
Metacognitive Awareness and Academic Motivation Among Physical Therapy Students: A Correlational Study

Merolfson A. Cayabyab, Andrea B. Dinglasan, Anya S. Encarnacion, David Lance A. Noriega, Ralph Edison M Tan and Kermaigne Miranda Atienza, PTRP, MOH

ABSTRACT

Background: Metacognitive awareness is the ability to understand one's cognitive processes and is vital for effective learning and academic success. In higher education, particularly in fields like physical therapy that require substantial practical and theoretical knowledge, metacognitive skills affect how students approach learning tasks, manage strategies, and maintain motivation. While research has emphasized the importance of metacognitive awareness for academic performance, the specific relationship between metacognitive awareness and academic motivation in physical therapy students remains underexplored. Understanding this connection is essential for developing educational strategies to enhance both metacognitive skills and motivation in this field.

Purpose: This study aimed to determine the relationship between metacognitive awareness and academic motivation among physical therapy students. Specifically, it seeks to assess the levels of these variables, examine differences based on demographic characteristics, and explore their correlation. By identifying the extent to which these two variables are related, the research aimed to provide insights that could enhance curriculum planning and instructional approaches in physical therapy education.

Methods: A quantitative correlational research design was employed in this study involving 217 physical therapy students. Metacognitive awareness was assessed using the Metacognitive Awareness Inventory (MAI), and academic motivation was measured with the Academic Motivation Scale - College Version (AMS-C 28). Descriptive statistics, t-tests, ANOVA, Chi-square tests, and Pearson's correlation were used for data analysis.

Results: Among the 217 respondents, 69% demonstrated high metacognitive awareness, with no significant differences by gender or year level. Most students exhibited high academic motivation, particularly second-year students, who had an average score of 24.8 (\pm SD 3.6) in the 'identified' domain of extrinsic motivation. Amotivation levels were low (mean = 9.4 \pm SD 5.5). Females scored higher in introjected extrinsic motivation (23.2 \pm 4.1) than males (21.7 \pm 4.8, $p < 0.05$), and second-year students showed more amotivation than first-year students. A weak but significant correlation was found between metacognitive awareness and academic motivation ($r = 0.34$, $p < 0.05$). Weak correlations were observed with intrinsic motivation ($r = 0.33$ to $r = 0.37$) and very weak correlations with extrinsic motivation ($r = 0.01$ to $r = 0.26$). The strongest correlations were between comprehension monitoring and intrinsic motivation to experience stimulation.

Conclusion: In conclusion, the study reveals that metacognitive awareness is consistently high among physical therapy students, showing no significant differences based on gender or academic level. In contrast, academic motivation is robust, particularly among second-year students. The differences in introjected extrinsic motivation among genders suggest that educational interventions should consider these variations to foster a more supportive learning environment for all students.

Implications: Understanding how metacognitive awareness interacts with academic motivation can guide the development of focused educational strategies in Physical Therapy programs. Strengthening these components could enhance both academic and clinical outcomes, ensuring students are better equipped for their professional practice. This study has important implications for educators and curriculum designers. By integrating metacognitive training into the curriculum, educators can enhance students' self-regulatory skills and academic performance. Furthermore, workshops, seminars, and classroom activities focused on metacognitive awareness can lead to improved learning outcomes and prepare students for successful healthcare careers.

Key words: metacognitive awareness, academic physical therapy

Physical therapy (PT) students must acquire complex skills and knowledge to become competent professionals. As physical therapy education programs grow and develop, the importance of researching various aspects of learning and teaching has increased¹. Furthermore, the American Physical Therapy Association (APTA) has emphasized the necessity for educational research to gather evidence that enhances learner progress and outcomes, aligning with the needs of the society². This emphasis highlights the critical role of studies aimed at developing optimal educational guidelines in physical therapy, particularly in the context of improving student performance. Previous research conducted within medical and nursing education programs has generated a substantial body of evidence regarding understanding the impact of metacognitive awareness and academic motivation on academic performance.³⁻⁶ Metacognition is the recognition of self-knowledge and the control of one's learning process to align with the requirements of a particular task. Developing metacognitive strategies enables students to manage their cognitive processes and regulate their learning actively⁶. As a result, they can create more effective study plans and take greater responsibility for their learning. Metacognition is an important and powerful skill that can help health-allied students academically and clinically⁷. Furthermore, it was shown that metacognitive practices could enhance patient care, clinical reasoning, clinical decision-making, and lifelong learning, which is essential in medical practice. On the other hand, academic motivation is a student's passion for academic subjects as demonstrated by approach, perseverance and level of interest when the student's proficiency is assessed against a standard of performance or excellence⁸. Motivated students are more likely to participate in learning activities and retain their learning status. Academic motivation is linked to several favorable educational results, encompassing academic success, a positive self-image, and tenacity. Moreover, it has the potential to influence students' engagement, their approach to learning, and their capacity to maintain their dedication to educational objectives⁹. Multiple researchers consistently indicate significant relationships between both metacognitive awareness and academic motivation have been associated with different academic outcomes, and academic achievement¹⁰⁻¹². Within the context of physical therapy, there is a lack of research on the

correlation between metacognitive awareness and academic motivation. Exploring this correlation could provide valuable insights into the factors influencing student success and professional competence in the field of physical therapy.

Metacognitive Awareness

Metacognition is the ability to manage and enhance one's learning and performance⁷. This indicates the relevance of metacognition and in turn metacognitive awareness in student outcomes and performance. Furthermore, this is supported by the study that showcases the use of metacognition among students and how it can be a concept that should be included in education. Metacognition can be divided into two broad components: metacognitive knowledge and metacognitive regulation¹³. Metacognitive knowledge pertains to an awareness of an individual's strengths and weaknesses and being conscious of one's thinking, while metacognitive regulation refers to how an individual facilitates one's thinking to manage his learning style that suits his or her motivation level. Metacognitive regulation is divided into planning, information management strategies, comprehension monitoring, debugging strategies, and evaluation. While metacognitive knowledge consists of declarative, procedural, and conditional knowledge¹⁴.

Academic Motivation

According to a recent paper, motivation is defined as "the process whereby goal-directed activity is instigated and sustained; an internal state that arouses, directs and maintains behavior; an internal force that activates, guides, and maintains behavior over time"⁵. Academic motivation refers to students' willingness or enthusiasm to participate in learning and engage with their school environment. Studies consistently show that students who are academically motivated view school and learning as worthwhile, demonstrate a genuine interest in learning, and derive enjoyment from educational activities¹⁵. There are three categories of motivation: intrinsic, extrinsic, and amotivation. Intrinsic motivation drives people to perform tasks that produce internal feelings of satisfaction. In comparison, extrinsic motivation forces people to focus on the end result, regardless of the outcome. Lastly, amotivation happens when a learner has no desire to exhibit the action¹⁶.

Correlation Between Academic Motivation and Metacognitive Awareness

Several research have found a substantial link between metacognition skills and academic motivation. These researches linked the effectiveness of students' academic involvement to their motivation and the use of reliable and effective metacognition skills, as opposed to their peers who do not have intrinsic motivation¹⁷. There is a lack of literature pertaining to the correlation between academic motivation and metacognitive awareness within the scope of physical therapy students, however, there is literature that indicates that there is a measurable correlation between the two variables. One study stated "a significant relationship between metacognitive awareness, intrinsic motivation and extrinsic subscales of academic motivation, and metacognition predicted a major proportion of the variance in all components and subcomponents except for amotivation"¹⁸.

Previous research has shown that students with higher levels of metacognitive awareness tend to exhibit higher levels of academic motivation, leading to greater academic success^{19,20}. However, research on the relationship between metacognitive awareness and academic motivation among physical therapy students is limited. Some research identifies metacognition as a strong predictor of being academically motivated which means that metacognitive strategies, either metacognitive regulation or knowledge, may contribute to motivation^{21,22}. Moreover, metacognitive awareness has an impact on the intrinsic and extrinsic motivation of the student's academic achievement¹⁷. Students with higher metacognitive awareness are more motivated to engage in academic activities. However, some studies contradict these findings wherein based on their results there is a negative or no relationship between metacognition and the academic motivation of the students²³.

This study, therefore, aimed to determine the relationship between metacognitive awareness and academic motivation among Physical Therapy students. In particular, the study sought to achieve the following objectives:

- To determine the level of metacognitive awareness and academic motivation among Physical Therapy students
- To investigate significant differences between metacognitive awareness and

academic motivation based on demographic characteristics such as sex & year level

- To examine the correlation between metacognitive awareness and academic motivation among physical therapy students

The significance of understanding the relationship between metacognitive awareness and academic motivation among physical therapy students is to provide insight into effective learning strategies and retain information that may lead to better performance of the students. Students who develop metacognitive awareness are more likely to engage in self-regulated learning, allowing them to critically analyze their thought processes and learning strategies such as goal setting, self-monitoring, and reflective practice. These skills are crucial for developing critical thinking, problem-solving, and clinical decision-making abilities. This self-awareness equips them for clinical practice, as they can better evaluate their performance, identify areas for improvement, and adapt their approaches to patient care²⁴.

The findings of this study will also help in improving the competence and success of future physical therapists not only academically but also clinically. By emphasizing the importance of metacognitive skills, the study contributes to the existing literature that highlights their role in academic achievement in healthcare education as previous research has shown that metacognitive strategies are linked to higher levels of academic motivation and success in various healthcare disciplines, suggesting that similar benefits could be observed in physical therapy education²⁵.

MATERIALS AND METHODS

Study Design

A quantitative correlational research design was utilized for this study to determine the relationship between metacognitive awareness and academic motivation among Physical Therapy students. This design was chosen because quantitative methods effectively measure specific variables and reveal statistical relationships. By using this approach, we can better understand how changes in metacognitive awareness might affect academic motivation. The purpose of correlational research was to determine the extent to which variations in one characteristic or variable are correlated to variations in one or more

other characteristics or variables²⁶. Previous research has shown that correlational designs are useful in educational studies for identifying significant relationships between variables^{27,28}.

Sample Size Estimation and Sampling Design

In this study, we implemented stratified sampling to represent each academic year level proportionally within a population of 319 students. This method maintains population structure, with each year level's sample size calculated based on its proportion of the total population. Using Epi Info™ software from the Centers for Disease Control and Prevention, we calculated a total sample size of 175, based on a 95% confidence level and a 5% margin of error to be allocated across the academic year levels. Each academic year level's sample size was then determined proportionally: 1st year $(97/319) \times 175 \approx 53$ students, 2nd year $(92/319) \times 175 \approx 51$ students, 3rd year $(81/319) \times 175 \approx 44$ students, and 4th year $(49/319) \times 175 \approx 27$ students. This stratified distribution ensures that the sample reflects the broader population structure, reducing sampling bias and strengthening the reliability and generalizability of the findings.

Study Population

The study was conducted on physical therapy students of FEU-NRMF. Inclusion criteria required enrolled students from FEU-NRMF School of Physical Therapy in S.Y. 2023-2024, aged between 18 to 28 years, for both sexes. Exclusion criteria included students who dropped a course, shifted to another course, filed a leave of absence, and were medically diagnosed with any mental health condition. A total of 217 students were recruited through stratified random sampling from the school's registry. This selection method guarantees that the final study population effectively captures the characteristics of the enrolled students, delivering a thorough representation relevant to the research objectives.

Research Instruments

The instrument "Metacognitive Awareness Inventory (MAI)"¹⁴ developed by Schraw G & Dennison RS and "Academic Motivation Scale College Version (AMS-C 28)" developed by Vallerand, et al.²⁹ were used as the basis for the Survey Questionnaire.

The MAI and AMS-C 28 tools are widely available and granted free access to the public. No permissions were needed to access and use the tool. The online Google form was divided into three sections: 1) demographic information, which consists of the participants' age, sex, year level, and questions about who dropped a course, shifted to another course, filed a leave of absence, and medically diagnosed with any mental health condition; 2) Metacognitive Awareness Inventory (MAI) by Schraw, et al., 1994¹⁴ and 3) the Academic Motivation Scale College Version (AMS-C 28) by Vallerand, et al., 1993.²⁹

Metacognitive Awareness Inventory (MAI) by Schraw and Dennison (1994)

The participants' metacognitive awareness was assessed using Metacognitive Awareness Inventory (MAI) questionnaire which consists of 52 statements that is answerable by "True" as 1 point each and "False" as 0 point each covering two metacognitive factors, such as knowledge about cognition (17 items) and regulation of cognition (35 items). Knowledge about cognition was divided into Declarative knowledge (8 items, factual knowledge, talk about "what," "about" or "that"), Procedural knowledge (4 items, application of knowledge, knowledge on "how"), and Conditional knowledge (5 items, knowledge on "when" and "why"). Regulation of cognition was divided into planning (7 items), information management strategies (10 items), comprehension monitoring (7 items), debugging strategies (5 items), and evaluation (6 items). The scores for each question is added up and the level of cognition is categorized as low for scores 0-24 points, moderate for scores 25-38 points, and high for scores 39-52 points²⁶. General higher scores means that the participant is more metacognitively aware. This scale has a Cronbach alpha of 0.78 (knowledge), 0.80 (regulation), and 0.79 (MAI total).

Academic Motivation Scale College Version (AMS-C 28) by Vallerand (1993)

The Academic Motivations Scale - College Version 28 (AMS-C 28) was utilized to assess the participants' academic motivation. It consists of 28 items graded on a 7-point Likert scale ranging from 1-7, which indicates 1 as does not correspond at all and 7 as correspond precisely. This tool measures the perception of the participants in regard to

academic motivation based on three subscales of intrinsic motivation (12 items) with subdomains such as knowledge, accomplishment, stimulation; extrinsic motivation (12 items) with subdomains such as identified, introjected, external regulation; and amotivation (4 items). This scale has a Cronbach's alpha value = 0.81 and 0.71 to 0.92 internal consistency. The total scores of the students were considered high level of academic motivation if it was $\geq 60\%$ and low level if it was $< 60\%$ ³⁰.

Data Gathering Procedure

This study received approval from the FEU-NRMF Institutional Ethics Review Committee (IERC) and Data Protection Officer (DPO). The research questionnaires were distributed online via group chats. Questionnaires were sent to the study participants through Google Forms, where they would be redirected to the page containing information about the research study's purpose and background, informed consent, and eligibility criteria at the bottom they had the option to decline participation by selecting "No, I do not wish to take part in the research" and alternatively, they could choose "Yes, I agree to take part in the research" to proceed, at which point participants were assured their participation was entirely voluntary. No personal information was obtained from them other than email addresses and it would take 15 to 20 minutes to complete the survey questions.

Ethical Consideration

The researchers completed a technical evaluation form and submitted the proposal for review and approval to the FEU NRMF Institutional Ethics Review Committee (IERC). Before data collection, the researchers got a consent form to protect the data privacy of the participants. The participants that were included in the study are enrolled students from FEU-NRMF School of Physical Therapy in S.Y. 2023-2024, aged 18 years old and above, for both sex. The study was also considered low-risk in nature because the collection of data was done via Google Forms and does not require face-to-face. The participants were informed about the study's objectives, methods, anticipated complications, and discomforts. Participants may withdraw from the study at any time and refuse to answer any particular questions. The researchers ensured anonymity and

confidentiality to the participants, their data would be kept confidential, and the results were published anonymously.

The authors acknowledged and extended their sincere gratitude to their invaluable partners in the study, FEU-NRMF (Far Eastern University - Nicanor Reyes Medical Foundation). Their active participation, unwavering support, and insightful contributions have been instrumental in the successful execution of our research endeavors. The collaboration with FEU-NRMF not only provided us with a diverse and representative sample but also enriched the depth of our findings through their unique perspectives. Furthermore, the guidance and expertise offered ensured the rigor and credibility of the current study. Their commitment to academic excellence has been a constant source of inspiration throughout this research journey. The authors sincerely appreciate their involvement, which has undoubtedly enhanced the quality and significance of our research outcomes.

Anticipated Challenges/Limitations

Limitations are factors that may affect the results of this research. The following limitations identified by the researchers were the questionnaire type due to being within the confines of the choices. They may not fully encompass the scope of what the respondents would like to state. Another area for improvement is the limited access to information or lack of understanding of the topic matter that may affect the questionnaire results. Challenges, on the other hand, mainly involve the distribution of the questionnaire to the respondents and receiving them promptly for statistical analysis.

Conflict of Interest

There was no conflict of interest due to the nature of the study with the use of forms that have no association with the researchers, study site and participants.

Privacy and Confidentiality

In accordance with the Data Privacy Act of 2012, the information shared was only used for this research and shall not be shared with or given to anyone except Far Eastern University - Nicanor Reyes Medical Foundation Technical Review and Institutional Ethics Review Committee.

Process of Informed Consent

Consent forms were distributed via email to participants and compiled and tallied upon completion to procure a final list of participants for the research.

Vulnerability

Participants were not vulnerable due to the subjective nature of the instruments used, data gathered may have varied results between participants.

Risks of Participating in Study

Personal and confidential information were collected from participants safeguarded and managed. The study was also considered low-risk in nature because the collection of data was done via Google Forms and did not require face-to-face.

Benefits of the Study to the Participants

There was no perceived direct benefit to the participants, but their participation could help find out more about the relationship could between metacognitive awareness and academic motivation among Physical Therapy students of FEU-NRMF.

The results of this study could provide insights into effective learning strategies and retaining information that may lead to better performance of students. The findings of this study will also help in improving the performance and success of future physical therapists not only academically but also clinically by developing metacognitive awareness and academic motivation.

Community Benefits from the Study

This research may aid in understanding the relationship between metacognitive awareness and academic motivation among Physical Therapy students of FEU-NRMF. This information may be used in future research and development of educational plans that may include these concepts.

Incentive

No incentives were given to the participants in this research which was carried out for academic purposes only.

Right to Refuse or Withdraw

Participants were informed of their right to withdraw at any point during the study without needing to provide a reason, as outlined in the informed consent form. The authors emphasized that participation was entirely voluntary, and no coercion or pressure would be applied to retain participants against their will. The withdrawal process allowed participants to communicate their decision through dedicated email and phone contacts provided in the consent form, without detailed explanations. The researchers maintained open communication with participants throughout the study, actively encouraged them to express any concerns or discomfort, and promptly respected and acted upon any requests to withdraw. The final research reported the number of withdrawals and, if provided, reasons while safeguarding participant anonymity. Additionally, after a year all information collected shall be deleted.

Participant Selection

Participants were given a letter of informed consent stating “You are being invited to take part in this research because we feel that your experience as a physical therapy student can contribute much to our understanding and knowledge regarding Metacognitive awareness and Academic motivation of Physical therapy students.” Selection of participants was solely for currently enrolled Physical Therapy students of Far Eastern University- Nicanor Reyes Medical Foundation.

Recruitment Process

Participants were recruited via Google form links that were sent through respective grade level representatives of each year level.

Duration of Data Storage

The information collected should be securely stored for a duration of one year, after which it shall be permanently deleted from the records. The authors believe that retaining the information for this specific period is essential for the purposes of analysis and record-keeping. However, beyond this timeframe, maintaining the data is unnecessary and potentially poses privacy risks. The authors are committed to safeguarding your information and ensuring its responsible management throughout its lifecycle, including its timely removal when no longer needed.

Data Analysis

Descriptive statistics were utilized to summarize the participant's characteristics. Categorical data like sex and year level were analyzed using frequency. Level of metacognitive awareness and academic motivation were calculated as mean with standard deviation. Independent t-test was used to compare means between sex, and One-way analysis of variance (ANOVA) was used to compare mean scores across year levels. To compare frequencies across the said categories, the Chi-square test was used. Pearson's correlation was used to determine the relationship of academic motivation and metacognitive awareness. A significance level of 5% was used to test the hypotheses. STATA 15.1 (StataCorp LLC, TX) was used for data analysis.

RESULTS

A total of 217 respondents participated in the study, with half of the students (50%) aged 20 years or younger. Slightly more females than males were represented (59% vs. 41%), providing a balanced demographic for analysis. (Table 1)

The results in Table 2 indicate that a significant majority of respondents (69%) reported a high level of metacognitive awareness, while only 3% demonstrated a low level metacognitive awareness. This suggests that most students possess a strong ability to monitor and regulate their learning processes. No statistically significant differences in metacognitive awareness were observed across sex and year level, as shown in Tables 3 and 4, implying that these factors do not appear to influence students' self-regulated learning abilities^{14,44}.

Table 1. Respondent demographics (n=217)

	Mean ± SD; Frequency (%)
Age, years	20.67 ± 1.68
18-20	109 (50.23)
21-24	103 (47.47)
25 and up	5 (2.3)
Sex	
Male	88 (40.55)
Female	129 (59.45)
Year level	
1 st year	59 (27.19)
2 nd year	59 (27.19)
3 rd year	58 (26.73)
4 th year	41 (18.89)

Table 2. Metacognitive awareness

	Mean ± SD; Frequency (%)
Overall score	41.41 ± 7.75
Knowledge about cognition	
Declarative knowledge	5.57 ± 1.82
Procedural knowledge	3.17 ± 1.02
Conditional knowledge	4.05 ± 1.04
Regulation of cognition	
Planning	5.28 ± 1.66
Information management strategies	8.30 ± 1.49
Comprehension monitoring	5.83 ± 1.39
Debugging strategies	4.67 ± 0.68
Evaluation	4.52 ± 1.34
Level of metacognitive awareness	
Low	7 (3.23)
Moderate	61 (28.11)
High	149 (68.66)

Table 3. Metacognitive awareness, by sex

	Male (n=88)	Female (n=129)	p-value
	Mean ± SD; Frequency (%)		
Overall score	41.38 ± 8.36	41.44 ± 7.34	0.950*
Knowledge about cognition			
Declarative knowledge	5.75 ± 1.78	5.45 ± 1.84	0.233*
Procedural knowledge	3.1 ± 1.09	3.22 ± 0.98	0.419*
Conditional knowledge	4.02 ± 1.06	4.07 ± 1.03	0.745*
Regulation of cognition			
Planning	5.22 ± 1.7	5.32 ± 1.64	0.658*
Information management strategies	8.28 ± 1.55	8.32 ± 1.45	0.870*
Comprehension monitoring	5.89 ± 1.5	5.79 ± 1.31	0.619*
Debugging strategies	4.58 ± 0.84	4.74 ± 0.54	0.095*
Evaluation	4.53 ± 1.46	4.54 ± 1.25	0.963
Level of metacognitive awareness			0.650†
Low	4 (4.55)	3 (2.33)	
Moderate	25 (28.41)	36 (27.91)	
High	59 (67.05)	90 (69.77)	

Statistical tests used: * - Independent T-test; † - Chi-square test

Table 4. Metacognitive awareness, by year level

	1 st year (n=59)	2 nd year (n=59)	3 rd year (n=58)	4 th year (n=41)	p-value
	Mean ± SD; Frequency (%)				
Overall score	41.1 ± 7.56	41.8 ± 8.77	41.57 ± 7.14	41.1 ± 7.57	0.955*
Knowledge about cognition					
Declarative knowledge	5.64 ± 1.71	5.46 ± 2.08	5.72 ± 1.75	5.41 ± 1.72	0.794*
Procedural knowledge	3.19 ± 1.14	3.05 ± 1.06	3.12 ± 1.01	3.39 ± 0.8	0.419*
Conditional knowledge	3.83 ± 1.12	4.02 ± 1.04	4.14 ± 0.96	4.29 ± 1.01	0.150*
Regulation of cognition					
Planning	5.17 ± 1.66	5.34 ± 1.84	5.38 ± 1.51	5.2 ± 1.63	0.887*
Information management strategies	8.32 ± 1.27	8.63 ± 1.44	8.05 ± 1.65	8.17 ± 1.58	0.188*
Comprehension monitoring	5.78 ± 1.33	5.88 ± 1.37	6.03 ± 1.15	5.54 ± 1.75	0.355*
Debugging strategies	4.63 ± 0.72	4.68 ± 0.65	4.71 ± 0.7	4.68 ± 0.65	0.936*
Evaluation	4.54 ± 1.32	4.75 ± 1.33	4.41 ± 1.3	4.41 ± 1.43	0.520*
Level of metacognitive awareness					0.650†
Low	2 (3.39)	2 (3.39)	1 (1.72)	2 (4.88)	
Moderate	17 (28.81)	18 (30.51)	17 (29.31)	9 (21.95)	
High	40 (67.8)	39 (66.1)	40 (68.97)	30 (73.17)	

Statistical tests used: * - One-way analysis of variance; † - Chi-square test

In terms of academic motivation, nearly all respondents reported high levels, particularly among 2nd-year students. Extrinsic motivation, specifically in the 'identified' domain (mean score = 24.8 ± SD 3.6), was the highest, closely followed by the 'external regulation' domain (mean score = 24.5 ± SD 3.6). This suggests that many students are driven by external factors such as goals and rewards, which is typical in structured academic environments.⁴⁵ Additionally, Physical Therapy students reported low levels of amotivation, with an average score of 9.4 ± SD 5.5, indicating that most students were engaged and had a clear sense of purpose in their studies (Table 5).

Table 5. Academic motivation

	Mean ± SD
Overall score	144.41 ± 19.59
Intrinsic motivation – to know	22.72 ± 4.26
Intrinsic motivation – toward accomplishment	21.80 ± 4.49
Intrinsic motivation – to experience stimulation	18.59 ± 4.94
Extrinsic motivation – identified	24.82 ± 3.59
Extrinsic motivation – introjected	22.59 ± 4.43
Extrinsic motivation – external regulation	24.54 ± 3.58
Amotivation	9.35 ± 5.54
Level of academic motivation	
Low	17 (7.83)
High	200 (92.17)

While no significant differences in motivation were found across sex, an exception was observed in the introjected extrinsic motivation category, where female students scored higher than males (Females: 23.2 ± 4.1 vs. Males: 21.7 ± 4.8, $p < 0.05$), indicating that females may experience more self-imposed pressures or expectations related to their academic performance (Table 6). Additionally, a significant difference in amotivation scores was observed across year levels, with 2nd-year students being more amotivated than their 1st-year counterparts, possibly reflecting adjustment challenges as students' progress through the program (Table 7).

Of particular interest is the correlation between metacognitive awareness and academic motivation. A weak but statistically significant positive correlation was found between overall metacognitive awareness and academic motivation ($r = 0.34$, $p < 0.05$), suggesting that students who are more metacognitively aware also tend to be more academically motivated. However, metacognitive awareness was not significantly associated with external regulation or amotivation, indicating that students' ability to regulate their learning does not necessarily influence

Table 6. Academic motivation, by sex

	Male (n=88)	Female (n=129)	p-value
	Mean ± SD; Frequency (%)		
Overall score	143.18 ± 22.37	145.26 ± 17.49	0.445*
Intrinsic motivation – to know	22.67 ± 4.31	22.75 ± 4.24	0.890*
Intrinsic motivation – toward accomplishment	21.35 ± 4.76	22.1 ± 4.29	0.229*
Intrinsic motivation – to experience stimulation	18.66 ± 5	18.54 ± 4.92	0.865*
Extrinsic motivation – identified	24.32 ± 3.76	25.17 ± 3.45	0.086*
Extrinsic motivation – introjected	21.7 ± 4.81	23.2 ± 4.05	0.014*
Extrinsic motivation – external regulation	24.44 ± 3.99	24.61 ± 3.3	0.734
Amotivation	10.03 ± 5.89	8.88 ± 5.25	0.130
Level of metacognitive awareness			0.110†
Low	10 (11.36)	7 (5.43)	
High	78 (88.64)	122 (94.57)	

Statistical tests used: * - Independent T-test; † - Chi-square test

Table 7. Academic motivation, by year level

	1 st year (n=59)	2 nd year (n=59)	3 rd year (n=58)	4 th year (n=41)	p-value
	Mean ± SD; Frequency (%)				
Overall score	144.37 ± 19.43	148.32 ± 20.48	143.03 ± 20.1	140.8 ± 17.4	0.260*
Intrinsic motivation – to know	22.9 ± 4.35	22.73 ± 4.16	22.36 ± 4.84	22.95 ± 3.42	0.890*
Intrinsic motivation – toward accomplishment	22 ± 4.44	22.14 ± 4.71	21.57 ± 4.63	21.34 ± 4.15	0.797*
Intrinsic motivation – to experience stimulation	18.36 ± 5.09	19.41 ± 4.76	18.38 ± 5.13	18.05 ± 4.76	0.508*
Extrinsic motivation – identified	24.98 ± 3.65	24.92 ± 3.36	24.66 ± 4.15	24.71 ± 3.07	0.956*
Extrinsic motivation – introjected	22.49 ± 4.88	23.12 ± 4.15	22.71 ± 4.34	21.83 ± 4.3	0.550*
Extrinsic motivation – external regulation	24.97 ± 3.27	24.54 ± 3.36	24.24 ± 4.14	24.37 ± 3.55	0.724*
Amotivation	8.68 ± 5.12	11.47 ± 6.43	9.12 ± 5.28	7.56 ± 4.16	0.002*
Level of metacognitive awareness					0.760†
Low	3 (5.08)	5 (8.47)	6 (10.34)	3 (7.32)	
High	56 (94.92)	54 (91.53)	52 (89.66)	38 (92.68)	

Statistical tests used: * - One-way analysis of variance; † - Chi-square test

their motivation driven by external rewards or lack of motivation. Weak correlations were observed between metacognitive awareness and intrinsic motivation ($r = 0.33$ to $r = 0.37$), and very weak to weak correlations with extrinsic motivation ($r = 0.01$ to $r = 0.26$). The strongest correlations were seen between comprehension monitoring and intrinsic motivation to experience stimulation and intrinsic motivation to know, as well as between information management strategies and intrinsic motivation to experience stimulation. These findings highlight the potential for instructional strategies that focus on enhancing metacognitive skills to positively influence intrinsic motivation, particularly in helping students engage with their learning on a deeper, more personal level^{46,47}. (Table 8)

These findings have significant implications for educational practices. The high levels of metacognitive awareness among students highlight the need to integrate metacognitive skill development into curricula, as it positively correlates with

Table 8. Relationship of metacognitive awareness and academic motivation

	Overall academic motivation	Intrinsic motivation			Extrinsic motivation		Amotivation	
		To know	Toward accomplishment	To experience stimulation	Identified	Introjected		External regulation
Overall metacognitive awareness	0.34*	0.37*	0.33*	0.37*	0.26*	0.21*	0.01	-0.06
Knowledge about cognition								
Declarative knowledge	0.26*	0.27*	0.27*	0.28*	0.19*	0.14*	0.01	0.00
Procedural knowledge	0.18*	0.20*	0.23*	0.19*	0.19*	0.13	0.02	-0.10
Conditional knowledge	0.21*	0.28*	0.21*	0.24*	0.18*	0.12	0.05	-0.09
Regulation of cognition								
Planning	0.21*	0.27*	0.18*	0.29*	0.15*	0.09	-0.09	-0.05
Information management strategies	0.30*	0.24*	0.27*	0.32*	0.20*	0.21*	0.05	0.02
Comprehension monitoring								
Comprehension monitoring	0.33*	0.36*	0.29*	0.34*	0.22*	0.21*	0.03	0.00
Debugging strategies	0.24*	0.21*	0.21*	0.17*	0.22*	0.20*	0.13*	-0.11
Evaluation	0.26*	0.31*	0.28*	0.27*	0.23*	0.18*	-0.03	-0.08

Correlation interpretation: 0 = No correlation; (0.0-0.2) = Very weak; (0.2-0.4) = Weak; (0.4-0.6) = Moderate; (0.6-0.8) Strong; (0.8-1) = Very strong; 1 = Perfect correlation; positive/negative sign shows direction of the relationship

*Statistically significant

academic motivation. Specifically, the link between comprehension monitoring and intrinsic motivation suggests that students who better monitor their understanding are more motivated to learn for knowledge’s sake^{48,49}. Educators can use these insights to design strategies that enhance both metacognitive awareness and intrinsic motivation, promoting deeper engagement with academic content.

The observed gender differences in introjected motivation indicate a need for gender-sensitive approaches, such as targeted support services to reduce academic pressures and improve outcomes for female students⁴⁵. Moreover, clear data presentation, as emphasized by Nicol and Pexman, is essential for interpreting findings and applying them to educational practice.⁵⁰ This study provides actionable insights that can enhance student engagement and success.

DISCUSSION

Demographic Profile of the Respondents

The study comprised a total of 217 respondents, with a slightly higher representation of females (59.45%) compared to males (40.88%) among the Physical Therapy (PT) students at FEU-NRMF. This investigation aimed to assess the levels of metacognitive awareness and academic motivation among these students. Current findings revealed no significant statistical differences in metacognitive awareness based on sex ($p=0.95$) or year level ($p=0.955$). Conversely, all year levels exhibited high levels of academic motivation ($p=0.260$), with second-year students demonstrating the highest motivation levels. Notably, except for introjected extrinsic

motivation—where female PT students scored higher than their male counterparts (Females: 23.2 ± 4.1 , Males: 21.7 ± 4.8 , $p < 0.05$)—no other statistically significant distinctions were found between sexes.

Metacognitive Awareness

All students across year levels exhibited high levels of metacognitive awareness, with only 3% reporting low awareness. The analysis of mean percentage scores across metacognitive domains indicated that declarative knowledge had the highest mean score (5.57 ± 1.82), while procedural knowledge received the lowest (3.17 ± 1.02). In terms of regulation of cognition, information management strategies scored highest (8.30 ± 1.49), whereas evaluation received the lowest mean score (4.52 ± 1.34). These results suggest that while most students possess a solid understanding of their learning capabilities and can effectively organize and summarize information. They may struggle with the strategic processes of learning and evaluating their performance. These findings align with previous research, which also identified high levels of declarative knowledge among students²⁷. However, unlike earlier studies that reported condition knowledge as the lowest, our results highlight a critical area for further research—understanding why students face challenges in evaluating their cognitive processes. Given the essential role of metacognition in education, these insights could inform instructional strategies that better support students in developing their evaluative skills^{13,7}.

Academic Motivation

Majority of the students who participated had a high level of academic motivation, specifically among 2nd year students. For the total mean percentage scores of the domains of academic motivation, extrinsic motivation - external regulation had the highest mean percent score and amotivation had the lowest mean score. This finding implies that most students are significantly driven by external factors, such as grades and recognition, rather than intrinsic desires to learn. Results show that female physical therapy students scored higher in academic extrinsic motivation than males which are supported with the results of multiple studies^{17,31}. However, this contradicts other literature that found male students exhibiting greater extrinsic motivation^{8,32,33}. Addressing these contradictions could pave the way for future research to investigate

the underlying factors influencing these differences and their implications for educational practice.

Difference of Level of Metacognitive Awareness among Male and Female Students

There was no statistical difference in the metacognitive awareness scores across sex. The results showed that only 3% of respondents had a low level of metacognitive awareness, whereas 69% of respondents indicated a high level. This finding is similar to a previous study³⁴ where students' sex has no effect on their metacognitive awareness, despite the fact that numerous research findings discuss how sex affects a person's cognitive abilities. However, from a previous study³⁵, it was stated that when compared to male students, female students have higher levels of metacognitive awareness. Therefore, it is likely that female metacognitive thinking abilities are seen favorably. Based on another study³⁶, it was stated that female students' retention was higher than that of male students' retention in terms of metacognitive skills and critical thinking. Furthermore, results from a different study³³ revealed no significant correlations between the sexes of college participants, their involvement in group discussions, and their metacognitive awareness scores. This suggests a nuanced understanding of gender differences in cognitive abilities, highlighting the need for further exploration into how these differences manifest in educational contexts.

Difference of Level of Metacognitive Awareness among 1st year to 4th year Students

The data analysis illustrates no significant statistical difference among all year levels ($p=0.955$). There is limited evidence regarding the level of metacognitive differences between different year levels of undergraduates. However, metacognitive efficiency decreases with age which can dissociate an individual's self-belief and behavior³⁴. Younger learners use fewer strategies, relying more on innate acquisition processes. As schooling progresses, they develop enhanced learning abilities, leading to increased strategy utilization. Age correlates positively with the acquisition and utilization of metacognitive strategies and awareness^{35,36}. Demographic attributes of the participating students, such as gender and year of curriculum, as well as external environmental factors like type of admission and home location, did not significantly influence their intrinsic and extrinsic

motivation toward medicine³⁷. This highlights the importance of fostering metacognitive strategies early in educational programs, as foundational skills may not naturally develop with progression through years³⁸.

Difference of Level of Academic Motivation among Male and Female Students

The results of the study showed that there was no statistical difference found across sex except only in introjected extrinsic motivation where female students have higher scores compared to males (Females 23.2 ± 4.1 , vs Males 21.7 ± 4.8). This finding is similar to a previous study¹⁷ where extrinsic motivation was higher in females than males. However, these findings are contradicted by different studies wherein there extrinsic motivation was greater among male students as compared to female students³². Another study¹⁰ with contradictory results found that female students have higher intrinsic motivation and male students have higher extrinsic motivation. These discrepancies highlight the need for further investigation into the factors influencing academic motivation across genders. Understanding these differences can inform educational practices and support services by prompting the development of targeted interventions that cater to the distinct motivational profiles of male and female students^{24,39}. By addressing these gaps, future research can provide insights that enhance educational outcomes and support effective decision-making in academic settings⁴⁰.

Difference of Level of Academic Motivation among 1st year to 4th year Students

The findings of the current study indicate that a statistical difference was seen in motivation scores ($p=0.002$) across year levels, with 2nd-year students being more amotivated compared to 1st year students. Findings from a study stated¹⁵ "that there are significant differences in academic motivation of university students based on the year of study". with the study indicating that 3rd and 4th year students had higher academic motivation as compared to 1st and 2nd year students. Another significant finding⁴¹ states that intrinsic and extrinsic domains of academic motivations differed, wherein 1st year students had higher levels of academic motivation as compared to 4th year students. Another study⁶ compared academic motivation levels of freshmen and seniors also had

similar differences as to freshmen having higher academic motivation than seniors. However, findings from another study⁵ had different indications that there is little to no statistical difference between academic motivation and its sub domains across year levels of students with each level having similar scores to each other, emphasizing the need for tailored motivational strategies for each cohort.

Correlation of Metacognitive Awareness and Academic Motivation

The authors found that there was a weak but statistically significant correlation ($r=0.34$, $p<0.05$) between the overall metacognitive awareness scores and overall academic motivation. Amotivation and external regulation did not significantly correlate with metacognitive awareness. Metacognitive awareness and intrinsic motivation showed weak correlation ($r = 0.33$ to $r = 0.37$), and very weak to weak correlations ($r = 0.01$ to 0.26) were observed with extrinsic motivation. The domains where correlations were highest were comprehension monitoring with intrinsic motivation to know and experience stimulation, and information strategies with intrinsic motivation. A study¹⁸ showed similar results wherein there was significant relationship between metacognitive awareness and academic motivation including their respective domains. While a study¹⁷ had different findings wherein metacognitive awareness and only intrinsic motivation had a significant correlation. These findings suggest that enhancing metacognitive awareness may improve students' intrinsic motivation, thereby positively impacting academic outcomes. Educational practices could focus on developing comprehension monitoring and information strategies to foster deeper engagement. Future research should further explore contextual factors influencing these relationships to refine interventions and support services in educational settings.

CONCLUSION

The primary focus of this study was to examine the extent of metacognitive awareness and academic motivation among physical therapy students and correlate them accordingly. A total of 264 students were surveyed during data gathering and only 217 respondents were eligible to participate in the study. It found no significant differences in metacognitive awareness across sexes or year levels. However,

academic motivation was notably high across all years, with second-year students exhibiting the highest motivation levels. Interestingly, except for introjected extrinsic motivation, where female students displayed higher scores than males, there were no other significant distinctions observed in academic motivation between genders. This suggests that while there are similarities in metacognitive awareness and overall academic motivation levels among PT students, there may be nuanced differences in certain motivational aspects between male and female students. Overall, the findings underscore the importance of understanding motivational dynamics within the PT student population for tailored educational interventions and support.

To improve educational practices, physical therapy educators, faculty, and deans should consider implementing strategies that promote metacognitive awareness and intrinsic motivation, including reflective learning practices and self-regulatory techniques to foster a supportive learning environment and improve student engagement and motivation. Future investigations might explore the role of peer-led study groups and mentorship programs in supporting these objectives^{24,42}. By focusing on translating research outcomes into practical applications will enhance the significance and effectiveness of educational interventions in healthcare setting.

LIMITATIONS & RECOMMENDATIONS

Limitations of the study include the lack of previous research studies regarding the relationship between metacognitive awareness and academic motivation within the context of physical therapy. Additionally, the reliance on self-reported measures introduces potential biases, as participants may misrepresent their levels of metacognitive awareness or academic motivation, and their lack of understanding of the topic matter that may affect the questionnaire results. This limitation is exacerbated by the study's focus on a single institution, which may restrict the generalizability of the findings. Future researchers are encouraged to include a more diverse range of public and private higher education institutions (HEIs) to obtain a broader perspective on these relationships. The findings indicate that most students possess high procedural knowledge, suggesting awareness of their learning capabilities. However, they may struggle with the processes and strategies required for effective self-evaluation and

performance improvement. To address these gaps, future studies should consider longitudinal designs or experimental research focused on interventions aimed at enhancing both metacognitive awareness and academic motivation. Such approaches could provide valuable insights into how these factors interact, particularly when influenced by external motivators like rewards or constraints.

Furthermore, the timing of the study should be taken into account, as academic periods (e.g., prelims, midterms, finals) may significantly impact students' metacognitive awareness and motivation. Investigating these variables in future research will deepen our understanding of their interplay and contribute to the development of more effective educational practices. By expanding on these limitations and recommendations, the study can better inform future inquiries and practical applications in the field of physical therapy education.

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