

Research Article

Higher-Order Thinking Skills of Pre-Service Social Studies Teachers

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Abstract: Higher-order thinking skills (HOTS) focus on four domains: critical thinking, creative thinking, problem-solving, and decision-making. There is a lack of quantitative evidence about HOTS since it is dominated by qualitative research, which limits the capacity to evaluate the advancement of HOTS among social studies majors. This descriptive study aimed to identify the level of HOTS of pre-service social studies teachers. The statistical information on their evolution in higher education is not provided. There is a limited capacity to evaluate the advancement of HOTS on social studies pre-service teachers. A random sample of 139 social studies majors from different universities and colleges in Panay and Negros Islands, Philippines, answered the research questionnaire. The descriptive statistics used were mean and rank, while the inferential statistics used were the Kruskal-Wallis H-test set at a 0.05 level of significance. The study revealed that social studies pre-service teachers demonstrated a high level of HOTS, with problem-solving skills being highly used. Meanwhile, critical thinking skills ranked last among the four domains, making it the least commonly used of the four thinking skills. Significant differences were found in their high-order thinking skills. Strengthening higher-order thinking skills prepares them to guide the students to become thoughtful citizens who are equipped to address problems in society.

Keywords: higher-order thinking skills (HOTS); social studies; teacher education

1. Introduction

Higher-Order Thinking Skills (HOTS) involve examining thought processes, assessing information, and generating solutions to address a problem (Miterianifa et al., 2021). Through HOTS, students can identify ideas, make hypotheses, argue well, solve problems, and construct explanations well. Understanding how HOTS domains, such as critical thinking, creative thinking, problem-solving, and decision-making were the focus of recent studies, and through integrating cutting-edge teaching techniques like problem-based learning, group projects, and technology integration, while focusing to deficiencies in teacher preparation programs, standardized testing instruments, and the use of HOTS at all educational levels, most especially in elementary and secondary education. A significant problem nowadays is the misalignment between educational methods and the growth of HOTS. Assessments created by teachers frequently emphasize lower-order thinking skills (LOTS), neglecting critical thinking, creative thinking, and problem-solving. There has been increasing interest in arguing that curriculum reform is necessary to make the development of HOTS a top priority. Teachers need to quickly adopt more efficient teaching methods and assessment techniques, in light of the identified gaps in problem-solving, decision-making, critical analysis, and creative thinking. This includes giving students additional chances to practice these skills in a variety of settings, to improve their logical reasoning, information processing, and creative problem-solving skills, and to foster a more knowledgeable and flexible approach to decision-making (Witte, 2024). Teachers can help students grow into more effective critical thinkers who can address the different problems of the modern world by knowing these deficiencies. In social studies, these skills are particularly significant because the field calls on students to assess societal problems, critically analyze historical events, and provide solutions to current problems.

Research on university-level students is still limited, even if HOTS are essential in social

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studies education. There is a knowledge gap regarding HOTS among social studies majors because the majority of research focuses on elementary and secondary education. Current studies mostly focus on younger students, ignoring how college students acquire and use these abilities. HOTS is dominated by qualitative research, which offers descriptive insights but lacks empirical metrics. Although HOTS concepts are examined in this research, statistical information regarding their evolution in higher education is not provided. The capacity to evaluate HOTS advancement among social studies majors is limited by the lack of quantitative evidence. Research such as Palangda et al. (2025) and Busri et al. (2023) described HOTS in teacher education; however, skill growth is not quantified. The effectiveness of university students' learning and application of HOTS is undetermined, given the lack of quantitative evidence. Research in this field is still primarily associated with theoretical discussions and not with quantifiable results. Although they emphasize the value of quantitative approaches, Boral et al. (2025) concentrate on high school students instead of college students. It is difficult to assess HOTS development throughout educational levels due to a lack of quantitative data. To comprehend HOTS development among social studies majors, statistical analysis is required.

This study is anchored with Bloom's Revised Taxonomy and Metacognition Theory, which serves as the foundation for this study. Analysis, evaluation, and creation are among the mental processes required for HOTS that can be formally defined and categorized using Bloom's Revised Taxonomy. In line with the recognized requirement for quantitative research, this model aids in measuring and quantifying the growth of HOTS. (Aziz & Rawian, 2022). However, because metacognition theory contains self-regulation, reflective thinking, and awareness of cognitive processes, these are all emphasized as being lacking from teacher training programs, and it is intimately related to HOTS growth. Giving students opportunities to apply these abilities in different situations enhances their critical and creative thinking (Alpindo et al., 2024). The higher-order thinking abilities of pre-service social studies teachers are derived, argued, and processed by both Bloom's Revised Taxonomy and Metacognition Theory. Surveys are utilized in this study to examine the HOTS of social studies pre-service teachers. A quantitative study design offers concrete insights into their cognitive growth in order to give educators, lawmakers, and curriculum developers evidence-based recommendations that will help them better align social studies education with the of the 21st century's evolving demands.

This research specifically aims to answer the following research questions: (1) What is the level of HOTS of social studies pre-service teachers? (2) Are there significant differences in the HOTS of social studies pre-service teachers? Based on the preceding problems, the researchers proposed the hypothesis: There are no significant differences in the HOTS of social studies pre-service teachers.

2. Materials and Methods

2.1. Research Design

This study used a quantitative descriptive research design by McCombes (2019), which aims to methodically assess the higher-order thinking abilities of pre-service social studies teachers. A descriptive research design systematically describes a population, situation, or phenomenon. This kind of research design allows an in-depth and systematic examination of the current level of higher order thinking skills, without altering any data. Each individual who wants to participate, has a fair chance to take part in the study by using this kind of selection strategy, which only relies on probability (Noor et al., 2022).

2.2. Research Instrument

This study adapted the Likert scale of Witte (2024), indicating a high level of reliability, which has an overall reliability result of 0.959. The four sections of the questionnaire are (a) critical thinking skills, (b) creative skills, (c) problem-solving skills, and (d) decision-making skills. Respondents indicated their level of agreement with each of the 16 statements in each section by checking the corresponding response column. Respondents indicated their level of agreement with each statement by selecting one of the following options: a.) Strongly Agree, b.) Agree, c.) Neutral, d.) Disagree, and e.) Strongly Disagree. The results were interpreted as:

Table 1. Scale and interpretation of results.

Scale	Interpretation
4.20-5.00	Very High
3.40-4.19	High
2.50-3.39	Moderate
1.80-2.59	Low
1.00-1.79	Very Low

To interpret the responses of their level of agreement, the following descriptive range by Çelik and Oral (2016) was used for the 5-point Likert scale (table 1): 1.00-1.79 (Very Low) indicates that their level of HOTS are very low; 1.80-2.49 (Low) suggests that their level of HOTS are low; 2.50-3.39 (Moderate) reflects a moderate level; 3.40-4.19 (High) signify a high level; 4.20-5.00 (Very High) demonstrates a very high level of their HOTS. This interpretation guide was applied in analyzing the mean score to ensure consistency and clear analysis of respondents' level of HOTS.

2.3. Research Respondents

The subjects of this study were randomly selected social studies majors from different universities and colleges in the Panay and Negros Islands, Philippines. Random sampling is a sampling method mostly utilized in quantitative studies with survey instruments (Noor et. al., 2022).

Table 2 shows the distribution of the 139 social studies major respondents from universities and colleges in the Panay and Negros Islands. The most students were third-year students, comprising 52, or 37.4%, of the total, followed by first-year students with 46, or 33.1%. Second-year students accounted for 27, or 19.4%, while fourth-year students were the smallest group with 14, or 10.1%. This distribution implies that most participants were in the middle years of their academic programme, ensuring that various year levels were represented in the study.

Table 2. Distribution of the respondents as an entire group and when classified as a whole and according to year level.

Category	N	Percentage
As a Whole	139	100%
<i>Year level</i>		
1st Year	46	33.1%
2nd Year	27	19.4%
3rd Year	52	37.4%
4th Year	14	10.1%

2.4. Data Collection

A formal letter was sent to the different colleges and universities to conduct the data gathering. A Google Form version of Witte's original survey instrument was made and was administered to the respondents online (Witte, 2024).

All the respondents were requested to answer the questionnaire to determine the level of their HOTS. After the data was collected, the researchers analyzed, counted, and tallied the data through Microsoft Excel. The given answers of each respondent were encoded using the Statistical Package for the Social Sciences (SPSS). The discussion, recommendations, and conclusions were made after conducting the survey and after a thorough analysis.

2.5. Ethical Considerations

Prior to their involvement, respondents were notified of the study's goals, and their agreement was sought. Their responses remained anonymous, as no personal identifiers were collected or used. Participants can withdraw their participation at any moment without penalties, which means it requires voluntary participation. Responses were examined for accuracy, outliers, and inconsistencies, including reverse-coding errors, in order to ensure the data's quality. Furthermore, Likert scale responses were changed into numerical values between 1 and 5 in order to code them quantitatively for analysis.

2.6. Data Analysis Procedures

To analyze the results, statistical procedures were applied to the study's data. The percentage was used to calculate the percentage of pre-service social studies teachers who belonged to a particular category to determine the level of their HOTS. Ranking was also integrated to determine which items in the questionnaire were most frequently identified by the respondents. While the mean was computed to identify the average value, and the total amount of the data gathered. Additionally, the Kruskal-Wallis H-test, a non-parametric technique, was used to compare the mean rankings of critical thinking, creative thinking, problem-solving, and decision-making skills of social studies pre-service teachers. Lastly, the ANOVA Repeated Measures was employed to identify whether significant differences existed in the HOTS within the same group of pre-service social studies teachers across multiple conditions.

3. Results

This section presents and explains the results gathered from the respondents. It focuses on how pre-service social studies teachers demonstrate their HOTS based on the data collected. Each result is explained in connection to how these skills appear in teaching and learning situations. The data were analyzed using descriptive statistics which includes mean, interpretation, standard deviation, and rank, along with inferential statistics that includes significant differences between the variables.

3.1. Descriptive Data Analysis

Table 3 answers the first research question: What is the level of HOTS of pre-service social studies teachers? The results show how the respondents performed in the four domains of HOTS, namely critical thinking, creative thinking, problem-solving, and decision-making. Its shows that the level of HOTS of social studies pre-service teachers was high (M= 4.06, Sd= 0.40), with problem-solving skills ranked as first (M= 4.1, Sd= 0.59), followed by decision-making skills (M= 4.09, Sd= 0.48), creative skills (M= 4.09, Sd= 0.49), and critical thinking skills (M= 3.97, Sd= 0.65) as last on the ranking.

Table 3. HOTS of Social Studies Pre-Service Teachers.

HOTS	Mean	Interpretation	Std. Deviation	Rank
As a Whole	4.06	High	0.40	--
Critical Thinking Skills	3.97	High	0.65	4
Problem-Solving Skills	4.1	High	0.59	1
Decision-Making Skills	4.09	High	0.48	2
Creative Skills	4.09	High	0.49	3

The overall result shows a high level of HOTS with a mean of 4.06. This means that the respondents generally show good ability to analyze, evaluate, and create ideas. Among the four domains, problem-solving skills ranked highest with a mean of 4.10, showing that pre-service teachers are confident in applying knowledge to find solutions to real-life problems. Decision-making skills ranked second with a mean of 4.09, which means they can make sound and reasonable choices in different situations. Creative skills, with the same mean of 4.09, show that respondents are able to generate new ideas, though this area may still need more focus in their training.

The lowest mean is found in critical thinking skills (3.97), which suggests that while respondents can think critically, there is still room for improvement in evaluating and analyzing information. Overall, the results show that pre-service social studies teachers demonstrate strong higher-order thinking abilities, especially in practical and applied areas like problem-solving and decision-making. However, they may benefit from more activities that strengthen their critical and reflective thinking to achieve balanced development across all HOTS domains.

3.2. Inferential Statistics

Table 4 shows that there are significant differences in the HOTS of social studies pre-service teachers. The table illustrates varying mean ranks across different domains of HOTS: creative thinking, problem-solving, decision-making, and creative skills. Among these skills, problem-solving skills obtained the highest mean rank (2.58), followed by decision-making

skills (2.54) and creative skills (2.53). Creative thinking skills recorded the lowest mean rank (2.35), implying that the respondents may be less confident or less exposed to tasks that require generating original or innovative ideas.

Table 4. HOTS of Social Studies Pre-Service Teachers

HOTS	Mean Rank	df	F-ratio (ANOVA)	P-Square
Creative Thinking Skills	2.35			
Problem-Solving Skills	2.58	3.000	2.740	0.049
Decision-Making Skills	2.54			
Creative Skills	2.53			

Legend: Significant at $p < 0.05$

The analysis also shows that the computed F-ratio (3.000) and p-value (0.049) are within the threshold of significance at $p < 0.05$. Since the p-value is less than the set level of significance, the difference in the mean ranks across the four higher-order thinking skill areas is statistically significant. This implies that the respondents do not demonstrate uniform levels of higher-order thinking; rather, certain skill areas are more developed than others. The variation suggests that while some pre-service teachers excel in problem-solving and decision-making, others may still need further development in creative thinking-based tasks. The results confirm that there are significant differences in the HOTS of social studies pre-service teachers, highlighting the need for instructional strategies and training programmes that strengthen weaker skill areas and promote balanced skill development.

4. Discussion

This study revealed important details about the reflective and cognitive processes of pre-service social studies teachers, modeled with Bloom’s Revised Taxonomy and Metacognition Theory. There are six levels of Bloom’s Revised Taxonomy cognitive skills: Remember, Understand, Apply, Analyze, Evaluate, and Create. The study’s findings reveal that the “Apply,” “Analyze,” and “Evaluate” levels of Bloom’s Revised Taxonomy imply the two most frequently employed HOTS, problem-solving and decision-making. Since the “Create” level implies creative skills, pre-service social studies teachers should also use new ideas and creative methods to encourage critical thinking and participation. As being the last on the ranking, critical thinking skills are implied to the “Analyze” and “Evaluate”, which suggests that the pre-service social studies teachers might still be developing the depth of their critical thinking skills.

The results demonstrate different levels of metacognitive awareness and regulation among pre-service teachers from the viewpoint of metacognition theory. Higher proficiency in problem-solving and decision-making reflects stronger metacognitive control, where individuals actively plan, monitor, and adjust their cognitive strategies. The lower scores in critical thinking may point to less developed metacognitive strategies related to self-questioning and critical evaluation.

The HOTS of social studies pre-service teachers are high. The results are anchored with existing studies, which show that their critical thinking dispositions were at a high level. Considering this, the awareness, reasoning, and abilities in judgment of pre-service teachers effectively enhance their understanding of the structure of knowledge to a sophisticated level. There is a strong foundation and appreciation for HOTS among teachers in training and practice. Their understanding of HOTS is clear, and they actively employ it in their academics and lessons (Carkit & Kurnaz, 2022; Krogman, 2022).

Problem-solving skills were the highly used HOTS. It means that the pre-service social studies teachers perceive themselves as most competent in this thinking skill. Problem-solving is a foundational skill for educators who must navigate complex classroom dynamics and social issues. It reflects the practical orientation of social studies education, which involves applying knowledge to real-world problems (Yilmaz, 2011). Problem-solving is a critical component of critical thinking frameworks, often serving as the entry point for engaging higher-order cognitive processes. It remains central in both educational and professional contexts, supporting the view that learners and practitioners prioritize this skill for effective reasoning and task completion (Facione, 2015).

Decision-making skills ranked as the second highly used higher-order thinking skill by pre-service social studies teachers. Making decisions is an essential aspect of both problem-

solving and critical thinking. It involves evaluating options and choosing the best ones, which is an essential procedure in situations that are unclear and unpredictable (Paul & Elder, 2014). Its position as a vital HOTS is further strengthened by the fact that it involves intricate cognitive processes that are essential for managing the real environment. These perspectives are supported by the present research, which indicates that people usually make decisions as a logical progression of problem-solving exercises, reflecting the degree of complexity needed in various fields (Castellón-Flores et al., 2025). The two HOTS that pre-service social studies teachers utilize the most are problem-solving and decision-making. This suggests that at the tertiary level, these two HOTS are dominant. They are encouraged to analyze, question critically, and detail material. Critical thinking abilities are typically developed through discussions and more thorough research. Furthermore, innovative thinking and creative problem-solving are frequently emphasized in college education programs (Lismaya et al., 2025).

Creative skills ranking third may mean that this thinking skill is often underemphasized in educational settings compared to problem-solving and decision-making. Creative skills significantly improve the students' HOTS. However, creativity tends to be less systematically developed due to constraints in the curricula and the dominance of tasks favoring convergent over divergent thinking (Yosepha et al., 2023). Creative thinking involves both domain-specific knowledge and domain-general cognitive abilities, and its effective cultivation requires supportive environmental and intrapersonal factors such as motivation and resilience. These results provide support for the notion that even when creativity is appreciated, it is still neglected (Brandt, 2023). Due to their similar means, decision-making and creative skills are placed second and third, respectively. This shows that pre-service teachers understand how important it is to make wise choices and be creative in their chosen field. To match teachings to the various needs of the students and promote innovation, creativity, and decision-making are both connected elements of HOTS (Kivunja, 2015).

Critical thinking skills were the HOTS that pre-service social studies teachers used the least. Self-efficacy among students was associated with critical thinking. The research of Syarifah et al. (2019), individuals who had lower levels of self-efficacy performed poorly on critical thinking tests such as inference and clarity. It might be difficult to continuously teach and practice critical thinking. It opposes the study's conclusions about why pre-service social studies teachers use critical thinking the least out of all the HOTS. Although critical thinking is valued by students, they may not always clearly show their critical thinking abilities. The observed decreased use may be the result of contextual factors that limit opportunities for critical analysis and evaluation or gaps in teaching strategies, highlighting the need for targeted approaches to develop these skills (Dwyer et al., 2014).

The four categories of HOTS varied significantly, based on this study. Pre-service social studies teachers often demonstrate similar levels of creativity, problem-solving, and decision-making abilities. In their daily or educational contexts, these skills might be improved or applied frequently. The study's finding that critical thinking skills scored lowest among the four areas of HOTS reveals an ongoing challenge for pre-service social studies teachers. This indicates the need for improved teaching methods that focus on the development of critical thinking, especially through organized debates, exercises using evidence-based reasoning, and analytical tasks that go beyond memorizing. Witte (2024). It was also highlighted that the underdevelopment of critical thinking skills can be attributed to insufficient training and the inadequacy of teacher-made assessments in measuring HOTS uniformly (Abosalem, 2016). Critical thinking skills were the least developed among the domains of HOTS. A need for more instructional interventions and assessment frameworks that are intentionally and specifically designed to cultivate and measure the critical thinking skills of social studies pre-service teachers. Moreover, the significant differences observed in the study may also be explained by instructional variations. Groups exposed to innovative teaching methods showed marked improvements in problem-solving skills and creative skills (Hamdan et al., 2019).

Furthermore, this research revealed the level of HOTS of pre-service social studies teachers and the significant differences in their HOTS. However, some limitations and gaps should be addressed in future studies. Firstly, this study was limited to pre-service social studies teachers from a specific region, the Panay and Negros Island regions only. Future research should include pre-service social studies teachers from a variety of institutions and geographic regions. Secondly, the accuracy of reporting the HOTS domains, like critical thinking, was affected by introducing bias in the use of self-assessment questionnaires, as responses relied on respondents' self-perception rather than observation of behavior or

performance-based tasks. Considering this, future studies may supplement self-report questionnaires with other methods such as classroom observations and performance-based assessments. Thirdly, it does not consider how HOTS develops over time as students advance in their teacher education programs. Incorporating a mixed-methods approach could help enhance self-reported data by including observational evidence. Fourthly, control of variables is limited in this research; the variables, such as prior academic training, individual factors like self-efficacy or motivation, were not isolated. Future studies may use controlled experimental designs or advanced statistical methods to isolate and identify the effects of specific variables. Lastly, this study does not examine the progression of HOTS among pre-service teachers throughout their program. It fails to identify whether training, teaching experience, or instructional methods significantly influence the development of these skills. Future studies should analyze the impact of specific training, teaching experiences, and instructional methodologies on the development and enhancement of HOTS. There is a need to conduct deliberations on the curriculum to ensure that learning objectives are in line with HOTS. Active learning techniques like collaborative inquiry and problem-based learning must be implemented in order for the students to be encouraged to actively engage with content through discussion, investigation, problem-solving, fostering critical thinking, creativity, and decision-making abilities.

5. Conclusions

Pre-service social studies teachers mostly rely on problem-solving skills, while critical thinking skills are the least developed. Its significant differences in their domains underline the necessity to cultivate critical thinking and creative thinking alongside problem-solving and decision-making, to ensure a balanced domain of HOTS. These skills are essential for social studies pre-service teachers to navigate the challenges that they face in their academic journey and real-world teaching demands successfully when they become professionals. The results of this study show that the respondents have a high level of HOTS, particularly in problem-solving, decision-making, and creative thinking. The knowledge that they learn shows how their thinking skills continue to develop as they advance in their careers, affecting not only their academic and personal growth but also the future of social studies education. Employing HOTS is beneficial, especially for pre-service teachers to be able to solve problems rationally, think critically, make decisions wisely, craft creative ideas about different social issues, analyze causes and effects, and encourage their students to ask questions and form independent opinions. These skills allow them to understand lessons deeply, apply their knowledge in real-life situations, and find meaningful solutions to problems that may arise in the classroom or community. These skills allow them to understand lessons deeply, apply their knowledge in real-life situations, and find meaningful solutions to problems that may arise in the classroom or community. When they become in-service teachers, these abilities will help them plan lessons that promote analysis, reflection, and creativity among their students. Schools and universities should continue to include activities that develop critical, creative, and analytical skills. These may include research projects, classroom debates, and real-life problem-solving tasks that help learners think beyond memorization. Therefore, developing their HOTS prepares them to not only educate but also lead future learners. As future educators, they will not only teach concepts and theories from the book but also foster inquiry and mold the students into becoming informed citizens capable of addressing problems in society.

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Data Availability: The data supporting the findings of this study are available from the author upon reasonable request.

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