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The Relationship Between Conceptual Understanding and Motivation of Grade 8 Learners on Force, Motion, and Energy: Basis for Intervention

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Abstract

This research aims to explore the relationship between level of motivation and conceptual understanding of Grade 8 students in the topics of Force, Motion, and Energy. A quantitative approach employing correlational analysis was used. The study was conducted at a private school in Iligan City, involving 40 students selected through purposive sampling. To gather data, test instruments were utilized to assess students' conceptual understanding, while questionnaires served as non-test instruments to evaluate their learning motivation. The findings revealed that students' conceptual understanding fell under the "Beginning" category, with a mean score of 9.025. Meanwhile, the students' average motivation score was 27.775, placing them in the "Moderately Motivated" category. A normality test indicated that the conceptual understanding data was not normally distributed, prompting the use of the Spearman correlation for analysis. The correlation test results showed a p value of 0.188, indicating no significant relationship between learning motivation and conceptual understanding of physics concepts in Force, Motion, and Energy.

Keywords: Conceptual Understanding, Level of Motivation, Grade 8, Force, Motion, and Energy, Physics Education

1. Introduction

According to Passinger, A., (2023) middle school years are a critical phase in shaping students' academic trajectories, and Grade 8 stands as a significant crossroads for foundational knowledge and skills. According to Chen, V., and Moser, T., (2016) conceptual understanding—the extent to which students grasp the fundamental principles and ideas—holds immense importance in their capacity to apply knowledge across diverse contexts. Moreover, motivation serves as a vital force that impacts students' engagement, perseverance, and overall academic achievement (Ruiz, E., 2020).

Research shows that emphasizing conceptual understanding enhances students' academic performance and reduces learning anxiety. For example, Hussein and Csíkos

(2023) found that integrating conceptual approaches in mathematics improved student achievement and attitudes. Similarly, Lubiano (2018) demonstrated that using interactive e-learning tools in physics increased conceptual understanding and engagement among learners.

This study draws upon constructivist learning theory, which emphasizes active knowledge construction and personal relevance in education (Balım, 2009), and self-determination theory, which highlights the importance of autonomy, competence, and relatedness in fostering intrinsic motivation (Deci, et al., 1991; Brooks & Young, 2011). Research has shown that aligning these frameworks can lead to improved comprehension and motivation, as well as enhanced educational outcomes (Alt, 2015).

There's always an intimate relationship that shows the dynamics between the understanding concept and motivation. That's how they are driving forces in terms of persistence of interest among students as a driving force in learning some tough concepts about science. Indeed, as mentioned by Skinner et al. (2017) and Schunk and DiBenedetto (2016), students with motivation show increased levels of allocation of their cognitive resources towards learning activities such as understanding abstract issues including topics about force, motion, and energy. For example, a highly motivated student towards physics will be more likely to expend the effort necessary to achieve active participation, critical thinking, and self-regulation necessary to gain conceptual mastery.

This relationship is mutual, since increased conceptual understanding can actually increase motivation. As students achieve a better understanding of scientific concepts, they feel a sense of accomplishment that builds their desire to learn more. According to Kang et al. (2016), one of the main elements involved in this process is cognitive conflict, which arises when students' misconceptions are challenged by new information. This conflict often fosters situational interest as learners become interested in the resolution of the discrepancy. For instance, a student who initially believes that heavier objects fall faster than lighter ones may become intrigued with Galileo's findings and will be motivated to dig deeper into the principles of motion.

The situational interest that is developed by the activities in class often plays a key role. In an experiment, demonstration, or problem-solving activity, a discovery might be made that simultaneously creates deeper understanding and sustains motivation. The teacher designing lessons to take advantage of those moments enables students to shift from extrinsic motivation, motivated by grades or external rewards, to intrinsic motivation, fostered by curiosity and love for learning.

By investigating the relationship between conceptual understanding and motivation, this study aims to provide educators with actionable strategies to enhance student learning in science. The findings will contribute to addressing misconceptions, fostering deeper engagement, and promoting sustained academic success among Grade 8 learners.

In this study the researcher focused on Force, Motion, and Energy concepts that were taken by the respondents during their Grade 7 level. The topics were limited to the: (1) Acceleration, (2) Distance-Time and Velocity-Time Graph, (3) Kinetic and Potential Energy, (4) Work and Energy, (5) Renewable Energy, and (6) Properties of Light. This paper assessed the conceptual knowledge and motivation of Grade 8 learners to Force, Motion, and Energy topics. Specifically, the following research objectives were sought:

1) Determine the Conceptual Understanding of grade 8 learners in Force, motion, and energy
2) Assess the level of motivation of grade 8 learners
3) Establish the relationship between the grade 8 learner’s conceptual understanding and level of motivation.

2.Methodology

This study utilizes a one-shot case study research design to examine the relationship between Grade 8 learners' conceptual understanding and motivation in force, motion, and energy. The participants are Grade 8 learners from a private high school in Iligan, selected through purposive sampling. The research instruments include a validated 30-item conceptual understanding test aligned with the DepEd MATATAG Curriculum and a motivation questionnaire adapted from Ching-Huei et al. (2021). The data gathering procedure involves administering the instruments to the participants after their prior exposure to the topics in Grade 7. The learners' performance on the test and their responses to the questionnaire are analyzed using descriptive statistics to summarize their conceptual understanding and motivation.

2.1 Participants

The study subjects are the Grade 8 learners who participated in assessing their conceptual understanding and motivation on the topics of force, motion, and energy. This study utilized purposive sampling, a non-probability sampling method where participants are selected based on specific characteristics that align with the research objectives. According to Etikan, (2016), purposive sampling is a technique that ensures the inclusion of participants who are most relevant to the study, allowing for a deeper exploration of the phenomena being investigated. The beneficiaries of this study are the enrolled Grade 8 learners of a private high school in Iligan. The pilot testing was participated in by a total of 120 students. After reviewing all items that passed the evaluation criteria of the pilot testing based on difficulty and discrimination indices, a Grade 8 level from the same school, was the source of 40 selected students for the initial implementation of the validated test instrument in high school physics. All evaluation activities were conducted through pen-and-paper methodologies.

2.2 Research Instrument

For the Validator

Validator's Rating Sheet

The rating sheet was adapted from the study of Simon, M., (2016). The instrument is intended to assess the reliability of the assessment questionnaire. The instrument is made to be used by the validators to evaluate the questions based on Clarity and Balance, Wordiness, Appropriateness of the Responses Listed, Application to Praxis, and Relationship to the Problem. Each criterion is rated by checking the appropriate number: 1 — Not Acceptable. Major Modification Needed, 2 — Below Expectations. Some Modification Needed, 3 —Expectation Meet. No Modification is needed but it can be Improved with minor changes, 4 — Exceed Expectation. No Modification Needed

Table 1: Rating Scale Description for the Evaluators

Rating Scale	Descriptor
3.25 - 4.00	Exceed Expectation
2.50 - 3.24	Expectation Meet
1.75 - 2.49	Below Expectation
1.00 - 1.74	Not Acceptable

For the Students

Conceptual Understanding Questionnaire

This researcher-made assessment tool was designed to evaluate students' conceptual understanding of Force, Motion, and Energy, aligning with the MATATAG Curriculum. The test consisted of a 30-items multiple-choice test, structured to assess various cognitive domains following Bloom's Taxonomy, from basic recall to higher-order thinking skills.

To enhance students' comprehension and application of Force, Motion, and Energy, a 30-item PISA-type multiple-choice test was implemented as an intervention. This test featured real-world problem-solving scenarios, emphasizing scientific literacy, analytical reasoning, and conceptual application rather than rote memorization. Each question was designed to reflect authentic physics contexts, such as (1) Acceleration, (2) Distance-Time and Velocity-Time Graph, (3) Kinetic and Potential Energy, (4) Work and Energy, (5) Renewable Energy, and (6) Properties of Light. By utilizing this intervention, the study seeks to measure and improve students' conceptual understanding of Force, Motion, and Energy, contributing to enhanced physics education in alignment with the MATATAG Curriculum.

Thus, after the assessment, an item analysis will be conducted to find out the least learned competencies of the learners. Hence, the item analysis utilized difficulty index and discrimination index.

Table 2: Difficulty Index by Raagas, Absin, (2004)

Index	Descriptor
Above 0.75	Easy Item
0.75 to 0.25	Item with Average Difficulty
Below 0.25	Difficult Items

Table 3: Discrimination Index by Edrina, (2007)

Index	Descriptor
Above 0.40	Discriminating Items
0.40 to 0.0001	Average Discrimination
0 or Below	Not Discriminating

Motivation Questionnaire

The motivational questionnaire was adapted from the study of Ching-Huei, C., et. al., (2021). The instrument is intended to assess the motivation of the students during the assessment task. The instrument is made to be used by the students to evaluate their experience in answering the questionnaire based on Interest, Competence, Pressure, Value, Effort and Choice. Each statement is rated by checking the appropriate number: – Strongly Agree, 3 – Agree, 2 – Disagree, and 1 – Strongly Disagree.

2.3 Data Analysis

To examine the relationship between conceptual understanding and motivation among Grade 8 learners, a systematic data-gathering procedure was implemented. The following steps outlined the process:

Preparation

In this study, the researcher utilized two (2) instruments: test questionnaire and motivation questionnaire. The motivation questionnaire was adapted from the study of Ching-Huei, C., et. al., (2021), on the other hand, the test questionnaire went through a validation process. In developing the test questionnaire, the researcher used the DepEd MATATAG Curriculum in identifying the learning competencies on Force, Motion and Energy. Next, a table of specification was created to assure distribution of questions based on the level of thinking in Bloom's taxonomy The test questionnaire was composed of 30 questions with 4 choices which had content questions and practical applications. The distribution includes 30% for the easy (remembering and understanding), 40% for average questions (applying and analyzing), and 30% for difficult (evaluating and creating).

Validation, Revision and Try-out

In validating the questionnaire, a content validation was made by five (5) evaluators. Rating sheets were distributed and retrieved. The over-all rating of the evaluators on the test questionnaire is 3.58 which implies to "Exceed Expectation" with no modification needed but could be improved with minor changes. Moreover, it was tried out to 120 students of a private high school of Iligan and an item analysis was conducted. It was revealed that the Cronbach alpha of the present material is 0.7230 (reliable). The Discriminating Index of 0.3375 which implies that the test questions are average and the Difficulty Index of 0.4250 which implies that the questions are average.

Data Gathering Procedure

This study was conducted among forty (40) 8th grade learners of a private high school of Iligan to which the researcher is affiliated. A test questionnaire was implemented which contains the motivation questionnaire and achievement test on Force, Motion and Energy. Grade 8 participants were exposed to Force, Motion and Energy topics during their Grade 7 level. In the context of research ethics, after approval from the school administrator, a consent form was included. Participation in this study was completely voluntary. Coding was used to assure confidentiality of their identity.

Data obtained were tabulated and analyzed with descriptive statistics such as mean and percentage. The motivation of the learners was interpreted based on Table 4. Thus, the performance of the respondents was interpreted with the remarks in Table 5. The interpretations for learners' performance were based on DepEd K to 12 Grading System (DepEd Order No. 8 s. 2015).

Table 4: Interpretation on Level of Motivation

Score Ranges	Motivation Level Interpretation
39-48	Highly Motivated
30-38	Motivated
21-29	Moderately Motivated
12-20	Low Motivation

Table 5: Descriptor of Performance

Achievement Test Score	Percentage (%)	Interpretation	Remarks
26-30	90-100	Outstanding	Passed
23-25	85-89	Proficient	Passed
21-22	80-84	Approaching Proficient	Passed
18-20	75-79	Developing	Passed
0-17	Below 75	Beginning	Failed

*Source: https://www.ciit.edu.ph/k-to-12-grading-system/

The table displays conceptual understanding interpretation with a passing average of 75%. The Department of Education-approved K-12 curriculum grading scheme serves as the basis for this. The range of scores are established using count, with the lowest interval (0-17) categorized as 'Beginning' and 'Outstanding' for the highest interval of 26-30. This table was used to interpret the learners' conceptual understanding.

Table 6: Mastery Level Using Mean Percentage Score (MPS)

Mean Percentage Score (MPS)	Descriptive Equivalent
96-100	Mastered
86-95	Closely Approximating Mastery
66-85	Moving Towards Mastery
35-65	Average
15-34	Low
5-14	Very Low
0-4	Absolutely No Mastery

*Source: https://depedph.com/mastery-level-deped/

3. Results and Discussion

The researchers organized the data and results according to the Motivation Result of the Learners during the Assessment, and Conceptual Knowledge of the Learners on Force, Motion, and Energy.

3.1 Motivation Results of the Learners during the Assessment

This section presents the overall results of the engagement questionnaire given to the learners.

Table 7: Learners Level of Motivation (N=40)

Statement	Highly Motivated	Motivated	Moderately Motivated	Low Motivation
Interest				
I enjoyed engaging in the assessment in this topic.	22(55%)	11(28%)	5(12%)	2(5%)
The assessments in Physics were fun and interesting to do.	9(23%)	11(28%)	5(12%)	15(37%)
Competence				
I think I am pretty good at understanding Physics concepts covered in the assessment.	7(17%)	11(28%)	10(25%)	12(30%)
I think I performed well on the Physics assessment compared to others.	9(23%)	9(23%)	10(25%)	12(30%)
Pressure				
I felt anxious while answering the Physics assessment.	10(25%)	16(40%)	9(23%)	5(12%)
I felt pressured to do well on the Physics assessment.	13(33%)	20(50%)	5(12%)	2(5%)
Value				
I believe doing the Physics assessment could help me improve my understanding of the subject.	20(50%)	13(33%)	4(10%)	3(7%)

I think the Physics assessment was an important activity for my learning.	26(65%)	11(28%)	2(5%)	1(2%)
Effort				
I put a lot of effort into answering the Physics assessment.	20(50%)	14(36%)	5(12%)	1(2%)
I tried very hard to do my best on the Physics assessment.	28(70%)	12(30%)	0(0%)	0(0%)
Choice				
I believe I had some choice about participating in the Physics assessment.	23(58%)	17(42%)	0(0%)	0(0%)
I completed the Physics assessment because I wanted to improve my knowledge of the subject.	33(83%)	7(17%)	0(0%)	0(0%)

Table 7 presents a summary of the learners' level of motivation in Physics assessments among forty (40) respondents. The findings revealed varying levels of intrinsic motivation, competence, pressure, perceived value, effort, and sense of choice. In terms of Interest, 33 students (55% "Highly Motivated" and 28% "Motivated") reported enjoying their engagement with the assessment, suggesting a moderate level of enthusiasm. However, when asked whether the assessments were fun and interesting, only 20 learners (23% "Highly Motivated" and 28% "Motivated") responded positively, while 15 students (37%) "Moderately Motivated". This indicated that while students engaged with the assessment, many did not find it enjoyable, pointing to a need for more interactive and engaging assessment methods.

Regarding Competence, the results showed that students had mixed confidence in their understanding of Physics concepts. Only 18 students (17% "Highly Motivated" and 28% Motivated") believed they were good at understanding the concepts in the assessment, while 22 students (25% "Disagree" and 30% "Moderately Motivated") felt otherwise. Similarly, when asked about their performance compared to others, 18 students (23% "Highly Motivated" and 23% "Motivated") believed they did well, while another 22 students (25% "Moderately Motivated" and 30% "Low Motivation") felt they did not. This lack of confidence suggested that many students struggled with Physics, emphasizing the need for more effective instructional approaches to improve their comprehension and self-efficacy.

In terms of Pressure, the majority of students experienced stress during the assessment. A total of 26 learners (25% "Highly Motivated" and 40% "Motivated") reported feeling anxious, while only 14 (23% "Moderately Motivated" and 12% "Low Motivation") did not. Additionally, 33 students (33% "Highly Motivated" and 50% "Motivated") felt pressured to perform well, highlighting the significant stress they experienced during the assessment. These findings suggested that high-stakes testing might have contributed to test anxiety, which could negatively impact their performance and learning experience. Implementing assessment strategies that reduce pressure, such as formative assessments or low-stakes quizzes, could help alleviate student stress.

Despite these challenges, learners still recognized the Value of the Physics assessment in their education. A strong majority (33 students, with 50% "Highly Motivated" and 33% "Motivated") believed the assessment helped them improve their understanding of Physics. Furthermore, 37 students (65% "Highly Motivated" and 28% "Motivated") viewed it as an important learning activity, indicating that they acknowledged the role of assessments in their academic growth. This demonstrated that while students faced difficulties, they still perceived assessments as beneficial, reinforcing the need to ensure these evaluations are both effective and meaningful.

When it came to Effort, students exhibited a strong sense of perseverance. A total of 34 learners (50% “Highly Motivated” and 36% “Motivated”) reported exerting effort in answering the assessment, while 40 students (70% “Highly Motivated” and 30% “Motivated”) stated that they tried their best. These findings highlighted that, despite the anxiety and perceived difficulty, students remained determined to perform well. This suggested that their motivation could be further harnessed through strategies that boost confidence, such as providing feedback and targeted learning interventions.

Lastly, in the Choice category, students overwhelmingly felt a sense of autonomy regarding their participation. All 40 learners (58% “Highly Motivated” and 42% “Motivated”) believed they had some choice in taking the Physics assessment. Additionally, 40 students (83% “Highly Motivated” and 17% “Motivated”) stated that they completed the assessment to improve their knowledge. This indicated a high level of intrinsic motivation, as students were driven by their desire to learn rather than external factors.

Overall, while students exhibited effort and acknowledged the value of assessments, their struggles with competence, pressure, and engagement indicated areas for improvement. Addressing test anxiety, incorporating more engaging assessment formats, and providing targeted interventions to improve confidence and comprehension could enhance their learning experience. By focusing on these factors, educators could foster a more supportive and motivating environment for students in Physics.

3.2 Conceptual Understanding of Grade 8 Learners on Force, Motion, and Energy

Table 8: Learners Total Points

Item	Scores	Percentage (%)	Descriptor
ST001	15	50.00	Beginning
ST002	6	20.00	Beginning
ST003	10	33.33	Beginning
ST004	7	23.33	Beginning
ST005	8	26.67	Beginning
ST006	6	20.00	Beginning
ST007	5	16.67	Beginning
ST008	7	23.33	Beginning
ST009	6	20.00	Beginning
ST010	11	36.67	Beginning
ST011	7	23.33	Beginning
ST012	7	23.33	Beginning
ST013	14	46.67	Beginning
ST014	6	20.00	Beginning
ST015	7	23.33	Beginning
ST016	8	26.67	Beginning
ST017	8	26.67	Beginning
ST018	8	26.67	Beginning
ST019	12	40.00	Beginning
ST020	9	30.00	Beginning
ST021	10	33.33	Beginning
ST022	10	33.33	Beginning
ST023	11	36.67	Beginning
ST024	13	43.33	Beginning
ST025	9	30.00	Beginning
ST026	7	23.33	Beginning
ST027	13	43.33	Beginning
ST028	9	30.00	Beginning
ST029	9	30.00	Beginning
ST030	12	40.00	Beginning

ST031	9	30.00	Beginning
ST032	5	16.67	Beginning
ST033	10	33.33	Beginning
ST034	6	20.00	Beginning
ST035	12	40.00	Beginning
ST036	14	46.67	Beginning
ST037	5	16.67	Beginning
ST038	6	20.00	Beginning
ST039	9	30.00	Beginning
ST040	14	46.67	Beginning

The pretest scores of the 40 learners show that all of the learners were at the beginning level. This means they do not understand much of what was tested and need a lot of help to improve. Learners scored between 5 and 15 out of 30 points possible, or 16.67% to 50.00%. The top scorer, like ST001, got 15 points (50.00%), while most learners got scores between 5 and 14 points. A few students, like ST007, ST032, and ST037, scored 5 points (16.67%). Thus, the results of the pretest are shown in Table 8.

Table 9: Summary of the Conceptual Understanding of Grade 8 Learners

Index	Percent Frequency (n)	Percentage (%)	Interpretation
28-30	0	0	Average
26-27	0	0	Proficient
24-25	0	0	Approaching Proficient
22-23	0	0	Developing
0-21	40	100	Beginning
Total	40	100	
	Mean	Std. Dev.	Interpretation
Pretest	9.025	2.82378	Beginning

Table 9 reveals that all 40 respondents, representing 100% of the sample, scored within the range of 0-21 points, which falls under the Beginning category. This indicates that none of the participants demonstrated proficiency or even approached higher levels of achievement, such as Developing, Approaching Proficient, Proficient, or Average. The mean score of 9.025 further highlights the low performance level, suggesting that, on average, students performed poorly on the test. The standard deviation of 2.82378 indicates some variation in scores; however, all results remained within the Beginning level. These findings collectively suggest significant challenges in the students' mastery of the test content, underscoring the need for targeted interventions to improve their understanding and performance.

Table 10: Mastery Level of Grade 8 Learners on Physics Learning Competencies

Topic	Learning Competency	Item	Frequency Error	%	No. of Correct Responses	%	Mastery Level
Acceleration	Identify that forces cause objects to accelerate, and that acceleration of an object is its rate of change of velocity	#1	29	72.5	11	27.5	Low
		#2	24	60	16	40	Average
	Observe and describe examples of accelerating objects at school and in the local community, including objects that show uniform circular motion	#3	30	75	10	25	Low
		#4	30	75	10	25	Low
Distance-time and Velocity-time graph	Construct and annotate distance-time graphs and velocity-time graphs to represent uniform and non-uniform acceleration	#5	31	77.5	9	22	Low
		#6	27	67.5	13	32.5	Low
		#30	30	75	10	25	Low
Kinetic and Potential Energy	Describe kinetic energy as the movement of objects or particles, and potential energy as energy stored due to the position of objects or particles	#7	28	70	12	30	Low
		#8	27	67.5	13	32.5	Low
		#9	30	75	10	25	Low
	Identify examples of everyday situations that demonstrate: Kinetic energy being transformed to potential energy, and Potential energy being transformed to kinetic energy;	#10	22	55	18	45	Average
		#11	28	70	12	30	Low
		#12	26	65	14	35	Average
Work and Energy	Recognize that work is done when a force causes the displacement of an object	#13	30	75	10	25	Low
		#14	27	67.5	13	32.5	Low
		#15	30	75	10	25	Low
	Recognize that power is the rate of doing work	#16	30	75	10	25	Low
		#17	30	75	10	25	Low
		#18	26	65	14	35	Average
	Explain that the mechanical energy of an object is the sum of the kinetic energy and the potential energy available to do work	#19	31	77.5	9	22.5	Low
		#20	26	65	14	35	Average
Renewable Energy	Describe conservation of energy in everyday situations involving gravity, such as when objects fall	#21	31	77.5	9	22.5	Low
		#22	31	77.5	9	22.5	Low
		#23	28	70	12	30	Low

	Gather information from secondary sources to explain how potential energy stored in lakes and dams in the Philippines is used to produce kinetic energy to generate electricity for use in homes, communities, and industry	#24	28	70	12	30	Low
		#25	30	75	10	25	Low
		#26	25	62.5	15	37.5	Average
Properties of Light	Carry out guided investigations to describe and illustrate the reflection of light using plane and curved mirrors and the refraction of light using transparent blocks, lenses, and prisms with examples from everyday applications.	#27	23	57.5	17	42.5	Average
		#28	29	72.5	11	27.5	Low
		#29	26	65	14	35	Average
	Mean Percentage Score (MPS)					29.73	Low

Legend: Mastered: 96-100%, Closely Approximating Mastery: 86-95%, Moving Towards Mastery: 66-85%, Average: 35-65%, Low: 15-34%, Very Low: 5-14%, Absolutely No Mastery: 0-4%

Table 10 revealed that most Grade 8 learners had “Low” mastery of physics learning competencies, with an overall Mean Percentage Score (MPS) of 29.73%. Students struggled significantly in topics requiring graph interpretation, energy transformation, and acceleration concepts, with correct responses ranging mostly between 22% and 35%. The “Acceleration” and “Distance-time/Velocity-time Graphs” categories showed particularly weak performance, with only 10 to 16 students answered the item correctly. Similarly, “Renewable Energy” concepts were poorly understood, while “Kinetic and Potential Energy” and “Work and Energy” topics had slightly better but still low results. However, some items in “Properties of Light” and “Energy Transformation” reached an “Average” mastery level, with correct responses between 35% and 45%. Thus, these findings highlight the need for enhanced instructional strategies to improve students' comprehension of fundamental physics principles.

3.3 Relationship Between Conceptual Understanding and Level of Motivation

Spearman’s rank-order correlation was computed to assess the relationship between conceptual understanding and level of motivation. There was a negative correlation between the two variables, $r_s(38) = 0.248,\ p = 0.188$.

Table 11 Spearman Rank-Order Correlation Between Level of Motivation and Conceptual Knowledge

	Conceptual Understanding	Level of Motivation
Conceptual Understanding		.248
Level of Motivation	.248	

Note: p<0.01

Results from table 11 indicates a negative correlation between conceptual understanding and motivation of learners. These findings are similar to Basri, et al., (2023) where they concluded a negative relationship between two variables. The absence of a correlation between learning motivation and conceptual understanding can be attributed to several factors. According to Aulia, (2021) she noted that one significant factor is that students may not yet fully comprehend the tested physics concepts and materials. Another contributing factor is students' lack of seriousness when answering the given questions, resulting in suboptimal outcomes. Additionally, the mismatch between students' responses on the learning motivation questionnaire and their actual circumstances may influence the results, as students might not accurately reflect their true situation. Furthermore, intelligence levels play a crucial role; even highly motivated students with lower intelligence levels may struggle to achieve a strong understanding of the concepts.

4. Conclusion

The results of the study provide significant insights into the learners' motivation and conceptual understanding of Force, Motion, and Energy. Learning motivation plays a crucial role in shaping the process of learning physics. Students with high motivation are more likely to approach their physics studies with greater dedication. However, the analysis using the Spearman correlation test revealed a p= 0.188, indicating no significant relationship between learning motivation and students' conceptual understanding. The lack of correlation may be attributed to several factors, including students' incomplete grasp of the concepts of Force, Motion, and Energy, their lack of seriousness in completing the test, and the possible mismatch between students' responses on the motivational questionnaire and their actual attitudes. Therefore, this study suggests that to enhance physics education, teachers should focus on targeted instruction to address misconceptions, integrate hands-on and interactive learning to reduce pressure, and highlight practical applications to boost interest and relevance. Encouraging peer learning, providing regular feedback, and collecting qualitative data with larger sample sizes can further identify influential factors, improve motivation and competence, and guide effective interventions.

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