

# How do High School Students in Hanoi Explain the Factors that Affect their Critical Thinking Abilities?

Tran Mai Khanh  
mkhanhtran11@gmail.com

## ABSTRACT

Critical thinking is widely recognized as an important skill, yet students' perspectives on the factors influencing its development remain underexplored. This study explores how high school students in Hanoi explain the factors that affect their critical thinking abilities. This study used a mixed methods approach. In the quantitative phase, the study collected critical thinking test scores from 171 high school students in Hanoi from international and public schools. In the qualitative phase, 16 interviews were conducted with purposively sampled students. The findings show that students' critical thinking is shaped by individual, family, and school-level factors, with engagement playing a central role. Engaged reading, extracurricular activities, family discussions, and open-ended, interactive schoolwork were perceived to support critical thinking, while memorization-focused teaching and playing musical instruments were not directly associated with enhancing critical thinking. This study provides a student-centered understanding of critical thinking development in the Vietnamese high school context.

## CHAPTER 1: INTRODUCTION

### 1.1. Context

On November 23rd, 2024, the Vietnamese Ministry of Education stated that the education system is undergoing significant change, starting with enhancing critical thinking in students<sup>1</sup>. Critical thinking has become a central educational goal in Vietnam, emphasized by various initiatives by the Ministry of Education Training (MOET) aiming to prepare students for global citizenship and problem-solving in modern society. There have been many efforts by the Vietnamese Department of Education to incorporate

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<sup>1</sup> Ha, Thanh. 2024. "English Teachers in Hanoi Trained to Utilize Linearthinking Method." Tuoi Tre News. August 6, 2024. <https://news.tuoitre.vn/english-teachers-in-hanoi-trained-to-utilize-linearthinking-method-10381311.htm>. May 2026

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critical thinking into the learning curriculum, such as the introduction of “Linearthinking” in 2024<sup>2</sup> and the Cambridge English Curriculum Training in 2025<sup>3</sup>.

## 1.2. Rationale

Most existing research on critical thinking in Vietnam and the world as a whole focuses on finding correlations between certain factors and critical thinking scores. Research conducted by Le et al (2022) categorized all factors affecting secondary students’ critical thinking abilities into three categories: demographics factors, educational factors, and nonacademic factors. The results found that all three factors show correlation, with educational factors showing the most correlation. However, such a question remains about the reasoning behind this, and there has been no further research to answer this question.

Globally, there have been many quantitative studies aiming to find factors that could influence critical thinking. I have categorized the factors into three main categories: school-level factors, individual-level factors, and family-level factors. The table below categorized factors affecting students’ critical thinking abilities. (See Table 1) The factors are placed with the top meaning most impact and the bottom meaning least impact.

Individual-level factors	Family-level factors	School-level factors
<ul style="list-style-type: none"> <li>- Reading abilities</li> <li>- Nonacademic classes</li> <li>- Playing musical instruments</li> <li>- Social media usage</li> </ul>	<ul style="list-style-type: none"> <li>- Demographics</li> <li>- Family education</li> <li>- Personality</li> <li>- Birth order</li> <li>- Siblings</li> </ul>	<ul style="list-style-type: none"> <li>- Teaching method</li> <li>- Academic classes</li> <li>- Assessment method</li> </ul>

Table 1: Categorized factors affecting critical thinking abilities.

The majority of previous studies have also targeted university or higher education students. This excludes an important population: high school students transitioning from adolescence to adulthood. They are still living with their parents and experiencing familial impact, yet have been in the education system long enough to understand and have opinions about it. Therefore, their perspectives will be very nuanced, which will offer valuable insights.

Within the limited qualitative research on critical thinking, all focus on how different target populations interpret critical thinking. There has been no research focusing on how students explain the correlations

<sup>2</sup> VietNamNet News. 2025. “100 Hanoi Teachers Begin English Training for Bilingual Cambridge Courses.” VietNamNet News. 2025. <https://vietnamnet.vn/en/100-hanoi-teachers-begin-english-training-for-bilingual-cambridge-courses-2442454.html>.

<sup>3</sup> VietNamNet News. 2024. “Happiness at the Core of Vietnam’s Education Reform Efforts.” VietNamNet News. 2024. <https://vietnamnet.vn/en/happiness-at-the-core-of-vietnam-s-education-reform-efforts-2344898.html>. May 2026

found in studies above. Therefore, this is the first study exploring the reasons behind these correlations, specifically how high school students explain the factors that influence their critical thinking abilities.

While previous research emphasizes correlations, this study focuses on students' own explanations for why certain factors have a stronger influence over their critical thinking abilities. By using a qualitative approach and focusing on high school students, this study aims to offer detailed insights into how students perceive the development of their critical thinking skills and why they can benefit from certain factors more than others.

Ultimately, this study aims to increase educators' understanding of students' perspectives, which may create future curriculum designs or teaching approaches that align more with how students most effectively develop critical thinking skills.

## **CHAPTER 2: LITERATURE REVIEW**

In this chapter, I will first define the study's definition of "critical thinking". Next, I will review the international literature of factors influencing critical thinking. I will then connect to the Vietnamese context, summarize all my literature findings, and come to my research question.

### **2.1. Defining Critical Thinking**

Critical thinking has been widely recognized as an essential cognitive skill for decision-making and problem-solving. There are many definitions of critical thinking in literature. It is defined as logical and goal-oriented thinking (Halx & Reybold, 2006); self-regulation, inference, explanation, interpretation, and evaluation (Facione, 2007); decision-making skills with inference, analysis, and evaluation (Mendelman, 2007); logical reasoning and deciding the facts after taking opinions and examining them before acceptance (Fahim & Pezeshki, 2012). The current study uses Facoine's (2015) definition of critical thinking, which is "a purposeful, self-regulatory judgement that uses skills such as interpretation, analysis, evaluation, and inference, as well as explanation of the evidence where that judgement is based."

While critical thinking is defined as a set of higher-order cognitive skills such as analysis, evaluation, and inference, these skills do not develop in isolation. Prior research suggests that critical thinking is shaped by a range of factors. Therefore, this study examines factors at three levels, individual, family, and school, that may influence the development of critical thinking skills.

### **2.2. International Review**

#### **2.2.1. Factors**

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Learning environment, teaching methods, and curriculum design are key determinants of students' critical thinking scores. Mahapoonyanont (2012) found that school factors, specifically teaching methods, had a strong impact on students' critical thinking.

Similarly, Barta (2022) also found that concept mapping, an innovative teaching method that requires students to draw relationships between different concepts, has had a moderate impact on students' critical thinking abilities and disposition compared to traditional methods.

Additionally, Jamil et al (2021) found that traditional assessment methods, which focus on rote memorization, can hinder the development of CT skills. This suggests that teaching and assessment methods focusing on making connections and reflection can deepen critical thinking skills, while those encouraging memorization may hinder it.

Individual-level variables, particularly reading ability, playing musical instruments and social media usage, are also factors that have moderate to significant effect on critical thinking abilities. Among teaching styles, parenting methods and reading abilities, Mahapoonyanont (2012) found that reading abilities have the highest correlation on students' critical thinking scores.

Similarly, nonacademic activities that encourage creativity and cognitive flexibility, such as playing a musical instrument, have also been linked to improvement in CT (Lippolis et al, 2022)

Examining the digital environments' influence on critical thinking, Duterte (2024) found that using social media for educational purposes can enhance CT, while excessive use for entertainment purposes can decrease it. These findings suggest that engagement in cognitively stimulating activities, academic or extracurricular, can contribute to developing students' CT scores.

Demographics and family-related factors have also been shown to impact critical thinking. Child-rearing methods, specifically democratic child-rearing, is one important family factor affecting CT (Mahapoonyanont, 2012).

Goisis et al (2022) found that only children demonstrated stronger critical thinking abilities, disagreeing with Sumbas and Yurtcu (2024) who found that sibling interactions contribute to cognitive development, including problem-solving skills and social understanding.

Birth order has also been found to be a strong influencing factor. Black et al (2007) and Bjerkedal et al (2007) found strong effect of birth order on IQ within families. Barclay (2015), Rohrer et al (2015) and Zajonc & Markus (1975) found that first borns have higher IQ than later borns. Since IQ measures a person's ability to reason using logic and critical thinking is the ability to analyze information and logically make judgements, these two processes are complementary, meaning that if a person has high IQ, they will likely also have high CT scores.

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Hotz & Pantano (2015) also found that those born earlier performed better academically because those born earlier benefitted from teaching their younger siblings and experienced stricter parenting than those born later.

Additionally, earlier borns are more likely to develop personality traits such as perfectionistic self-presentation (Louis & Kumar, 2016), which can be used to explain better academic performance. This shows that family backgrounds can strongly impact critical thinking abilities.

### 2.2.2. Theories

There are only several theories offering possible explanations for these factors.

There are two theories proposing why only children scored higher on the critical thinking test. First is the resource dilution theory (Blake, 1989; Downey, 1995), stating that only children tend to perform better academically than children who have siblings because they don't have to share parental resources, and second is the confluence theory (Zajonc and Markus, 1975), stating that families with one child tend to have higher intellectual abilities than larger families, so only children benefit from higher quality intellectual environment. However, the Socialization theory (Falbo and Polit, 1986) opposes this statement, saying that only children might benefit in educational outcomes, but they will experience other kinds of disadvantages because they lack siblings, resulting in worse personal adjustment, cooperativeness and ability to get along with peers.

Though there has been no results of gender being an influencing factor on students' critical thinking abilities, there have been theories and findings hinting on such results. Guillem and Mograss (2005) found that women are inclined to elaborate information in more depth, while Seinstra et al (2015) found that males are more likely to be motivated by overarching information themes. Furthermore, females have been found to outperform males in word recalling, language and memory tests (Kaushanskaya et al, 2013; Loprinzi and Frith, 2018; Theofilidis et al, 2020) while males generally showed better performance in spatial abilities, especially in mental rotation (Levine et al, 2016; Lauer et al, 2019). Spatial abilities contain problem-solving and reasoning skills, which is closely related to critical thinking. This suggests that males would score higher on the critical thinking test, and although the influence is not significant enough to be incorporated into the study, it should be held as a confounding factor.

### **2.3. Vietnamese Review**

In the Vietnamese context, there are even fewer quantitative studies about critical thinking, however the findings are quite similar to that of the previously analysed researches'. There are several factors that influence students' critical thinking abilities, including demographics characteristics, school education, and participation in extracurricular activities. However, among these, school education plays the most

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significant role in shaping students' critical thinking development (Le et al, 2022). This suggests that the teaching approaches, assessment methods, and curriculum design have a stronger impact on students' critical thinking skills than background or nonacademic factors.

## **2.4. Summary**

Overall, the literature highlights that critical thinking is influenced by a combination of school-level, individual-level, and family-level factors. International studies consistently indicate that teaching methods, learning environments, and assessment styles play the most significant roles in shaping students' critical thinking abilities. Individual-level factors such as reading habits, participation in extracurricular activities, and educational social media usage also contribute positively to CT development. Meanwhile, family-level factors including family environment, birth order, and personality traits vary in influence.

Although theoretical perspectives such as the Resource Dilution Theory, Confluence Theory, and Socialization Theory offer explanations for how family structure and upbringing may affect intellectual outcomes, findings remain mixed. Similarly, while gender differences in CT are not conclusive, cognitive and motivational variations suggest they may act as confounding variables.

In the Vietnamese context, research is still limited, but existing studies show patterns similar to international findings, with school-level factors, particularly teaching methods and assessment practices, emerging as the strongest determinant of CT skills. These insights emphasize the need for further research exploring how individual-level, family-level, and school-level factors interact to shape Vietnamese students' critical thinking abilities.

## **2.5. Research Question**

This paper seeks to understand how high school students in Hanoi explain the factors that affect their critical thinking abilities.

## **CHAPTER 3: METHODOLOGY**

In this chapter, I will first explain the research's mixed-method design and sampling criteria. Next, I will explain my data collection process. I will then tabulate my quantitative data and analyze my qualitative data using thematic analysis. Finally, I will consider my positionality, the ethics requirements, and this study's limitations.

### **3.1. Research Design**

For this research, I used a mixed-method approach, consisting of a survey of students from two school strata in Hanoi and interviews with purposively sampled students. The surveys are used to select students who I interviewed, while the interviews are used to get a deeper understanding into students' perspectives of the factors that affect their critical thinking abilities.

#### **3.1.1. Quantitative Design**

Standardized critical thinking tests such as the California Critical Thinking Skills Test or the Cornell Critical Thinking Test are unsuitable for this research because they require 40-55 minutes to complete (Butler, 2024) and mostly target university students aged 18 and above. In my school, the teacher allowed only 15 minutes for data collection during class, making these tests impractical. Therefore, after careful consideration, I selected the [Aptitude Online Critical Thinking Test](#) as the most feasible option.

The Aptitude Online Critical Thinking Test is an online test created by Aptitude-Test.com Ltd. The test assessing critical thinking skills has 10 questions and a 6-minute time limit. This test has no proven credibility, therefore, it serves as a screening/ proxy tool rather than a definitive measurement of CT.

I chose this test because the survey aims to measure CT skills to select participants for the interview phase, so a long 70-item test would be unnecessary. The test's short completion time fits my time constraints and allows students to finish it at school, increasing participation compared to longer take-home tests. Despite the Aptitude Online Critical Thinking Test's usage in previous research being low and that it lacks an accuracy score, the test met my time requirement, which allowed me to gather more data.

#### **3.1.2. Interview Design**

I designed my interview in 5 sections: Critical thinking knowledge, Family-level factors, Individual-level factors, School-level factors, and Additional information. The literature review has shown that the above categories impact a student's criticality, so this design is to ensure most information is gathered from students. The order of the sections is set from lighter-thinking to deeper-thinking questions to ensure smooth flow. The questions are also student friendly, ensuring conversational language and open tone.

### **3.2. Sampling**

#### **3.2.1. Quantitative Sampling**

This study used a purposive sampling method with a mixed-methods design to explore how high school students explain the factors that affect their critical thinking abilities. Purposive sampling is when researchers intentionally select participants. Using purposive sampling in this study helped me select only

participants with high and low critical thinking, and therefore be able to compare the data, which generates more meaningful results.

The target population of this study includes high school students in Hanoi currently attending grade 10 in public schools and grade 9 and 10 in international schools. Grade 9 public school students were excluded because they are still considered middle schoolers by the Vietnamese public school system and learn with the middle school curriculum, therefore including them would negatively impact the study. Grade 11 and grade 12 students are also excluded because they are generally busier with more school workload, preparing for university entrance examinations, and have stricter time constraints.

A total of 171 students responded, with 88 from international schools and 83 from public schools. Within the international schools, there were 37 grade 9 students (19 female, 18 male) and 51 grade 10 students (28 female, 23 male). Within the public schools, all were grade 10 students and there were 48 females and 35 males. The table below shows the total number of respondents in each category (See Table 2).

School type	Grade	Female	Male	Total
International	9th	19	18	37
International	10th	28	23	51
Public	10th	48	35	83

Table 2: Participation data in the critical thinking test in each category

### 3.2.2. Qualitative Sampling

In the quantitative phase, students from both public and international high schools in Hanoi took the Aptitude Online Critical Thinking Test. This served to select students for the interview phase.

Based on the survey result, eight students who performed highest and eight who performed lowest on the critical thinking assessment were selected for the qualitative phase. This allowed the study to compare insights from students who demonstrated strong and weak critical thinking skills.

Eight students from public schools and eight from international schools were selected to control for demographics factors. Four 9th graders and four 10th graders were also selected in international schools to control for age. An equal number of males and females were selected (8 male, 8 female) to control for gender.

### **3.3. Data Collection**

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I collected quantitative and qualitative data from 9th grade and 10th grade students in a public school and an international school. I gathered quantitative data through the Aptitude Online Critical Thinking Test scores and qualitative data through my interviews.

### 3.3.1. International School Strata

For the international school, I first gained approval from my counselor, sent an email to my principal, and got an email approval from the high school principal. I then pitched my research to 9th and 10th graders and sent them an interest form to fill out. After that, I asked students who were interested in participating to complete the critical thinking test in class under teacher supervision. Students were asked to screenshot their results and email it to me to ensure data accuracy. Finally, I selected my interview participants based on the inclusion criteria above.

I conducted the interviews on Google Meet using English. I used Read AI to transcribe my interviews since the software is free but only supports English. The average interview length with international school students is around 30 minutes. These participants were generally chattier, likely because they were already familiar with me.

### 3.3.2. Public School Strata

For the public school, I used a gatekeeper to get access to high school students. I discussed my research with the principal and asked for their approval to conduct research on their students.

As the test was administered to students from public schools, adjustments were required to ensure accessibility and appropriateness. Since many public school students had limited English proficiency, the test was translated into Vietnamese and delivered via Google Forms. Questions 1, 7, 8, 9, and 10 were adjusted to be culturally appropriate. In Question 1, "freedom of speech" was changed to "students' learning responsibilities" because freedom of speech is a sensitive topic to Vietnamese students. The question format was kept and only the term was changed. In Question 7, 8, 9, and 10, "Michael" was changed to "Minh", a common Vietnamese male name, and "Greenfield" was changed to "Hanoi", the capital of Vietnam, to make the questions more relatable.

After 10th graders filled out the test using Google Forms, I selected my participants and interviewed them online using Google Meet. The interviews were in Vietnamese, so I used Tactiq.io to transcribe the meetings. The average interview length with public school students is approximately 23 minutes. These participants were more reserved. A few only gave 1-2 word answers, and there were lots of further questions needed for them to elaborate. 5 out of 8 participants were also late or forgot their interviews. Those who came in late were given more time, while those who forgot were asked to reschedule their interview.

I listened to the recording again after each interview with the transcription to verify accuracy. The transcript was accurate, but the platform often mixed up speakers and split up sentences. Nevertheless,

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there were no audio or accent problems because public school students had a northern accent, which is the mainstream accent in Vietnam.

### 3.4. Pseudonyms

For all 16 participants who participated in the interview, I used pseudonyms to protect participants' privacy, ensure anonymity, and make participants feel more comfortable sharing. Pseudonyms are false names used in research to protect participants' identities while still humanizing them.

The interview contains personal questions about family and siblings, so all participants wished to remain anonymous. The table below shows the pseudo-names I employed for these students along with their descriptions. (See Table 3)

School Type	Grade	Scoring	Male (CT score)	Female (CT score)
International	9	High	James (8/10)	Emma (8/10)
International	9	Low	Ethan (4/10)	Sophia (3/10)
International	10	High	Daniel (10/10)	Grace (9/10)
International	10	Low	Lucas (4/10)	Lily (4/10)
Public	10	High	Quang (9/10) Huy (8/10)	Thao (10/10) Mai (9/10)
Public	10	Low	Nam (3/10) Tuan (3/10)	Vy (3/10) Ha (3/10)

Table 3: Pseudo-names for participants from each category

Since there were 16 participants, students from international schools were given English pseudo-names while students from public schools were given Vietnamese pseudo-names so readers can follow the data analysis easier.

### 3.5. Data Analysis

To analyze the data, I used a mixed-methods approach using both quantitative and qualitative data analysis.

#### 3.5.1. Quantitative Data

For the quantitative data, I categorized the critical thinking score by school strata, grade, and gender, then tabulated the data from lowest to highest. There were also duplicates from students who answered more than once, so I only took the first response and eliminated all duplicates.

### 3.5.2. Qualitative Data

For the qualitative data, I employed thematic analysis, a method developed by Braun & Clarke (2006), to analyze my data, which is used to identify, analyze and interpret patterns within data. This approach allowed for deeper insights and analysis into students' explanation of different factors that affect their critical thinking abilities. To do this, I first read my notes from different participants to identify any repetitiveness in their answers. I then identified recurring themes and highlighted important statements from their answers. Lastly, I named and explained how these themes answer my research question.

### **3.6. Positionality**

As a high school student in Hanoi, my positionality as both an insider to the education system and a researcher studying critical thinking may influence my interpretations. My familiarity with Vietnamese schooling and social norms may be beneficial when communicating to students, but I must be careful to not inject assumptions or overlook perspectives that challenge my experiences.

I come from an upper middle-class household, so that might affect some biases and assumptions I have about students from lower income households. While I have spent some time in public schools in the past, I come primarily from an international school background, which might affect some outdated vision I have of public schools.

To lessen this, I will be mindful not to assume from participants' answers or jump to conclusions for them. I will also ask detailed open-ended questions and be open to nuanced perspectives from my interviewees.

### **3.7. Ethics**

This study worked best to follow rigorous ethical standards. Participants received a consent form explaining the purpose of the study, the procedures, and the usage of their data. They were asked to sign a consent form before participating. Since our participants are students under 18, the consent form must be signed by both the student and their legal guardian. Participation in this study is entirely voluntary. Students may choose to withdraw anytime without consequences. All data collected remained confidential. The survey is entirely anonymous, so no real names appeared in the publication. Lastly, this study was conducted with the approval of the school administrations under their ethical guidelines.

### **3.8. Limitations**

There are several limitations to consider in this study. First, the small sample size of interviewees, due to limited time, could result in a possibility that the data gathered wouldn't accurately reflect all high school students in Hanoi. Second, the Aptitude Critical Thinking Test has no information verifying its credibility, which leaves room for concerns about the results' accuracy. Third, this research was conducted by a single researcher, so there is a possibility that some factors could be overlooked during the literature analysis.

Despite these limitations, this research is still important because it addressed a research gap of students' opinions, target population, and geographical context. Furthermore, future research can build on the findings by researching ways to incorporate the results into education curriculums to enhance students' critical thinking developments.

## **CHAPTER 4: FINDINGS**

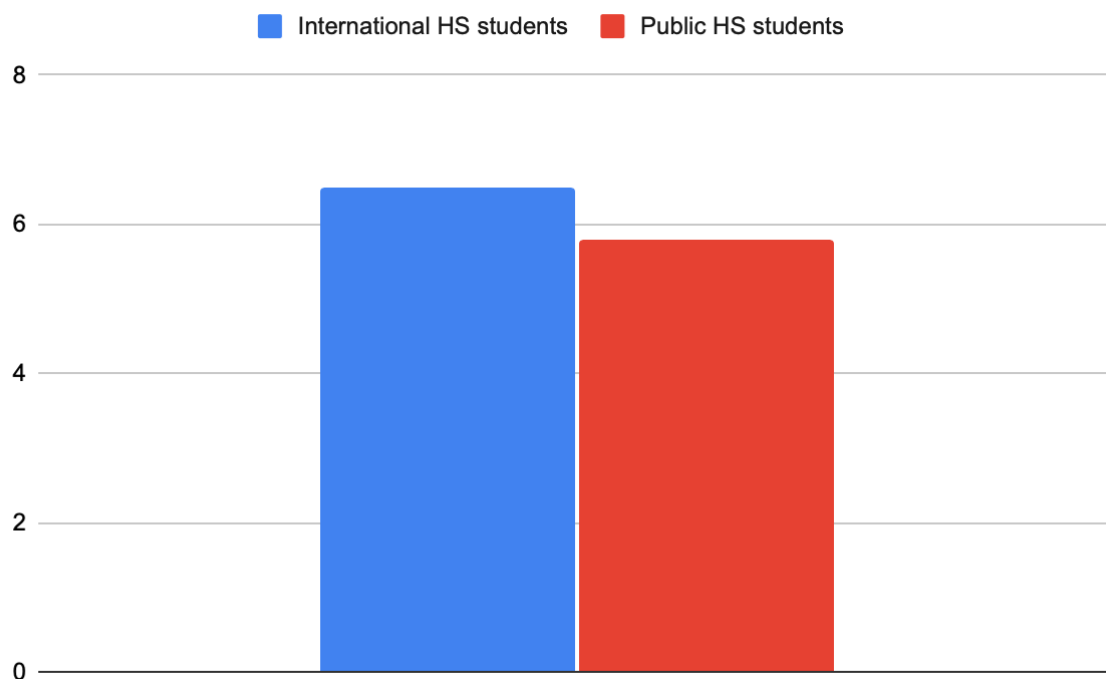
In this chapter, I will detail through all my quantitative and qualitative findings. In the quantitative analysis section, I will identify general trends, while in the qualitative analysis section, I will explore the nuances in students' perspectives of factors that influenced their critical thinking abilities.

### **4.1. Quantitative Analysis**

I used quantitative analysis mainly to identify overall trends in students' critical thinking scores and to select interview participants. Several general patterns emerged from the data.

On the whole, high school students from international schools in Hanoi performed higher on the critical thinking assessment than students from public schools. International school students had a higher mean score ( $M = 6.5$ ;  $SD = 1.77$ ) compared to public school students ( $M = 5.8$ ;  $SD = 1.70$ ). The graph below shows the average critical thinking score of high school students from international schools compared to their peers from public schools. (See Graph 1)

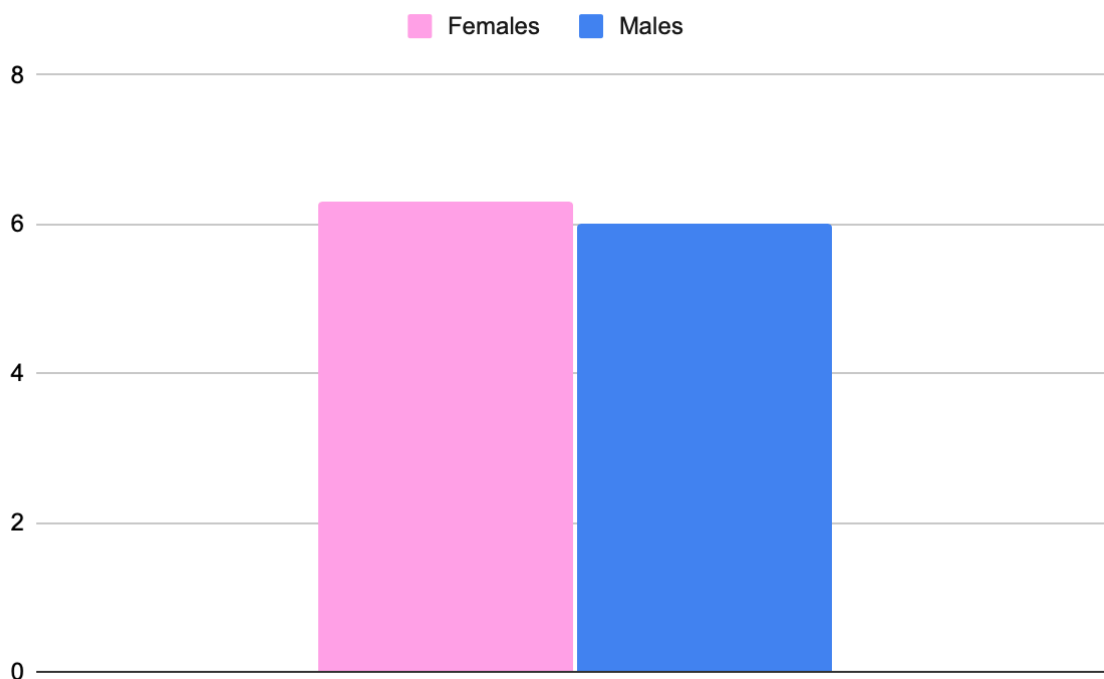
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Graph 1: Average critical thinking score of high school students from international schools compared to high school students from public schools

As shown in Graph 1, this difference indicates that students in international school environments tend to demonstrate stronger critical thinking skills on average. Although the gap is moderate, it suggests a consistent advantage that may be linked to differences in curriculum, teaching methods, or learning environments between the two school types.

There was also a small but consistent gender difference. Female students performed slightly higher on average ( $M = 6.3$ ;  $SD = 1.74$ ) than male students ( $M = 6.0$ ;  $SD = 1.80$ ). The graph below shows the average critical thinking score of female students compared to male students. (See Graph 2)



Graph 2: Average critical thinking score of female students compared to male students

Data shown in Graph 2 suggests that females, on average, tend to demonstrate stronger critical thinking. However, the difference is minimal, indicating that gender may not be a strong determining factor in critical thinking ability within this sample.

When examining more closely at grade level and school type, similar patterns appeared. Among 10th graders in international schools, female students performed higher ( $M = 7.0$ ;  $SD = 1.55$ ) than male students ( $M = 6.5$ ;  $SD = 1.81$ ). The same pattern was found in public schools, where female students performed higher ( $M = 6.0$ ;  $SD = 1.72$ ) than male students ( $M = 5.5$ ;  $SD = 1.65$ ).

However, this trend did not appear in all groups. Among 9th graders in international schools, male students performed slightly higher ( $M = 6.4$ ;  $SD = 1.91$ ) than female students ( $M = 6.1$ ;  $SD = 1.87$ ), although the difference was minor. Below is the frequency table of all participants' critical thinking scores (See Table 4).

The distribution of scores is concentrated at the mid-range, with the highest frequency at a score of 6 (38 results), followed by scores of 5 and 7. This indicates that most students demonstrate moderate critical thinking abilities. In contrast, very few students achieved the highest score 10, and no students scored at the lowest levels (1 and 2). This suggests that there are still limited variations at the extremes.

Critical Thinking Scores (out of 10)	Frequency
1	0
2	0
3	10
4	21
5	33
6	38
7	24
8	27
9	13
10	5

Table 4: CT scores' frequency

Overall, the quantitative results suggest that students from international schools generally performed better on the critical thinking test, and that female students tended to score higher than male students in most groups. The quantitative findings were also used to select interview participants and provided a basis for the qualitative analysis.

## **4.2. Qualitative Analysis**

### **4.2.1. Critical Thinking Understanding**

Before examining the factors that influence critical thinking development, it is important to understand how students define critical thinking and whether they have seen changes in their understanding over time.

There is uneven understanding of the concept "critical thinking" among students. Ha defined it as "the process of analyzing information in a logical and objective way," while Lucas described it as "using logic to understand certain complex topics." Similarly, Vy viewed critical thinking as "the thinking used to solve problems or challenge others' viewpoints based on my own thinking." highlighting problem-solving and response. Several students also emphasized considering multiple perspectives, such as Nam, who defined it as "the thinking used to rebut or respond to certain ideas." However, not all definitions were clear, as Tuan explicitly stated that he doesn't understand critical thinking. Therefore, participants' definitions of critical thinking mainly emphasized analysis, logic, and independent judgment, though the definition's clarity varied.

Out of 16 students, 8 said that their understanding of CT changed in the last year, 5 from international schools and 3 from public schools. James and Emma mentioned that it changed because of moving to high school, Daniel and Ethan mentioned that their understanding changed because of academic exposure, while Lily mentioned that it changed because of personal experiences like teaching siblings. Daniel explicitly linked this shift to academic engagement, noting that his understanding “changed last year after reading lots of books and doing a few debates”. Vy also mentioned that her understanding changed after reading a book about critical thinking.

In contrast, the other 8 participants said their understanding of CT didn’t change in the last year. Lucas and Grace mentioned that their understanding hasn’t changed recently because nothing significant happened. Participants also explained why no change occurred. Lucas noted that his “thinking hasn’t changed much because his school didn’t clearly define and teach students about critical thinking,” while Mai said that her thinking remained the same because “there hasn’t been any significant event” to prompt change. This suggests that while most students associate moving to high school with improved critical thinking, development remains uneven.

Overall, participants demonstrated a mixed understanding of critical thinking. While some showed an accurate understanding, others viewed it mainly as problem-solving or communication, and one participant did not understand it at all. Additionally, only half of the participants reported a change in their understanding over the past year, suggesting that the transition to high school influenced some students’ understandings but not others.

#### 4.2.2. Individual-level Factors

This section explores participants’ perspectives on individual-level factors that influence critical thinking. Participants noticed that reading habits, extracurricular classes and social media usage influenced critical thinking, but they did not link playing musical instruments to critical thinking development.

Most participants linked reading to critical thinking development. 11 out of 16 students, 6 from international schools and 5 from public schools, mentioned that they enjoy reading. Within those 11 students, 10 agreed that reading helped them think or question things differently because it increases their knowledge and questioning and they get to experience different perspectives. Ethan said that “reading allows you to live a life you’ve never lived before”. However, Tuan didn’t think that reading changed his perspectives because “if you want real changes, you need to go out into the real world and think more.” Additionally, higher-scoring participants like Grace and Mai were questioning more when they read compared to lower-scoring participants, with Mai saying that she often wonders about different authors’ writing styles. Interestingly, Lucas, a lower-scoring participant, mentioned that he only questions when reading fiction but doesn’t question a lot in non-fiction. Daniel also highlighted that reading frequency does not necessarily determine depth of thinking, noting that “I don’t read often, but when I do read, there is a lot of thought process and questioning going on.” This suggests that reading supports critical thinking primarily when readers are engaged.

Joining extracurricular classes increased critical thinking. All participants participated in extracurricular classes like sports or math classes, and all could identify moments when they had to use logical thinking. However, the extent to which they used logical thinking in those classes varied. Grace mentioned that she "makes a lot of judgments weighing how to play the violin most efficiently in violin class" while Lucas only made "some judgments about the charcoal amount in the shading unit" during his art class. Quang also mentioned that he "uses logical thinking a lot in English class to guess the word's meaning", while Tuan described more basic decision-making in sports. Therefore, the extent to which critical thinking is influenced also depends on the type of extracurricular classes taken.

Playing musical instruments also influences critical thinking. All participants from international schools played a musical instrument, primarily piano or violin, but none from public schools played a musical instrument. Those who played musical instruments thought it was somewhat similar to academic learning, but only in certain stages. Daniel, James, Emma, and Ethan explained that learning a new piece requires focus, decision-making, and problem-solving, skills they associated with critical thinking in school, while playing the piece relied more on muscle memory and involved less thinking. Others viewed the two activities as different. Sophia said that she focuses more but thinks less when playing an instrument, Lily described piano as more physically stressful but school as more mentally stressful, and Lucas felt that his focus during piano came more from interests since he usually gets bored at school. While none of the public school students played a musical instrument, all thought that playing musical instruments would increase concentration. Thao also thought that playing musical instruments can increase creativity. This suggests that students thought playing musical instruments can increase concentration and problem-solving skills, but did not directly associate it with critical thinking.

Most participants said that using social media increased their critical thinking. Out of 16 students interviewed, all use social media. They often watch content related to their interests, memes, or entertainment content. 15 out of 16 participants feel like using social media increases their knowledge about different perspectives and new knowledge they didn't know before. Lucas mentioned that using social media "expanded the scope of things I know by viewing a lot of things", and Thao said that her knowledge increased because she got exposed to more information. However, Grace felt like social media didn't increase her knowledge because she "only uses it for entertainment". Additionally, Vy warned of false information online, and James mentioned that social media would be beneficial if people use it the "right way", that is with screen time and content limit. Therefore, the way students use social media is important to developing critical thinking.

Overall, participants believed that individual-level factors influence critical thinking in different ways. Reading only supports critical thinking when readers are engaged. Extracurricular classes are also found to enhance critical thinking, but the extent depends on the type of class taken. Furthermore, social media is also viewed as beneficial for expanding perspectives, though its impact depends on how it is used. In contrast, playing musical instruments is mainly associated with concentration and problem-solving rather than critical thinking itself.

### 4.2.3. Family-level Factors

This section explores students' perspectives on family-level factors that influence critical thinking. Students emphasized the importance of family conversations, having siblings and teaching younger siblings in enhancing critical thinking.

Families influence how students think and reflect outside of school. All 16 students mentioned that their families place a strong value on education. Dinner conversations often served as informal spaces for critical thinking. All 16 students reported discussing school-related or daily events with their families during meals. Emma shared a story of her and her parents discussing her basketball game, how even though she was shorter, she still made a shot. She said that this made her think deeper about determination and effort. 13 also talked about work or daily events with their parents. Notably, 4 students from international schools mentioned discussing current events like the current Vietnamese economy or a new disease with their families. Therefore, students viewed regular family discussions as an informal but meaningful way to practice critical thinking outside of the classroom.

All participants mentioned that having siblings increased their problem-solving skills. Those with older siblings mentioned that they learned from their siblings' experiences and have to find ways to resolve problems together. James also said that being younger made him more patient. Meanwhile, those with younger siblings mentioned that they learned to solve problems earlier on and they have to be more responsible and mature. Lily reflected on this change over time, explaining that when she was an only child, she tended to solve problems in a more "self-centered and immature" way, but having a younger sibling required her to become more independent and rely on logical thinking to solve problems independently. Emma said that being an older sibling made her become a mediator for her younger siblings, and Lucas said that he can also use his knowledge to guide his sister through solving problems. Therefore, having siblings influences critical thinking by developing problem-solving skills, patience, responsibility, and the ability to guide or mediate others.

Many participants also linked teaching younger siblings to their critical thinking development. 10 out of 16 participants have younger siblings (5 from international schools and 5 from public schools) All 10 have taught their younger siblings something, whether it was Math, cooking, manners, or origami. Out of those 10, 7 thought that teaching their younger siblings increased their own knowledge, 2 thought that it somewhat increased their knowledge, and 1 said that it didn't increase their knowledge at all. Participants thought teaching their siblings increased their own knowledge because they learned how to explain better and found their own knowledge gaps. Daniel said that "you have to be a master at something to teach someone else" while Tuan said that "everytime I teach is another time I learn; the more I do it, the more confident I will be." However, Lucas and Lily thought that teaching their younger siblings only somewhat increased their understanding. Lucas said that happened because he "doesn't teach often and isn't putting real time and effort into doing so", while Lily said that it didn't increase her knowledge of that topic but helped her better understand her sister's learning needs. On the other hand, Quang said that teaching his younger siblings didn't increase his knowledge, because he is only conveying his knowledge and isn't

learning new information. Therefore, participants explained that teaching others can support critical thinking by strengthening understanding and reflection, though its impact varies by effort and purpose.

Overall, participants see their families as playing an important role in developing their critical thinking outside of school. Regular family discussions provide opportunities for reflection, while having siblings and teaching younger siblings help build problem-solving skills, responsibility, and deeper understanding. Although teaching siblings does not benefit everyone equally, everyday family interactions are consistently viewed as meaningful contributors to students' critical thinking.

#### 4.2.4. School-level Factors

This section explores students' perspectives on school-level factors that influence critical thinking. Students highlighted the role of engaging teachers, open-ended assessment formats, and subjects that emphasize reasoning in promoting deeper thinking.

15 out of 16 students reported a favorite teacher who significantly influenced their critical thinking. These teachers were consistently described as caring, patient, and engaging. Interestingly, only one favorite teacher didn't encourage questions. Others all encouraged questions through different methods like creating an approachable classroom, stopping to ask questions or assigning research projects. Students also actively participated in their favorite teacher's class. Thao said that in her favorite teacher's math class, she was one of 3 students in a class of more than 15 who actively participated and asked questions. Lucas also mentioned that he often stayed late to ask questions in his favorite teacher's class. Therefore, students are able to gain more critical thinking from teachers they are more fond of because of increased engagement.

Test assessment format also influences CT. Participants said that they usually get tested with multiple choice questions, essays, or projects. When asked to compare how deeply each assessment type makes them think, all said that essays or projects make them think deeper than multiple choice questions. Daniel and 3 others said that presentations make them think deeper than multiple choice questions because they also have to consider the listener's perspectives. Grace and 10 others said that essays make them think deeper because there is no definite right answer and they have to "craft their own voice", while James and 6 others mentioned having to think about organization in essays and presentations. Nevertheless, all students agreed that they think less deeply in multiple choice questions because there is a right answer and it is guessable. Therefore, students think more critically during open-ended assessment formats like essays than closed assessment formats like multiple-choice questions.

All participants believed that some subjects promote critical thinking more than others. There were mixed answers when participants were asked which classes they think makes them think the hardest. English and Math were most frequently mentioned (6 out of 16 students) as encouraging logical thinking, interpretation, and having multiple viewpoints. Emma noted that English requires her to justify her opinions rather than memorize facts, while Tuan said that he learns English in a completely new language, which requires more thinking. Ha mentioned that Math problems require her to integrate a lot of

knowledge together. Science subjects were mentioned by 4 students as hard classes, with Lily remarking that Chemistry is “completely new knowledge”. Therefore, subjects that emphasize reasoning and explanation are perceived as more effective in promoting critical thinking skills.

Most participants also mentioned that they used memorization in certain classes more than others. Participants often identified STEM classes like math or science as classes where they were memorizing a lot. When asked why this happened, 8 mentioned that they memorized because of the passive teaching style, 6 mentioned the testing style that encouraged memorization, and 5 mentioned that the curriculum and knowledge itself required students to memorize. Mai told a story about one particularly boring Physics class when the teacher was reading formulas off of the book, and she had to memorize them while the teacher barely explained anything. Sophia also mentioned that “the test is basically memorization”, while Lily said that “the core of the subject forced you to memorize.” Students suggested that teachers could include more interactive activities such as games, experiments, or presentations. Ethan said that “experiments let you figure out the knowledge for yourself, not just the teacher feeding you knowledge.” Tuan also mentioned that “the teacher should add more games because when the mind is more relaxed and engaged, learning becomes easier.” However, Grace mentioned that there weren’t any classes where she was memorizing because she self-developed a mindset where instead of memorizing, she would question the knowledge, which helped her understand the topic. She felt like this helped her academic performance, so she thought that it would be beneficial if this was taught in school. Therefore, participants suggested that teaching and assessment styles influence whether learning relies on memorization or encourages deeper questioning and critical thinking.

Overall, students believed that school-level factors strongly shape their critical thinking. Teachers who are engaging and encourage questions increase student participation and deeper thinking. Teaching and assessment styles can either encourage critical thinking or lead to memorization-based learning. Open-ended assessments and subjects that emphasize reasoning are also seen as more effective in promoting critical thinking, while passive teaching and memorization-focused assessments limit it.

#### 4.2.5. Improving Critical Thinking at School

Finally, participants were asked to change one thing at their school to increase critical thinking among students.

Many students want changes in school projects. Daniel, Grace and Lucas want more group projects, which would help students consider many perspectives. Huy, Thao and Vy also want to learn less from books and more through experience like speaking activities. Furthermore, Ethan and Sophia want more ungraded skill-based activities, which would allow students to put less pressure on getting the answers right and focus more on skill development.

Several students also want additions in school curriculums. Lily wants creative writing classes where students can practice reading and writing skills, and James wants more debates or conversations about

learning topics. Furthermore, Ha wants more school trips to individually expand knowledge, and Tuan wants critical thinking to be taught more in school.

Finally, some students want changes in teaching styles and classroom environments. Quang and Nam want teachers to create a more inclusive and comfortable learning environment where all students feel cared for and comfortable sharing ideas. Emma and Mai want teachers to encourage more questions.

## **CHAPTER 5: DISCUSSION**

In this chapter, I will compare all my findings from individual-level, family-level, and school-level factors with existing literature to identify similar patterns and see if there is new knowledge discovered. I will also compare the general trends in my findings with previous literature.

### **5.1. Individual-level Factors**

The findings indicate that reading habits, extracurricular classes and social media usage influence students' critical thinking, while playing musical instruments was not perceived to directly increase critical thinking.

Many participants reported that reading supports critical thinking when they are actively engaged with the text, such as questioning ideas or reflecting on meaning. This finding aligns with Mahapoonyanont (2012), who said that reading abilities strongly influenced critical thinking abilities. Furthermore, this also extended the literature by showing that engagement is necessary for reading to effectively support critical thinking.

Many participants reported that reading supports critical thinking when they are actively engaged with the text, such as questioning ideas or reflecting on meaning. This finding aligns with Mahapoonyanont (2012), who found that reading abilities strongly influence critical thinking. This trend can also be interpreted through Socialization Theory (Falbo & Polit, 1986), which suggests that cognitive skills develop through interaction with one's environment. Active engagement with texts may provide opportunities for students to practice interpretation, evaluation, and reflection, thereby strengthening critical thinking skills.

Involvement in extracurricular classes have also been found to enhance critical thinking abilities, agreeing with Le et al (2022) who found that extracurricular classes influence critical thinking. This also built on previous research by finding that the extent to which critical thinking is enhanced also depends on the type of extracurricular classes taken.

Furthermore, participants mentioned that while using social media can increase critical thinking, their purpose and the way they use it determines critical thinking development. This supports Duterte (2025) who reasoned that using social media for educational purposes can increase critical thinking but using it excessively for entertainment purposes can hinder it.

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Many participants also reported that playing musical instruments helps improve concentration, but they did not directly associate it with the development of critical thinking. This finding partially aligns with Lippolis et al. (2022), who found that playing musical instruments offers cognitive benefits related to focus and mental discipline. However, this disagrees with existing literature by suggesting that students perceive these benefits as irrelevant to critical thinking development.

Therefore, reading habits, extracurricular classes and social media usage contributes to critical thinking development, but playing a musical instrument does not. This confirms Mahapoonyanont (2012), Le et al (2022), and Duterte (2025), and partially disagrees with Lippolis et al. (2022) by suggesting that although musical training improves concentration, it is not directly linked to critical thinking.

## **5.2. Family-level Factors**

The results supported that regular family discussions, sibling interactions, and teaching younger siblings all contribute to critical thinking development.

Family discussions serve as informal but meaningful ways to practice critical thinking outside of the classroom. This finding is consistent with Le et al (2022), who said that children with more involved parents tend to develop more critical thinking skills, and Mahapoonyanont (2012), who said that child-rearing (the upbringing of a child) greatly influences critical thinking development. This trend can also be explained by Socialization Theory (Falbo & Polit, 1986), which suggests that cognitive skills develop through social interaction. Family discussions may provide opportunities for students to practice reasoning, questioning, and evaluating ideas, thus supporting critical thinking development.

Participants also mentioned that having siblings influences critical thinking by developing problem-solving skills, patience, responsibility, and the ability to guide or mediate others. This agrees with Sumbas and Yurtcu (2024), who said that sibling interactions lead to cognitive developments like problem solving and social understanding. However, this finding contrasts with Resource Dilution Theory, which suggests that an increase in the number of siblings may reduce the availability of parental resources for each child, potentially limiting critical thinking development. The positive role of sibling interaction found in this study suggests that learning between siblings may help offset this limitation.

Many participants also reported that teaching younger siblings supports their critical thinking by requiring them to explain ideas clearly and reflect on their own understanding. This finding aligns with Hotz and Pantano (2015), who found that older siblings develop more critical thinking skills from teaching younger siblings. This finding can also be explained by Confluence Theory, which suggests that the intellectual environment changes as siblings interact. Older siblings who teach younger ones may reinforce their own understanding through explanation and reflection, enhancing their critical thinking skills. Nevertheless, these findings also extend the literature by showing that the critical thinking impact depends on the student's effort and purpose, as students who actively engaged in explaining and guiding benefited more than those who helped only occasionally.

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Therefore, three family-level factors that enhance critical thinking abilities are family discussions, sibling interactions and teaching younger siblings. This confirms Le et al (2022), Mahapoonyanont (2012), Sumbas and Yurtcu (2024), and Hotz and Pantano (2015). While these findings disagree with the Resource Dilution Theory, they are supported by the Socialization Theory and the Confluence Theory.

### **5.3. School-level Factors**

Data indicated that 3 important school-level factors emerged, which is assessment method, teaching style, and student engagement.

Many students mentioned that they think more critically during open-ended assessments such as essays than closed assessment formats like multiple choice questions, supporting Jamil et al (2021), who argued that traditional assessment methods focusing on rote memorization can hinder critical thinking development. This study also built on prior research by showing that open-ended assessments actively encourage deep thinking and analysis, which can enhance critical thinking development.

Furthermore, students perceived subjects that emphasize reasoning and explanation as more effective in promoting critical thinking. They also thought that teaching and assessment styles determine the level of critical thinking in the class. These findings aligned with Jamil et al (2021), Mahapoonyanont (2012), which found teaching methods to have a strong impact on critical thinking, and Barta (2022), which showed that teaching approaches requiring students to make connections are more effective than traditional methods. This can also be interpreted through Socialization Theory, as classroom environments and teaching methods shape how students engage with information and develop higher analytical skills.

Notably, most students also reported gaining more critical thinking skills from teachers they find interesting, highlighting student engagement as an important factor and new findings from this research.

Therefore, assessment method, teaching style, and student engagement are three important school-level factors influencing critical thinking development. This confirms Jamil et al. (2021), Mahapoonyanont (2012), and Barta (2022). Importantly, this study also adds new insight by identifying student engagement, particularly interest in teachers, as an additional factor that supports critical thinking development.

### **5.4. General Trends**

This section outlines general trends in the critical thinking test scores of high school students in Hanoi by school strata and gender.

General trends have shown that international school students coming from higher demographics score higher on the critical thinking test. This data supports Le et al (2022) and Goisis et al (2022), who said

that children coming from higher socioeconomic backgrounds demonstrate stronger critical thinking skills.

General trends have also shown that females slightly outperform males in the critical thinking test. This finding disagrees with Levine et al (2016) and Lauer et al (2019), who found that males generally show better performance in spatial abilities and critical thinking.

Overall, students from international schools tended to score higher on the critical thinking test, aligning with existing literature, while the slightly higher performance of female students disagrees with some previous findings and suggests the influence of other factors.

## **CHAPTER 6: CONCLUSION**

In this chapter, I will summarize the study and its key contributions to the research knowledge. I will also give recommendations for key stakeholders and future research.

### **6.1. Summary of the Study**

This study investigates how high school students in Hanoi explain the factors that influence their critical thinking abilities. Although critical thinking has been widely discussed in educational literature, research focusing on high school students remains limited, particularly qualitative research that examines students' perspectives. Drawing on the literature, this study focuses on three main categories of influences on critical thinking: individual-level, family-level, and school-level factors.

This study used a mixed-methods approach to capture both the overall trends and in-depth student perspectives. Quantitative data from 171 students were collected through a critical thinking test and used to identify general trends and select interview participants. Qualitative data was collected through 16 interviews with students sampled purposively from international and public schools, including both male and female students in Grades 9 and 10. Quantitative data was organized using Google Sheets, while qualitative data was analyzed through thematic analysis.

Overall, the findings suggest that students perceive critical thinking as being shaped by factors at multiple levels. Individual-level factors relate to how students engage with learning activities and information, family-level factors reflect the role of everyday interactions and support outside of school, and school-level factors highlight the influence of teachers, teaching approaches, and assessment styles. Together, these show that students view critical thinking development as a process influenced by experiences both inside and outside the classroom.

### **6.2. Knowledge Contribution**

This study found that individual-level factors influence critical thinking in different ways. Reading supports critical thinking only when students are engaged, extracurricular classes enhance critical thinking

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depending on the type of class, and social media can expand perspectives depending on how it is used. In contrast, playing musical instruments was mainly associated with concentration and problem-solving rather than critical thinking itself.

The study also found that families play an important role in developing critical thinking outside of school. Regular family discussions provide opportunities for reflection, while having siblings and teaching younger siblings help build problem-solving skills, responsibility, and deeper understanding. Although teaching siblings does not benefit all students equally, everyday family interactions were consistently viewed as meaningful contributors to critical thinking.

At the school level, the study found that teaching style, assessment methods, and student engagement strongly shape critical thinking. Engaging teachers who encourage questions increase student participation and deeper thinking, while teaching and assessment styles determine whether learning encourages critical thinking or relies on memorization. Open-ended assessments and subjects emphasizing reasoning were seen as more effective, while passive teaching and memorization-focused assessments limited critical thinking development.

### **6.3. Implications**

Findings suggested that individual-level factors, family-level factors, and school-level factors all play a significant role in influencing high school students' critical thinking abilities. Therefore, below are some key takeaways and recommendations for key stakeholders.

#### **6.3.1. Students**

Students play the most central role in critical thinking development since their actions will directly impact their own critical thinking abilities. First, students should engage actively in learning by asking questions, explaining ideas, and reflecting rather than memorizing information. Second, students should use reading, extracurricular activities, and social media in purposeful ways that involve questioning and evaluation. Third, students should practice critical thinking by explaining concepts to others, such as peers or younger siblings.

#### **6.3.2. Educators**

Educators play an important role in developing high school students' critical thinking at school. First, educators should create engaging and supportive classrooms that encourage questioning and student participation. Second, educators should use more open-ended assessments, such as essays, projects, and presentations, to promote deeper thinking. Third, educators should explicitly teach and model critical thinking skills rather than assuming students will develop them naturally.

#### **6.3.3. Parents**

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Parents also play an essential role in high school students' critical thinking development outside of school. First, parents should encourage regular discussions about school, daily experiences, or current events to help children practice reasoning at home. Second, parents should allow children to explain their thinking and decision-making rather than giving immediate answers. Third, parents should support balanced and purposeful use of social media and extracurricular activities to promote critical thinking development.

#### **6.4. Next Steps**

Future research can build on the findings of this study in several ways. First, studies should include a larger sample size and more schools to better represent high school students in Hanoi. A larger sample would allow the findings to be more generalizable.

Second, future studies should use a more reliable critical thinking test, as no verified information on the accuracy of the Aptitude Critical Thinking Test was found, which may affect the reliability of the results.

Third, future research could also examine the impact of being an only-child on critical thinking development. Research has shown that only children score higher on CT than children with siblings, and there have been many theories supporting that. However, this study has not been able to incorporate that factor into the research.

Finally, future research can also build on the findings by exploring practical ways for educators to incorporate them into education curriculums.

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