Original Article

Critical Thinking Skills of Education Students in a State University: Insights and Implications for Curriculum Development

Carlito Asuncion [1,*], Olive Lorenzo [1], Jean Aguillon [1]

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Abstract

This study assessed the critical thinking skills of education students in a state university and examined how the findings may inform curriculum development in teacher education. Framed by Bloom's revised taxonomy and the national emphasis on 21st-century competencies, the study used a sequential explanatory mixed-methods design in which survey results were interpreted alongside students' open-ended descriptions of instructional strategies. Respondents were predominantly aged 20-22 years (54.10%), female (77.60%), mostly in the third year (26.50%), and enrolled in BEEd (34.70%), BSEd English (32.70%), or BSEd Social Studies (32.70%). Quantitative results showed satisfactory critical thinking across creating (WM = 3.18, SD = 0.574), evaluating (WM = 3.27, SD = 0.531), and analyzing (WM = 3.18, SD = 0.745), with evaluating emerging as the strongest domain. No significant differences were found across gender and year level in the three domains. Age showed a significant difference only in creating ($F = 3.356$, $p = 0.037$), while specialization showed significant differences in creating ($F = 13.519$, $p = 0.000$) and analyzing ($F = 8.729$, $p = 0.000$). Qualitative findings showed that faculty commonly used questioning, problem-solving tasks, gamified activities, collaboration, authentic assessment, inquiry tasks, projects, discussion, and feedback. These strategies help explain students' stronger evaluative confidence, while the comparatively modest results in creating and analyzing suggest that creativity and analytical depth require more deliberate, discipline-

[1] President Ramon Magsaysay State University, Zambales, Philippines
* hadrienmathis@gmail.com

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specific scaffolding. The study recommends curriculum interventions that intentionally strengthen the creation and analysis of content through specialization-based projects, inquiry tasks, authentic assessments, reflective feedback, and structured opportunities to engage with multiple perspectives.

Keywords: analyzing, creating, critical thinking, curriculum development, evaluating, teacher education

1. Introduction

Critical thinking is a core competence in teacher education because future teachers are expected not only to understand content but also to guide learners in questioning ideas, weighing evidence, solving problems, and producing reasoned judgments. Facione (2015) defines critical thinking as purposeful, self-regulatory judgment involving interpretation, analysis, evaluation, inference, and explanation. In curriculum terms, these skills are closely aligned with the higher cognitive processes in Bloom's revised taxonomy, particularly analyzing, evaluating, and creating (Anderson & Krathwohl, 2001). Evidence from higher education also shows that critical thinking improves when instruction is explicit, dialogic, problem-oriented, and connected to authentic tasks rather than limited to content transmission (Abrami et al., 2015).

The need to strengthen critical and creative thinking is especially urgent in the Philippine educational context. PISA 2022 describes its assessments as measuring how well learners solve complex problems, think critically, and communicate effectively, competencies that indicate readiness for real-life challenges (OECD, 2023). The PISA 2022 creative thinking report further shows the importance of creative thinking as a measurable educational outcome rather than an optional skill (OECD, 2024). For teacher education, this national concern connects with the Commission on Higher Education (CHED) policies and standards for the Bachelor of Elementary Education and Bachelor of Secondary Education, which emphasize outcomes-based preparation, professional competence, and the development of teachers who can respond to diverse learners and changing classroom demands (CHED, 2017a, 2017b).

Within this broader context, state universities need program-level evidence on how pre-service teachers demonstrate critical thinking and what instructional experiences support or limit its development. Studies that report institutional performance are useful for quality assurance, but the scientific value of this inquiry lies in linking students' critical thinking profiles with curriculum decisions in teacher education. This study, therefore, assessed education students' levels of creating, evaluating, and analyzing; examined whether these levels differed by age, gender, year level, and specialization; and interpreted the quantitative patterns through students'

descriptions of the instructional strategies they experienced. The findings are intended to guide curriculum development by identifying which higher-order thinking domains require common support across programs and which require specialization-specific interventions.

2. Methodology

2.1 Research Design

The study employed a sequential explanatory mixed-methods research design. Quantitative data were collected first to determine students' levels of critical thinking and to test differences across profile variables. The qualitative strand followed a focused explanatory phase, using an open-ended survey item that asked students to describe the instructional strategies faculty used to develop critical thinking. The qualitative responses were not treated as a separate measurement of faculty performance; rather, they were used to help interpret the quantitative patterns, particularly the comparatively modest creating scores and the significant differences in creating and analyzing by age and specialization. This design is consistent with explanatory mixed-methods procedures, in which qualitative evidence is linked to quantitative results during interpretation (Creswell & Plano Clark, 2018; Ivankova et al., 2006).

2.2 Respondents

The respondents of the study were education students in a state university. The accessible population consisted of 384 students enrolled in BEEd, BSEd English, and BSEd Social Studies during the data-gathering period. Using Slovin's formula, n = N/(1 + Ne2), with a 5% margin of error, the computed sample size was 196 respondents. Stratified random sampling was employed by grouping students according to year level and specialization, followed by proportional allocation and random selection within each stratum. This procedure ensured that the sample represented the major education programs and year levels included in the study.

2.3 Measures

The study used a modified survey questionnaire based on established instruments and related measures of critical thinking, particularly the Critical Thinking Questionnaire developed by Kobylarek et al. (2022) and the creative thinking measure used by Dupri et al. (2021). The instrument focused on three domains: analyzing, evaluating, and creating. It contained three sections: a respondent profile, a critical thinking skills assessment, and an open-ended item asking students to describe the actual instructional strategies used in their courses to promote critical thinking. The questionnaire underwent expert validation and pilot testing among BSEd and BEEd

students. Reliability analysis using SPSS yielded an acceptable overall Cronbach's alpha of 0.782.

2.4 Data Analysis

Quantitative data were analyzed using frequency, percentage, weighted mean, standard deviation, and analysis of variance at the 0.05 level of significance. The weighted means described students' levels of creating, evaluating, and analyzing, while ANOVA tested differences across age, gender, year level, and specialization groups. Qualitative responses from the open-ended item were analyzed using thematic analysis, which involved coding recurring statements, clustering similar codes into themes, and selecting representative statements that retained respondents' actual voices (Braun & Clarke, 2006). Integration occurred during results interpretation, connecting the instructional themes to the quantitative domains. For example, the frequency of questioning and problem-solving strategies was examined in relation to evaluating and analyzing, while the presence or absence of inquiry, project-based, and creative tasks was used to interpret the creating domain.

3. Results

3.1 Respondents Profile

The frequency and percentage distributions of the respondents' profiles by age, gender, year level, and specialization are shown in Table 1. The demographic profile of the respondents revealed a predominantly young group of education students. Most respondents were aged 20-22 years (106, 54.10%), followed by those aged 18-19 (58, 29.60%) and those aged 23 years and above (32, 16.30%). The sample was largely female (152, 77.60%), with 41 male respondents (20.90%) and 3 respondents identifying as LGBTQ+ (1.50%). In terms of year level, third-year students formed the largest group (52, or 26.50%), while first, second and fourth-year students each had 48 respondents (24.50%). The specialization distribution was also balanced, with BEEd students comprising 68 respondents (34.70%) and BSEd English and BSEd Social Studies students comprising 64 respondents each (32.70%).

3.2 Level of Critical Thinking Skills of Education Students

The level of critical thinking skills of education students was measured in three domains: creating, evaluating, and analyzing.

3.2.1 Creating

Table 2 shows the level of critical thinking skills of education students in creating a domain.

Table 1. Frequency and percentage distribution of the respondents' profile.

Profile Variables	Category	Frequency (f)	Percentage (%)
Age	18–19 years old	58	29.6
	20–22 years old	106	54.1
	23 years old and above	32	16.3
	Total	196	100.0
Gender	Male	41	20.9
	Female	152	77.6
	LGBTQ+	3	1.5
Year Level	First	48	24.5
	Second	48	24.5
	Third	52	26.5
	Fourth	48	24.5
Specialization	BEEd	68	34.7
	BSEd English	64	32.7
	BSEd Social Studies	64	32.7
Total		196	100.0

Table 2. Level of critical thinking skills of education students in terms of "Creating"**.**

No.	Creating	Weighted Mean	SD	Descriptive Equivalent	Rank
1	I like combining information from different texts	3.24	.573	Agree	4
2	The same content can be expressed in many different ways	3.28	.514	Strongly Agree	2
3	Everything already exists, so nothing completely new can be created	2.95	.718	Agree	10
4	I can see the structure of the text, and I could change it	3.10	.663	Agree	9
5	I form my impression on the basis of various information that I combine with each other	3.19	.532	Agree	6
6	I like discussing new meanings in texts that I already know	3.30	.569	Strongly Agree	1
7	I can provide many ways or suggestions for doing things	3.21	.514	Agree	5
8	I can generate a variety of ideas, answers and questions	3.26	.591	Strongly Agree	3
9	I can be able to produce unique and new expressions	3.17	.526	Agree	7
10	I can be able to detail the details of an object so that it becomes interesting	3.13	.541	Agree	8
Overall Weighted Mean		3.18	.574	Agree	

Table 2 shows that the creating domain had an overall weighted mean of 3.18 (SD = 0.574), indicating Agree. The highest-rated item was "I like discussing new meanings in texts that I already know" (WM = 3.30, SD = 0.569), followed by "The same content can be expressed in many different ways" (WM = 3.28, SD = 0.514) and "I can generate a variety of ideas, answers and questions" (WM = 3.26, SD =

0.591). The lowest-rated item was "Everything already exists, so nothing completely new can be created" (WM = 2.95, SD = 0.718).

3.2.2 Evaluating

Table 3. Level of critical thinking skills of education students in terms of "Evaluating".

No.	Evaluating	Weighted Mean	SD	Descriptive Equivalent	Rank
1	After reading it, I check important information, even if it seems to be true	3.34	.498	Strongly Agree	3
2	In the discussion, I care about justifying my stance on the matter and understanding the other party at the same time	3.17	.510	Agree	9
3	When I am interested in some information, I try to check if it is true	3.35	.602	Strongly Agree	2
4	To evaluate the information, I checked many sources	3.46	.558	Strongly Agree	1
5	I can use the ability of critical thinking to evaluate many various if issues in daily life	3.25	.479	Strongly Agree	7
6	I can adapt to many existing and new issues	3.28	.588	Strongly Agree	4.5
7	I can compare problems in many kinds of perspectives and evaluate its truth	3.19	.512	Agree	8
8	I can understand how opinion is incorrect	3.27	.559	Strongly Agree	6
9	I can accomplish many varieties of opinion/information resources contradicting	3.13	.509	Agree	10
10	I have my own choice and judgment of the authenticity of information	3.28	.504	Strongly Agree	4.5
	Overall Weighted Mean	3.27	.531	Strongly Agree	

Table 3 shows that the evaluating domain had an overall weighted mean of 3.27 (SD = 0.531), indicating Strongly Agree. The highest-rated item was "To evaluate the information, I checked many sources" (WM = 3.46, SD = 0.558), followed by "When I am interested in some information, I try to check if it is true" (WM = 3.35, SD = 0.602) and "After reading it, I check important information, even if it seems to be true" (WM = 3.34, SD = 0.498). The lowest-rated item was "I can accomplish many varieties of opinion/information resources contradicting" (WM = 3.13, SD = 0.509).

3.2.3 Analyzing

Table 4 shows that the analyzing domain had an overall weighted mean of 3.18 (SD = 0.745), indicating Agree. The highest-rated item showed that students assessed information from various sources (WM = 3.37, SD = 0.534). The lowest-rated item was "In-depth analysis of reality is a waste of life" (WM = 2.45, SD = 0.890), interpreted as Disagree.

Table 4. Level of critical thinking skills of education students in terms of "Analyzing".

No.	Analyzing	Weighted Mean	SD	Descriptive Equivalent	Rank
1	In-depth analysis of reality is a waste of life	2.45	.890	Disagree	10
2	I like finding dependencies between seemingly different phenomena	3.07	.544	Agree	9
3	I can extract the most relevant parts of a text	3.12	.606	Agree	8
4	To evaluate the information, I checked many sources	3.61	2.18	Strongly Agree	2
5	When I read the text, I research for a relationship between the information it contains and other texts that I have read	3.24	.573	Agree	5
6	I can make recommendation about daily life's problems happened	3.15	.555	Agree	7
7	I can compare the similarity and difference of many varieties of information sources I obtain	3.20	.498	Agree	6
8	I can assess information from many various of resources	3.37	.534	Strongly Agree	1
9	I can distinguish facts from opinion	3.34	.528	Strongly Agree	3
10	I can refine different views from the text when reading	3.32	.550	Strongly Agree	4
	Overall Weighted Mean	3.18	.745	Agree	

3.3 Difference in the Level of Critical Thinking Skill of Education Students when Grouped According to Profile Variables

Table 5 shows that age had a significant difference in the creating domain (F = 3.356, Sig. = 0.037), while no significant differences were found in evaluating (F = 0.598, Sig. = 0.551) and analyzing (F = 1.307, Sig. = 0.273) at the 0.05 level.

Table 5. ANOVA on the level of critical thinking skills of education students in terms of age.

Level of Critical Thinking	Source	Sum of Squares	df	Mean Square	F	Sig.
Creating	Between Groups	.751	2	.375	3.356	.037*
	Within Groups	21.580	193	.112		
	Total	22.331	195			
Evaluating	Between Groups	.166	2	.083	.598	.551
	Within Groups	26.761	193	.139		
	Total	26.927	195			
Analyzing	Between Groups	.364	2	.182	1.307	.273
	Within Groups	26.877	193	.139		
	Total	27.241	195			

Table 6 shows that gender had no significant difference in creating (F = 2.232, Sig. = 0.110), evaluating (F = 0.505, Sig. = 0.604), and analyzing (F = 2.253, Sig. = 0.108) at the 0.05 level.

Table 6. ANOVA on the level of critical thinking skills of education students in terms of gender.

Level of Critical Thinking	Source	Sum of Squares	df	Mean Square	F	Sig.
Creating	Between Groups	.505	2	.252	2.232	.110
	Within Groups	21.826	193	.113		
	Total	22.331	195			
Evaluating	Between Groups	.140	2	.070	.505	.604
	Within Groups	26.787	193	.139		
	Total	26.927	195			
Analyzing	Between Groups	.622	2	.311	2.253	.108
	Within Groups	26.620	193	.138		
	Total	27.241	195			

Table 7 shows that year level did not differ significantly in creating (F = 0.554, Sig. = 0.646), evaluating (F = 1.897, Sig. = 0.132), or analyzing (F = 0.411, Sig. = 0.745) at the 0.05 level.

Table 7. ANOVA on the level of critical thinking skills of education students in terms of year level.

Level of Critical Thinking	Source	Sum of Squares	df	Mean Square	F	Sig.
Creating	Between Groups	.192	3	.064	.554	.646
	Within Groups	22.139	192	.115		
	Total	22.331	195			
Evaluating	Between Groups	.775	3	.258	1.897	.132
	Within Groups	26.152	192	.136		
	Total	26.927	195			
Analyzing	Between Groups	.174	3	.058	.411	.745
	Within Groups	27.068	192	.141		
	Total	27.241	195			

Table 8 shows that specialization had a significant difference in creating (F = 13.519, Sig. = 0.000) and analyzing (F = 8.729, Sig. = 0.000), while no significant difference was found in evaluating (F = 1.328, Sig. = 0.267) at the 0.05 level.

Table 8. ANOVA on the level of critical thinking skills of education students in terms of specialization.

Level of Critical Thinking	Source	Sum of Squares	df	Mean Square	F	Sig.
Creating	Between Groups	2.744	2	1.372	13.519	.000*
	Within Groups	19.587	193	.101		
	Total	22.331	195			
Evaluating	Between Groups	.366	2	.183	1.328	.267
	Within Groups	26.561	193	.138		
	Total	26.927	195			
Analyzing	Between Groups	2.260	2	1.130	8.729	.000*
	Within Groups	24.982	193	.129		
	Total	27.241	195			

3.4 Instructional Strategies Employed by State University Faculty to Promote Critical Thinking Skills in Education Courses

The instructional strategies employed by State University faculty to promote critical thinking skills in education courses are presented in Table 9.

Table 9. Thematic Content Analysis (TCA) on the narrative responses from the respondents.

Code	Emerging Themes	Relevant Statements	Frequency
Gamification, Gamified Strategies, Gamified Techniques	Gamification and Game-Based Learning	"Quiz games make us think fast and explain our answers."	20
Questioning, Art of Questioning, Asking Open-ended Questions, Predict and Defend, Statement Stems	Questioning Techniques and Socratic Method	"Our teacher asks why and how, not only the answer."	25
Authentic Assessment, Real-Life Problems, Case Studies, Community Projects, Critiques	Authentic and Performance-Based Assessment	"We study cases or community examples and explain what we will do."	15
Group Work, Peer Review, Cooperative Learning, Group Reporting, Peer Tutoring	Collaborative and Cooperative Learning	"We compare answers in groups before reporting."	18
Problem Solving, Problem-Based Learning, Case Analysis, Word Problems, Scenarios	Problem-Solving and Analytical Thinking	"We solve situations and defend our solution."	22
Inquiry-Based Learning, Mini-Research, Exploration Tasks	Inquiry-Based and Research-Oriented Learning	"We do mini-research before giving conclusions."	12
Think-Pair-Share, Brainstorming, Constructivist Learning, Spiral Thinking	Constructivist and Experiential Approaches	"Think-Pair-Share helps me improve my first idea."	14
Projects, Brochure Design, Oral Presentations, Reporting	Project-Based Learning and Independent Tasks	"Projects like brochures or presentations make us create our own output."	13
HOTS, Critical Thinking Mindset, Analytical Skills	Higher-Order Thinking Skills Development	"Some activities ask us to analyze, evaluate, and create, not just memorize."	11
Feedback, Self-Assessment, Reflection, Explaining in Own Words	Feedback and Reflective Practice	"Feedback and reflection help me see what to improve."	10
Interactive Discussion, Real-life Examples, Debates, Argumentative Essays	Discussion-Based and Dialogic Learning	"Debates make us listen to different sides before deciding."	13

The thematic discussion shows that faculty members used diverse instructional strategies to develop critical thinking among education students. The most emphasized strategies were questioning techniques, Socratic questioning, problem-solving, and analytical tasks, which encouraged students to explain, justify, and defend their ideas beyond simple memorization. Respondents also shared that gamification, authentic and performance-based assessments, collaborative learning, inquiry-based activities,

constructivist approaches, project-based tasks, and higher-order thinking activities helped them connect lessons to real-life situations, evaluate different perspectives, and create meaningful outputs. In addition, feedback, reflection, debates, and classroom discussions allowed students to recognize areas for improvement, listen to opposing views, and form reasoned judgments. The themes suggest that critical thinking was strengthened when students were actively engaged in questioning, collaboration, research, reflection, and practical application of learning.

4. Discussion

The findings indicate that education students generally exhibit positive critical thinking skills, with the evaluating domain emerging as the strongest, while creating and analyzing showed relatively lower performance. This suggests that students are more adept at assessing, judging, and validating information than consistently generating original outputs or performing deep analytical tasks. Anchored in Bloom's revised taxonomy, evaluating and creating represent higher-order cognitive processes that require learners to justify judgments and synthesize ideas into novel products or solutions (Anderson & Krathwohl, 2001). The prominence of evaluating may be attributed to frequent questioning, discussion, and feedback practices employed by faculty, as critical thinking involves deliberate judgment, interpretation, evaluation, and inference (Facione, 2015), and higher-order questioning can effectively shift learners beyond simple recall toward reasoned judgment (Tofade et al., 2013).

Analysis of profile variables revealed that age significantly influenced only the creating domain, whereas gender and year level did not show significant effects across any of the critical thinking domains. Specialization, however, significantly impacted both the creation and analysis, indicating that discipline-specific learning experiences contribute more to these higher-order skills than demographic factors or academic year alone. This highlights the importance of intentionally embedding creative production and analytical tasks across the BEEd, BSEd English, and BSEd Social Studies curricula rather than assuming they will develop incidentally. These results align with prior research demonstrating that problem-based, collaborative, and project-based learning can strengthen critical thinking by engaging students in complex tasks, peer interactions, and tangible output creation (Abrami et al., 2015; Gokhale, 1995; Hmelo-Silver, 2004; Bell, 2010).

Qualitative findings help explain why evaluating remains stronger than creating. Instructional strategies such as questioning, problem-solving, gamification, collaboration, authentic assessment, inquiry, projects, reflection, and discussion were prevalent. Yet, tasks specifically designed to promote creative outputs, such as inquiry-based projects and independent production, were less frequent. Consequently, while faculty practices effectively support evaluation and analysis, the curriculum could benefit from more systematic scaffolding of original lesson designs, research-based outputs, instructional materials, and reflective feedback. Evidence from cognitive and educational psychology underscores that game-based learning is most

effective when motivational features align with cognitive goals (Krath et al., 2021), and collaborative learning enhances thinking through social interaction (Vygotsky, 1978). Timely, specific feedback strengthens performance and self-regulation (Shute, 2008). Overall, the study underscores the need for a balanced instructional design that consistently provides students with opportunities to analyze evidence, evaluate alternatives, and create authentic outputs across specializations, thereby fostering comprehensive higher-order thinking.

5. Conclusion

The findings revealed that the majority of respondents were young adult education students, predominantly female, mostly third-year students, and enrolled in BEEd, BSEd English, or BSEd Social Studies. This reflects a sample drawn largely from the major teacher education programs on campus. In terms of critical thinking skills, the students demonstrated a satisfactory level in the domains of creating, evaluating, and analyzing, with evaluating emerging as the strongest area. However, the creating domain appeared to require more intentional support through inquiry-based, project-based, and output-oriented learning tasks.

The results also showed no significant differences in critical thinking skills when grouped by gender and year level, while age significantly affected creating, and specialization significantly affected both creating and analyzing. These findings suggest that higher-order thinking skills may be influenced by students' developmental experiences and the discipline-specific learning opportunities provided in their respective programs. Furthermore, faculty members employed active and student-centered strategies such as questioning, problem-solving, gamification, authentic assessment, collaborative learning, inquiry tasks, projects, feedback, and discussion. These strategies helped explain the quantitative findings, particularly the strength of students in evaluating and the need to further strengthen their ability to create and conduct specialization-based analyses.

The study indicates that foundational critical thinking skills are already present among the respondents; however, higher-order creating skills and deeper analytical abilities require more deliberate curriculum scaffolding, stronger integration of authentic and inquiry-based outputs, and clearer alignment between course activities and the critical thinking domains expected of future teachers. Future research may be conducted to strengthen the curriculum scaffolding and the instructional strategies supporting the development of critical thinking.

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Conflict of Interest Statement

The authors declare no conflict of interest.

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