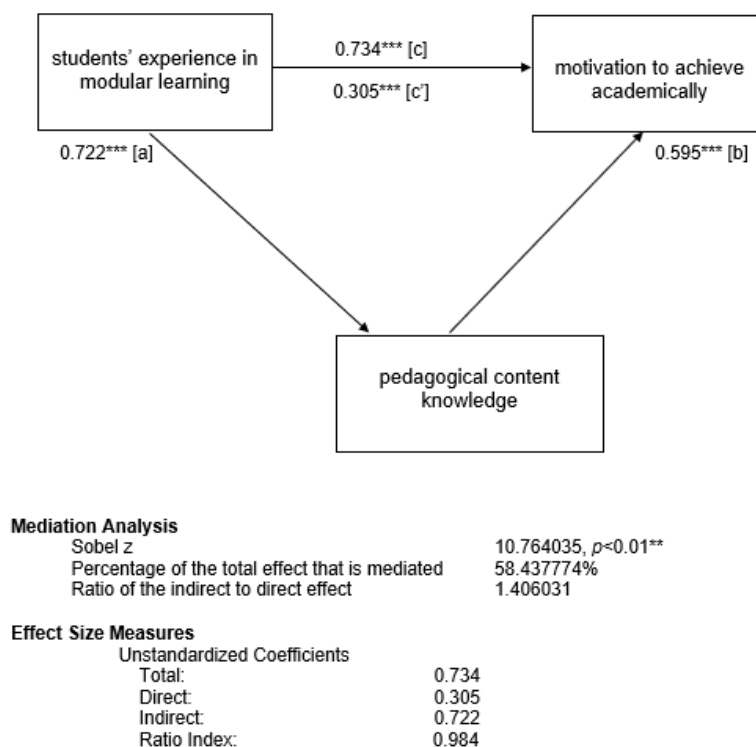
* $p < 0.05$

In addition, the total result of the computation of the mediating effects is depicted in the following figure. Performing the Sobel test, there is a significance level of 10.764035 for the z-value while the p-value is less than 0.05. This means that the mediating effect is partial, such that the original direct effect of students' experience in modular learning on motivation to achieve academically was partly attenuated when school climate was included as a variable. Sobel $z > 0$, supported by the results, suggests that the incorporation of pedagogical content knowledge diminishes students' experience in learning pertaining to modular patterns bearing on motivation to achieve academically.

Further, the directly observed mediation effect size that could be computed for the test of mediation seen between three variables is demonstrated in the figure as well. The nature and strength of the relationship between students' experience in modular learning and motivation to achieve academically can be linked to the effect size. The overall effect value is 0.734 and is applicable to the beta of the students' experience in modular learning on motivation to accomplish academically.

The direct effect value of 0.305 represents the beta of students' experience in modular learning to their motivation to achieve academically in items related to PCK as estimated in the regression model. The indirect effect of 0.722 is the value of the original beta between students' experience in modular learning and motivation to achieve academically, which now has an intermediate variable: pedagogical content knowledge to motivation to succeed academically. Overall, to indirect effect, the ratio index is derived, and for this study, 0.722 to 0.734 is equal to 0.9836. That is why, applying the data received, it is possible to outline that approximately 98,36% of the total influence of students' experience in modular learning on motivation to achieve academically is mediated by the pedagogical content knowledge.

Figure 2. Medgraph showing the variables of the study



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4. CONCLUSION

This study indicates that students from junior and senior high schools of Island Garden City, Samal, have a fair exercise of modular learning. This points to the fact that students often attempt to use knowledge taken from modular learning as a means to improve their understanding of the content matter and the way they were taught to apply it successfully. Thus, the behaviors of self-directed learning demonstrated by students revealed that those who frequently showed such self-regulation behaviors secured better results in all the content pedagogies studied. The level of academic motivation, as reported by the students, was high, a situation that may, from time to time, cause academic solid desire. Students are hereby encouraged to proceed with the other modular learning exercises and to utilize their incentives, as derived from their surroundings and from themselves.

The findings are based on Atkinson's theory (1957), called the expectancy-value theory, which underlines how processes in the mind involving expectations of achieving certain goals and the perceived valence of those goals influence behavior. For this reason, the study defines experience with modular learning as the extent to which students utilize their brains to manage the situation. Further, it enables them to change their actions in the environment, at least at the cerebral level, and thus produce such things as a positive or negative attitude toward a given situation. As such, these findings support the theory on which this study is premised. It is thereby suggested that these educational institutions, especially the junior and senior high departments, develop curricula that are based on the specific content knowledge of pedagogy that would motivate these learners to be academic as well as motivated to learn; this will enhance their accomplishment of the modular experience and the goal achievement behaviors in general.

However, the findings support a significant relationship between student's academic motivation and their modular learning and between students' academic motivation on the one hand and their pedagogical content knowledge and their experience with modular learning on the other. The result also shows that, in a way, the findings support the hypothesis that for junior and senior high school students in Island Garden City, Samal, pedagogical content knowledge only partly mediates the relationship between experience in modular learning and academic motivation. Thus, curricular development can enhance PCK, especially in all areas for teachers. Evaluating students' comprehension of the delivery of their course pedagogy is critical in the professional development of teachers. Through techniques such as debiasing, which teachers could not apply earlier, they can filter out biases and prejudices. Teachers should also cultivate the aspects of interest of students in the modules and see positive changes in how they feel about the modules, as well as an increase in enthusiasm and confidence due to their mastery of self-directed learning approaches.

Junior and senior high educational institutions, in particular, should develop curricula that are; a curriculum that is based on pedagogy content knowledge to enhance the student's motivation to learn coupled with their motivation for being academically inclined. This will facilitate their learning experience regarding the use of the modular learning format and come up with goal-oriented behaviors. Subsequent works can be done with experienced teachers, and the students' notions about the PCK of respective teachers can be focused on.

Moreover, it is recommended that these limitations guide researchers in future studies when choosing the independent and dependent variables for this study; second, when conducting the survey, some intervention should be implemented to conclude the study. It is also recommended to the research community and the literature field to conduct upcoming research that examines other variables not included in the study but essential in mediating the relationship between various variables such as personal experiences, parents' involvement, environment, peers, and teachers' enthusiasm. These could lead to further follow-through studies in education that categorize other types of PCK, evidence of the teacher's competencies in teaching this method, and ways of enhancing the approaches to managing lessons in students through various modes of learning.

The authors recommend that the researchers should take into account the limitations of the independent and dependent variables in this study for future research and that survey should end by putting some measures in place. Finally, it is recommended that the research community and the field of literature consider future studies featuring other conditions not investigated herein but that may help explain the relationship of various conditions.

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