

# Impact of Teachers' Critical Thinking Skills on Students' Academic Performance: Basis for an Upskilling Program

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## Abstract

This study investigates the impact of physical education (PE) instructors' critical thinking skills on students' learning in a business college in Wuhan, China. The research examined critical thinking across three dimensions: evaluating information, creative thinking, and problem-solving. Utilizing a descriptive design, data were collected through a validated questionnaire distributed to student respondents. The findings revealed that PE instructors demonstrate a high level of critical thinking. Key indicators, such as identifying new information, and applying PE skills to solve real-world problems, highlighted the instructors' capabilities. However, challenges were noted in distinguishing factual information from inferences and exploring alternative data interpretations. The study emphasizes the need for targeted upskilling program to further enhance the PE instructors' critical thinking skills, fostering improved educational outcomes and aligning with contemporary pedagogical demands. The results contribute to the broader discourse on integrating critical thinking into educational practices in China.

Keywords: critical thinking, academic performance, evaluating information, creative thinking, problem-solving



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## INTRODUCTION

The adage that the students are as good as their teachers hold through in most cases. A teacher who exhibits good dispositions can most of the time transcend that to their students. In Physical education, instructors are expected to have high critical thinking capabilities either in the classroom or in the field or in the actual games. Such critical thinking skills should transcend among students because they are directly engaging with the students. This should in anyway affect the student's academic performance. Physical education instructors ought to be smart, snappy and quick particularly in their decisions. Just as they engage in the actual sports games as referees, they need to be smart and quick. Their senses need to function as quick as possible. When they are the once engaged in the actual game, they need to be quick too. This stimulus requires their critical thinking, rote memory in order for them to function well as physical education instructors. These qualities should resonate with their

students who they trained as future leaders and enthusiasts in sports.

There is a great deal for physical education instructors to be smart and quick other than skillful in sports-related attributes which is required in the discipline. According to Plutarch (46-120AD), "The mind is not a vessel to be filled but a fire to be kindled." David Deutsch said that "One of the existing assumptions behind educational systems is that the purpose of education is to transmit valuable knowledge faithfully from one generation to the next. From the people who already have that knowledge to the people who don't." (Arthur, 2024).

Physical education instructors get more information at earlier ages than ever before and are frequently tested to see if they have retained it. But neither strategy teaches them how to think and make connections. In fact, many educators and policymakers don't understand how to help physical education instructors understand and how to think and make connections. Developing critical thinking is

more complicated than teaching basic arithmetic, and yet instructors receive little training in how to do it.

In contrast to remote learning, associative learning is defined as a learning principle that states that ideas and experiences reinforce each other and can be mentally linked to one another. The definition of associative learning encloses several different types of cognitive processes and events. It is a learning that takes place when two elements are connected in our brain. (Salazar, 2019). Examples of associative learning include how swimming may be connected to someone's fear of drowning or a misbehaving student who does not get to take part in a class activity as punishment.

Meaningful learning is characterized by relating new information to prior knowledge. When one recalls prior knowledge, all related information is more easily recalled (Firestone, 2020). The goal of meaningful learning is to build cognitive skills that physical education instructors will use for their lifetime. It is an effective method for physical education instructors to engage in conceptual learning and build new skill foundations. (Melanie, 2021). The physical education instructors' willingness to learn in a meaningful manner is something over which instructors have the least control. It can be indirectly influenced by using instructional and evaluation strategies that foster meaningful learning such as using active learning and team-based activities and reducing the amounts of verbatim facts tested on exams (Gleason et al., 2020).

Without critical thinking, how can we really live a meaningful life? We need this skill to self-reflect and justify our ways of life and opinions. Critical thinking provides us with the tools to evaluate ourselves in the way that we need to.

Critical thinking is a process of reasoning in which the person doing the thinking uses factual information gathered from various sources and analyzes that information to come to a logical conclusion, rather than relying on their own reasoning to justify their conclusion. Whether it is a problem with a course, an assignment, or a project, experiences in

learning a foreign language present challenge that demand learners' critical thinking to analyze the situation and formulate a solution prudently. Physical education instructors need to experiment high-level thinking tasks that prepare them for the professional life. According to Lin (2018), "Thinking skills are essential skills if one is to achieve academic success in his professional career and social life". Therefore, critical thinking requires integration into everyday education.

Similarly, critical thinking is significant in education, as it is a crucial way of inquiry for solving problems and making appropriate decisions (Simpson & Courtney, 2022). Thus, physical education instructors need a dynamic engagement in the learning process to put on their knowledge for solving learning problems and analyzing information so they can make formative decisions.

Furthermore, through critical thinking, physical education instructors can develop to be open-minded and creative in selecting the suitable learning strategy and the appropriate technique of solving problems (Tiwari, Lai & So, 2019). However, meaningful learning does not work for information that needs to be recalled, such as alphabet and phone numbers or historical data. If physical education instructors do not relate the new to old knowledge, they won't be able to connect the two together. It may lead to frustration and loss of interest. Most of the information learned through memorization alone is belatedly lost. A skilled critical thinker can separate opinion from fact and knows how to weigh up an issue from multiple perspectives. They can hold back their judgment while gathering facts and can eventually make rational speculation to come with a logical conclusion.

Despite physical education instructors' access to extensive material and regular evaluations, a mismatch persists between information retention and the capacity for critical thinking and making connections. Modern pedagogical approaches, including metacognition, associative learning, meaningful learning, and critical thinking, are supplanting rote

memorization. Nevertheless, educators frequently get insufficient training in the successful integration of critical thinking within their teaching methodologies. This study examines how physical education teachers in the evaluated institution address these issues and their effects on students' learning experiences.

In line with these, this study aims to elucidate the function of critical thinking among physical education instructors within business education contexts. This study investigates the use of evaluative reasoning, creative problem-solving, and critical analysis by PE teachers at CIBE, aiming to enhance discourse on the incorporation of cognitive skill development within multidisciplinary education. Moreover, the findings will guide specialized upskilling initiatives to augment teachers' pedagogical efficacy and facilitate enhanced student learning outcomes inside business education.

**Statement of the Problem.** This study aims to assess how the level of critical thinking of the PE instructors in College of International Business and Economics in Wuhan City, Hubei Province in China affects the academic performance of their students. The result of the study aims to develop an upskilling program for the PE instructors. Specifically, it sought answer to the following questions:

1. What is the profile of the student respondents in terms of:
  - 1.1 Sex;
  - 1.2 Age;
  - 1.3 Year Level; and,
  - 1.4 Academic Performance?
2. What is the perception of the student respondents on the level of their PE instructors' critical thinking in terms of these factors:
  - 2.1 Evaluating information;
  - 2.2 Creative Thinking; and,
  - 2.3 Problem Solving?
3. Is there a significant difference in the student respondents' perception of their PE

instructors' level of critical thinking when their profiles are taken as test factors?

4. What upskilling program for PE instructors may be proposed based on the result of the study?

## METHODOLOGY

**Research Design.** This study is descriptive-comparative research as it aimed to yield the different views among students at College of International Business and Economics in Wuhan City, Hubei Province in China on their respective Physical Education (PE) instructors. A comparative descriptive design is used to describe variables and examine differences in variables in two or more groups that occur naturally in a setting. The method of inquiry was based on two adapted instruments. The collected data from the questionnaires were analyzed by using appropriate statistical tools to derive the necessary results.

**Population and Sampling.** The participants in this study are 170 college students as samples from College of International Business and Economics in Wuhan City, Hubei Province in China. The researcher used proportional stratified random sampling using 95% level of confidence at 5% margin of error. This sampling method was used to guarantee proportional representation of all pertinent subgroups within the population, hence minimizing sampling bias and improving the generalizability of the study's results. Through the utilization of proportionate stratified random sampling, the researcher guaranteed that various strata within the student population were sufficiently represented, mirroring the numerous academic levels and backgrounds inside the college. This method is especially advantageous in research involving diversity within subgroups, since it facilitates more accurate estimations and comparisons among distinct types of students. Furthermore, the use of a 95% confidence level and a 5% margin of error ensures a high degree of dependability and precision in the results, guaranteeing that the findings are statistically significant and can be reliably generalized to the larger student population. The stratification

technique reduces possible sample mistakes by ensuring that each subgroup's representation corresponds to its proportion in the total population, resulting in a more precise and thorough investigation of the influence of PE teachers' critical thinking on student learning outcomes.

**Instrumentation.** The researcher adapted the Critical Thinking Assessment Test (CAT). The instrument assesses a broad collection of critical thinking skills that transcend most disciplines. This helped the student respondents successfully apply the CAT that were used to evaluate and encourage their teachers' critical thinking assessment with questions on evaluating information, creative thinking and problem solving.

**Statistical Treatment.** In analyzing the data, the following statistical treatments were used at 0.05 level of significance using Statistical Package for Social Sciences (SPSS) software:

1. Frequency Count and Percentage. This was used in the analysis of the profile of the student respondents in terms of sex, age and year level.
2. Weighted Mean. This was used to analyze the student respondents' perception of their teacher's level of critical thinking in terms of evaluating information, creative thinking and problem solving. The results were interpreted as follows:

Table 1  
*Four-point Likert scale to measure critical thinking skills*

Weight	Scale/Range	Description/Interpretation
4 -	3.51-4.00	Strongly Agree/ Very High Level
3 -	2.51-3.50	Agree/ High Level
2 -	1.51-2.50	Disagree/ Low Level
1 -	1.00-1.50	Strongly Disagree/ Very Low Level

3. T-test /ANOVA. The t-test and/or Analysis of Variance or F-test was used to determine if significant difference exists in the critical thinking of the PE instructors based on

student respondent's assessment when their profiles are taken as factors.

**Decision Criteria.** The analysis of the hypothesis was carried out using the 0.05 level of significance. The null hypotheses will be accepted if the computed significance value is greater than the set value at 0.05.

**Data Gathering Procedure.** The researcher adopted questionnaires which were validated by experts from the fields of educational psychology and leadership and management. After which, a letter of request was sent to the president of College of International Business and Economics in Wuhan City, Hubei Province in China, asking permission to conduct the study. Following approval, the questionnaires were distributed to the student respondents for data collection. However, before collection of data, an informed consent form was signed by the respondents of the study, and it was ensured that they understood the tenets of the research and how data will be used. This study was conducted during the first semester of school year 2023-2024.

## RESULTS AND DISCUSSION

**Profile of the Respondents.** Table 2 presents the profile data of the respondents. In terms of age, thirty-seven (37) or about 21.8% of the student respondents are 18 years old and below, sixteen (16) individuals, constituting 9.4%, fall within the 19 - 20 years old age group, eighty-five (85) students, representing 50%, belong to the 21 - 22 years old category, and thirty-two (32) respondents, accounting for 18.8%, are 23 years old and above. This means that majority of the respondents are within the age group of 21 to 22 years old. This may be taken to mean that the respondents are at the appropriate age to evaluate their teachers with regards to critical thinking.

In terms of sex, fifty-two (52) students, making up 30.6%, are male, while one hundred eighteen (118) students or 69.4%, are female. This means that the majority of the student respondents are female in terms of sex. This may be taken to

mean that there are more female students than male students in the institution.

Table 2  
*Frequency Distribution of the Student Respondents' Profile*

Profile	Frequency	Percentage
<b>Age</b>		
18 years old and below	37	21.8%
19 – 20 years old	16	9.4%
21 – 22 years old	85	50%
23 years old and above	32	18.8%
<b>Total</b>	<b>170</b>	<b>100%</b>
<b>Sex</b>		
Male	52	30.6%
Female	118	69.4%
<b>Total</b>	<b>170</b>	<b>100%</b>
<b>Year Level</b>		
Year 1	14	8.2%
Year 2	43	25.3%
Year 3	54	31.8%
Year 4	59	34.7%
<b>Total</b>	<b>170</b>	<b>100%</b>
<b>Academic Performance</b>		
75-79	3	1.8%
80-85	27	15.9%
86-90	84	49.4%
91-95	56	32.9%
<b>Total</b>	<b>170</b>	<b>100%</b>

In terms of Year level, fourteen (14) students, equivalent to 8.2%, are in Year 1, forty-three (43) students, comprising 25.3%, belong to Year 2, fifty-four (54) students, making up 31.8%, are in Year 3, and fifty-nine (59) students or 34.7%, are in Year 4. This means that majority of the respondents are in Year 4. This illustrates that the respondents are already towards the end of their studies for their chosen degrees.

In terms of academic performance, three (3) students, or 1.8%, fall within the 75-79, twenty-seven (27) students, representing 15.9%, have an academic performance between 80-85, eighty-four (84) students, making up 49.4%, perform within the 86-90 score range, and fifty-six (56) students, accounting for 32.9%, achieve scores between 91-95. This means that the majority of the student respondents have a recorded academic performance of 86 to 90. This means

that the student respondents' academic performance, as indicated by their Years, are satisfactory.

Perception of Student Respondents on the Level of their PE Instructors' Critical Thinking. Taking into consideration the assessment of the student respondents on the level of their PE instructors' critical thinking in terms of evaluating information, creative thinking, and problem solving, the highest mean of 3.60 (Table 3), with the qualitative description of the students strongly agreeing about their PE instructor and is interpreted as the level of their PE instructors' critical thinking in terms of evaluating information is very high, was found for item 3 which states that the students' PE teachers can understand the limitation of correlational data. Understanding the limitations of correlational data is crucial for PE teachers as it allows them to approach the information with a nuanced perspective.

Table 3  
*Mean Perception of Students in terms of Evaluating Information, (n=170)*

My PE teacher ...	Mean	Qualitative Description	Interpretation
can separate factual information from inferences.	3.00	Agree	High Level
can interpret numerical relationships in graphs.	3.21	Agree	High Level
can understand the limitation of correlational data.	3.60	Strongly Agree	Very High Level
can evaluate evidence and identify inappropriate conclusions.	3.13	Agree	High Level
<b>Composite Mean</b>	<b>3.23</b>	<b>Agree</b>	<b>High Level</b>

On the other hand, the lowest mean of 3.00, with the qualitative description of the students agreeing about their PE instructor and is interpreted as the level of their PE instructors' critical thinking in terms of evaluating information is high, was found for item 1 which states that the students' PE teachers can separate factual information from inferences. The ability to distinguish factual information from inferences is a fundamental aspect of critical thinking for PE teachers. In the context of physical education, accurate and reliable information is crucial for designing effective teaching strategies and assessing student progress. PE instructors with a high level of critical thinking demonstrate a keen awareness

of the distinction between facts and inferences, allowing them to make informed decisions based on solid evidence.

The overall mean of 3.23 shows that the students agree about their PE instructor and is indicative that the level of their PE instructors' critical thinking in terms of evaluating information is high. The unanimous agreement among students regarding their physical education (PE) instructor can be indicative of a high level of critical thinking on the part of the instructor when it comes to evaluating information. When students uniformly express positive sentiments about their PE instructor, it suggests that the instructor has effectively engaged with and responded to the needs of the students, demonstrating a keen understanding of their educational and physical development.

**Table 4**  
*Mean Perception of Students in terms of Critical Thinking, (n=170)*

My PE teacher ...	Mean	Qualitative Description	Interpretation
can identify alternative interpretations for data or observations.	2.90	Agree	High Level
can identify new information that might support or contradict a hypothesis.	3.54	Strongly Agree	Very High Level
can explain how new information can change a problem.	3.45	Agree	High Level
can analyze information and make a reasonable judgment call.	3.44	Agree	High Level
Composite Mean	3.33	Agree	High Level

Taking into consideration the assessment of the student respondents on the level of their PE instructors' critical thinking in terms of creative thinking, the highest mean of 3.54, with the qualitative description of the students strongly agreeing about their PE instructor and is interpreted as the level of their PE instructors' critical thinking in terms of creative thinking is very high, was found for item 2 which states that the students' PE teachers can identify new information that might support or contradict a hypothesis. PE teachers who possess a high level of critical thinking, particularly in terms of creative thinking, are adept at identifying new information that might either support or contradict a hypothesis. Creative thinking involves the ability to generate novel ideas, consider alternative perspectives, and explore

uncharted territories. In the context of physical education, this translates to a teacher's capacity to adapt to new information, challenge preconceived notions, and refine instructional approaches based on emerging insights.

On the other hand, the lowest mean of 2.90, with the qualitative description of the students agreeing about their PE instructor and is interpreted as the level of their PE instructors' critical thinking in terms of creative thinking is high, was found for item 1 which states that the students' PE teachers can identify alternative interpretations for data or observations. PE teachers with a high level of critical thinking, particularly in terms of creative thinking, excel in identifying alternative interpretations for data or observations. Creative thinking involves the ability to explore various perspectives and consider unconventional explanations for phenomena. In the context of physical education, this skill is crucial for instructors to develop a comprehensive understanding of students' performance, behaviors, and progress.

The overall mean of 3.33 shows that the students agree that the level of their physical education (PE) instructors' critical thinking in terms of creative thinking is high. When students unanimously agree about their PE instructor, it can be a strong indication of the instructors' high level of critical thinking, particularly in terms of creative thinking. This alignment of positive feedback reflects a well-rounded and effective teaching approach that goes beyond mere technical competence, showcasing the instructors' ability to engage students on a deeper level.

**Table 5**  
*Mean Perception of Students in terms of Problem Solving, (n=170)*

My PE teacher ...	Mean	Qualitative Description	Interpretation
can separate relevant from irrelevant information.	2.85	Agree	High Level
can integrate information to solve problems.	3.37	Agree	High Level
can learn and apply new information in appropriate situations.	3.30	Agree	High Level
can use PE skills to solve real - world problems.	3.52	Strongly Agree	Very High Level
Composite Mean	3.26	Agree	High Level

Taking into consideration the assessment of the student respondents on the level of their PE instructors' critical thinking in terms of problem solving, the highest mean of 3.52 (Table 5), with the qualitative description of the students strongly agreeing about their PE instructor and is interpreted as the level of their PE instructors' critical thinking in terms of problem solving is very high, was found for item 4 which states that the students' PE teachers can use PE skills to solve real - world problems. PE teachers who demonstrate the ability to apply physical education (PE) skills to real-world problems showcase a high level of critical thinking, particularly in terms of problem-solving. This capacity reflects the instructors' proficiency in translating theoretical knowledge into practical applications, showcasing a holistic and versatile approach to education. A PE instructor with a high level of critical thinking possesses the capability to identify connections between PE skills and real-world challenges. For example, if there's an issue of low physical activity among students, a creative-thinking PE teacher might design engaging and inclusive activities that address this problem directly. This ability to recognize and analyze real-world problems within the context of physical education signifies a depth of critical thinking that extends beyond the traditional boundaries of the subject. Moreover, the application of PE skills to real-world problems requires instructors to think innovatively and adapt their methodologies to suit the specific needs of their students. A teacher with high critical thinking skills might, for instance, develop programs that promote health and wellness within the broader community or collaborate with local organizations to address physical fitness challenges. This proactive and solutions-oriented approach reflects a teacher's ability to think critically and creatively about how PE skills can contribute to broader societal well-being. Instructors with a high level of critical thinking in problem-solving also demonstrate an awareness of the interconnectedness between physical health and various aspects of life. For instance, they might recognize the impact of physical well-being on academic performance, mental health, or social

dynamics. By addressing these interconnected challenges through PE skills, the instructor showcases a holistic understanding and a capacity for systemic problem-solving.

Furthermore, a PE teacher with strong problem-solving skills is likely to engage students in critical thinking themselves. This involves encouraging students to apply their physical education knowledge to solve real-world problems, fostering a sense of agency and empowerment. Students, under the guidance of such instructors, develop the ability to analyze challenges, think creatively about solutions, and apply their PE skills in meaningful ways beyond the classroom. All in all, the ability of PE teachers to use PE skills to solve real-world problems is a clear indication of their high level of critical thinking, particularly in terms of problem-solving. This approach goes beyond the traditional confines of the subject, showcasing a teacher's adaptability, creativity, and a commitment to addressing broader societal challenges through the lens of physical education. It highlights the instructors' capacity to think critically about the applicability and impact of PE skills in real-world contexts, ultimately contributing to a more comprehensive and beneficial educational experience for students.

On the other hand, the lowest mean of 2.85, with the qualitative description of the students agreeing about their PE instructor and is interpreted as the level of their PE instructors' critical thinking in terms of problem solving is high, was found for item 1 which states that the students' PE teachers can separate relevant from irrelevant information. The ability of PE teachers to effectively separate relevant from irrelevant information is a key indicator of their high level of critical thinking, particularly in terms of problem-solving. In the field of physical education, where instructors must navigate various data, feedback, and observations, this skill is crucial for making informed decisions and designing effective strategies to address challenges. PE instructors with a high level of critical thinking can discern which information is pertinent to the specific problem at hand. For example,

when evaluating the effectiveness of a new fitness program, they can focus on relevant data such as changes in students' physical fitness levels, engagement rates, or overall satisfaction. This selective approach to information processing allows instructors to avoid being overwhelmed by extraneous details, honing in on what is essential for problem-solving. The ability to separate relevant information is closely tied to an instructors' efficiency in problem-solving. A teacher who can quickly identify the key factors contributing to a challenge or obstacle is better equipped to devise targeted and effective solutions. For instance, if there is a decline in student participation, a critical-thinking PE instructor might pinpoint factors like lack of variety in activities, insufficient student engagement, or issues with scheduling, allowing for a more precise and strategic problem-solving process. Instructors with a high level of critical thinking also demonstrate a keen awareness of potential biases or distractions that could cloud their judgment. They approach information with a discerning eye, evaluating its reliability, validity, and significance in the context of the problem at hand. This skill contributes to a more objective problem-solving process, ensuring that decisions are based on accurate and pertinent information rather than irrelevant or biased data. Moreover, the ability to separate relevant from irrelevant information extends beyond the immediate challenges in the classroom. PE teachers with strong critical thinking skills can consider the broader implications of information, recognizing how it fits into the larger context of educational goals, student well-being, and societal needs. This holistic approach to information processing enhances the instructors' capacity to address multifaceted issues and contribute to more comprehensive and effective problem-solving strategies. All in all, the capability of PE teachers to separate relevant from irrelevant information is a clear indication of their high level of critical thinking, especially in terms of problem-solving. This skill enables instructors to streamline their decision-making process, focus on essential factors, and develop targeted solutions to challenges in the field of physical education. Ultimately, it enhances the overall

effectiveness of their problem-solving abilities, contributing to a more dynamic and responsive educational environment for students.

The overall mean of 3.26 shows that the students agree about their PE instructor and is indicative that the level of their PE instructors' critical thinking in terms of problem solving is high. When students uniformly agree about their physical education (PE) instructor, it serves as a compelling indicator that the instructor possesses a high level of critical thinking, particularly in terms of problem-solving. The agreement among students implies a consistent and positive experience, suggesting that the PE instructor is adept at addressing challenges and implementing effective solutions within the educational setting.

A high level of critical thinking in problem-solving for a PE instructor is reflected in their ability to identify and analyze issues systematically. Students are quick to recognize when their instructor navigates challenges with a thoughtful and strategic approach. Whether it's addressing issues related to student engagement, designing effective fitness programs, or managing time constraints, a PE instructor with advanced problem-solving skills demonstrates the ability to dissect problems and devise well-informed solutions. The agreement among students may indicate that the PE instructor excels in prioritizing and addressing the most impactful challenges. Critical thinking in problem-solving involves discerning which issues require immediate attention and which can be addressed through more gradual or comprehensive strategies. An instructor who garners agreement from students likely demonstrates a capacity to identify and tackle the most relevant and pressing concerns within the realm of physical education. Additionally, a high level of critical thinking in problem-solving enables the PE instructor to adapt to evolving circumstances. Students' agreement could imply that the instructor effectively adjusts their strategies to meet changing needs, whether due to shifts in student dynamics, emerging educational trends, or external factors. This adaptability is a key aspect of problem-solving, showcasing the



instructors' ability to think creatively and implement solutions that align with the dynamic nature of the educational environment. The agreement might indicate that the PE instructor incorporates student input and feedback into the problem-solving process. Critical thinking involves valuing diverse perspectives and actively seeking input from stakeholders. Instructors who foster an open and collaborative problem-solving environment demonstrate a commitment to continuous improvement, ensuring that solutions are not only effective but also resonate with the needs and experiences of the students.

All in all, when students unanimously agree about their PE instructor, it strongly suggests that the instructors' level of critical thinking in terms of problem-solving is high. The positive consensus indicates that the instructor is proficient in identifying, analyzing, and addressing challenges within the realm of physical education. This alignment of student perspectives highlights the effectiveness of the instructors' problem-solving strategies, ultimately contributing to a positive and enriching educational experience for all students involved.

Significant Differences in the Perception of the Student Respondents on their PE Instructors' Level of Critical Thinking. Table 6 presents the differences in the perception of the respondents relative to the critical thinking skills of their PE instructors. In terms of age, the analysis indicates that there are no significant differences in the assessment of the PE instructors' critical thinking among students of different age groups (18 years old and below, 19-20 years old, 21-22 years old, and 23 years old and above). The mean scores across these groups are relatively close, ranging from 3.20 to 3.30, with an overall mean of 3.28. The F-value of 0.75 with a p-value of 0.52 suggests that the differences are not statistically significant. Therefore, age does not seem to be a decisive factor influencing students' perceptions of their PE instructors' critical thinking abilities in terms of evaluating information, creative thinking, and problem-solving.

Regarding sex, the analysis indicates a statistically significant difference in the assessment of the PE instructors' critical thinking between male and female students. The mean scores for male and female students are 3.34 and 3.25, respectively. The F-value of 3.81 with a p-value of 0.05 suggests that these differences are statistically significant. Consequently, there is evidence to support the assertion that gender plays a role in how students perceive their PE instructors' critical thinking abilities.

Table 6  
*Differences in the Perception of Students in terms of Demographic Profile*

	Group	Mean	SD	F-value	Sig	Decision on Ho	Interpretation
Age	18 years old and below	3.25	.26	.75	.52	Accepted	Significant
	19 - 20 years old	3.20	.37				
	21 - 22 years old	3.30	.25				
	23 years old and above	3.26	.24				
	Total	3.28	.26				
Sex	Male	3.34	.20	3.81	.05	Accepted	Not Significant
	Female	3.25	.28				
	Total	3.28	.26				
Year Level	Year 1	3.16	.27	2.73	.04	Rejected	Significant
	Year 2	3.26	.19				
	Year 3	3.35	.26				
	Year 4	3.25	.29				
	Total	3.28	.26				
Academic Performance	75-79	3.35	.18	1.61	.18	Accepted	Significant
	80-85	3.17	.23				
	86-90	3.29	.27				
	91-95	3.29	.27				
Total	3.28	.26					

In terms of Year Level, the analysis reveals significant differences in students' assessments based on their Year level. While Year 1 students have a lower mean score (3.16), Year 3 students have a higher mean score (3.35). The F-value of 2.73 with a p-value of 0.04 indicates that these differences are statistically significant. Thus, students from different Year levels perceive variations in their PE instructors' critical thinking abilities.

In terms of Academic Performance, significant differences in students' assessments based on their academic performance exist. Notably, students with scores in the 75-79 range have a higher mean score (3.35), while those in the 80-85 range have a lower mean score (3.17). The F-value of 1.61 with a p-value of 0.18 suggests that these differences are not statistically significant. Therefore, academic performance does not seem to be a decisive factor in students' perceptions of their PE instructors' critical thinking.

## Proposed Upskilling Program for PE Instructors

Rationale of the Program. In response to the evolving landscape of physical education and the increasing demand for versatile and proficient educators, we present a comprehensive upskilling program designed to enhance the critical thinking, problem-solving, and creative thinking skills of physical education (PE) instructors. This initiative acknowledges the dynamic nature of the education sector and the pivotal role that PE instructors play in shaping students' holistic development. As we strive for excellence in physical education, it becomes imperative to equip our instructors with the tools and competencies necessary to navigate challenges, foster innovative teaching methodologies, and engage students effectively. The proposed upskilling program is rooted in the recognition that critical thinking is fundamental to effective teaching. It aims to empower PE instructors with the ability to evaluate information, make informed decisions, and adapt their teaching strategies to the diverse needs of students. Through targeted activities, workshops, and collaborative sessions, our program seeks to elevate instructors' critical thinking skills, providing them with a robust foundation for navigating the complexities of contemporary physical education.

Furthermore, the upskilling program places a strong emphasis on problem-solving and creative thinking. It envisions a learning environment where PE instructors can proactively identify and address challenges, fostering a culture of continuous improvement. By integrating problem-solving training, creative thinking development, and technology integration sessions, the program aims to cultivate an innovative mindset among instructors, enhancing their capacity to design engaging and effective lessons that resonate with the dynamic needs of today's students.

The proposed program recognizes the importance of ongoing learning and collaboration, fostering a community of practice among PE instructors. Through regular self-

reflection sessions, peer collaboration opportunities, and data analysis workshops, the program aims to create a supportive ecosystem where instructors can learn from each other, share best practices, and collectively elevate the standards of physical education within our educational institution.

By equipping our instructors with enhanced critical thinking, problem-solving, and creative thinking skills, we aim to not only meet the challenges of the modern educational landscape but also to foster an environment that inspires innovation, inclusivity, and excellence in physical education. Through this initiative, we reaffirm our commitment to providing high-quality and forward-thinking education that empowers both our educators and students alike.

Objectives. This proposed upskilling program for PE instructors intends to equip teachers with the appropriate skills which they can utilize and optimize in the exercise of their inherent role. Specifically, the proposed upskilling program for PE instructors below needs to be implemented, monitored and evaluated for all the concerned stakeholders.

Table 7  
*Matrix of Proposed Upskilling Program*

Key Result Area	Activity/ies	Persons Involved	Performance Indicators
Critical Thinking Enhancement	Conduct workshops on critical thinking in PE	PE instructors, educational psychologists	Increased participation in workshops; pre- and post-assessment scores
Problem-Solving Training	Provide problem-solving training sessions	PE instructors, instructional designers	Observable improvement in instructors' ability to design effective solutions to teaching challenges
Creative Thinking Development	Integrate creative thinking exercises into PE curriculum	PE instructors, curriculum development team	Student engagement levels, innovative activities incorporated into lessons
Continuous Professional Development	Facilitate regular seminars and webinars on new teaching methodologies	PE instructors, education experts	Participation rates in professional development opportunities; implementation of new methodologies in class
Peer Collaboration Sessions	Establish a platform for PE instructors to share best practices and challenges	PE instructors, facilitators	Frequency of collaborative sessions; implementation of shared best practices in individual teaching contexts
Incorporate Feedback Mechanisms	Introducing regular feedback cycles between students and instructors	PE instructors, students	Increased frequency and quality of feedback received; measurable improvements in teaching methods
Inclusive Teaching Practices	Develop training in inclusive teaching methods	PE instructors, diversity and inclusion specialists	Observation of instructors implementing inclusive practices; student feedback on inclusivity
Technology Integration Training	Provide training on incorporating technology into PE classes	PE instructors, technology specialists	Integration of technology in lessons; positive impact on student engagement
Regular Self-Reflection Sessions	Encourage instructors to engage in self-reflection practices	PE instructors	Evidence of self-reflection activities; improvements in teaching strategies over time
Data Analysis Workshops	Conduct workshops on effective data analysis in physical education	PE instructors, data analysis experts	Application of data-driven insights in teaching; improved student outcomes

**Conclusion.** Based on the findings of this study, the researcher came up with the following conclusions.

The demographic profile of the student respondents showed that the majority of the respondents are within the age group of 21 to 22 years old, are female in terms of sex, are in Year 4, and have a recorded academic performance of 86 to 90.

When students uniformly agree about their PE instructor, it is a strong indicator of the instructors' high level of critical thinking in terms of evaluating information, creative thinking, and problem-solving ability. This alignment of positive feedback suggests that the instructor excels in adapting teaching methods, providing constructive feedback, utilizing evidence-based practices, and prioritizing a student-centered approach. Ultimately, such qualities contribute to a positive and effective learning environment in physical education. A creative-thinking PE instructor goes beyond conventional teaching methods, fostering an engaging, adaptable, and student-centered learning environment. This alignment of positive feedback underscores the instructors' commitment to enhancing the overall physical education experience, contributing to the holistic development and well-being of the students. The positive consensus indicates that the instructor is proficient in identifying, analyzing, and addressing challenges within the realm of physical education. This alignment of student perspectives highlights the effectiveness of the instructors' problem-solving strategies, ultimately contributing to a positive and enriching educational experience for all students involved.

The results of the study show that age and academic performance don't have a significant influence on students' perception of the teachers' critical thinking skills. However, there are statistically significant differences based on gender and year level. For example, male students and students in higher academic levels tend to give their teacher better ratings for critical thinking. According to these results,

demographic factors have an extensive impact on how students evaluate the skills of their teachers.

**Recommendations.** Given that there are significant differences in students' assessments based on gender, future studies could delve deeper into understanding the specific aspects of the PE instructors' critical thinking that influence these perceptions. Exploring the nature of these differences may help in tailoring teaching strategies that resonate better with male and female students.

The study reveals significant differences in students' assessments based on Year levels. Conducting a more detailed examination of these variances, such as investigating specific challenges or preferences associated with each Year, could provide valuable insights. This information can be utilized to develop targeted interventions or teaching strategies that address the unique needs of students at different Year levels.

While academic performance does not show significant differences, further exploration may uncover nuances in how students with varying academic achievements perceive their PE instructors' critical thinking abilities. A qualitative approach, such as interviews or focus group discussions, could offer a more nuanced understanding of the relationship between academic performance and perceptions of teaching effectiveness.

To establish a more comprehensive understanding of how students' perceptions evolve over time, researchers may consider adopting a longitudinal study design. Following a cohort of students over several years could provide insights into the long-term impact of the PE instructors' teaching methods on critical thinking perceptions.

Supplementing quantitative findings with qualitative methods, such as interviews or open-ended surveys, can offer a richer understanding of students' experiences and perceptions. Qualitative data can provide context to quantitative results, allowing

researchers to explore the intricacies of critical thinking perceptions beyond numerical values. Increasing the sample size and diversifying the demographic characteristics of the participants may enhance the study's external validity. Including a broader range of students in terms of age, socio-economic background, and geographical location can provide a more comprehensive picture of how critical thinking perceptions vary across diverse student populations.

To gain a more nuanced understanding of critical thinking perceptions, future studies could investigate specific components of critical thinking, such as problem-solving, creative thinking, and information evaluation, separately. This approach would provide a more granular insight into the aspects of critical thinking that significantly impact student perceptions.

Establishing regular feedback mechanisms between PE instructors and students could contribute to ongoing improvements in teaching methodologies. Encouraging an open dialogue and collecting feedback throughout the academic year can enable instructors to make real-time adjustments based on student preferences and needs.

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