

Developing a critical thinking training model for high school students

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Abstract

The aim of this research was to devise a framework for fostering critical thinking skills among students within high school environments in Kermanshah. Employing a practical approach, the study adopted qualitative methods to attain its objectives. Participants consisted of experts, practitioners, and researchers familiar with the subject area. Utilizing purposive sampling, 23 individuals were selected based on theoretical saturation principles. Through a combination of document analysis and semi-structured interviews, data were meticulously analyzed using coding techniques, with Grounded Theory emerging as the primary method for theory generation. Results underscored the pivotal role of cultivating thinking management in the pedagogy of critical thinking within high school contexts. Moreover, findings highlighted the significance of facilitators' and students' professional competencies and personality traits, thoughtful planning, and familial influences as key determinants. Contextual factors impacting thinking management education encompassed supportive frameworks for managerial development, emotional dynamics within the classroom, strategies for teacher engagement, and adherence to authoritative guidelines.

Keywords: Critical Thinking, Critical Thinking Model, Thinking Training Management

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1. Introduction

Educational experts have long prioritized the scrutiny of academic advancement and its determinants. While aptitude stands out as a primary indicator of student achievement, it does not operate in isolation in forecasting academic success. Hence, scholars have endeavored to assess the impact of non-educational elements on academic development, with critical thinking emerging as one such factor (Fong, Kim, Davis, Hoang, & Kim, 2017; Sepahi Khazaei, Khoshay, Iranfar, & Timare, 2016; Vierra, 2014).

Siegel (1988) defines critical thinking as 'the educational cognate of rationality', and a critical thinker, 'as the individual who is appropriately moved by reasons' (p. 25). According to experts, the capacity to think critically, solve problems, and engage in logical reasoning is widely regarded as the primary and fundamental objective of education. Individuals are encouraged to evaluate their beliefs, thoughts, habits, tendencies, and behavior, and also consider the implications of each in their lives and interactions with others (Erickson et al., 2017).

Proficiency in critical thinking holds considerable importance as it equips students to address social, scientific, and practical challenges necessitating problem-solving capabilities. The essential abilities for critically solving problems encompass reasoning, assessing, problem-solving, decision-making, and ultimately analyzing outcomes, which can be undertaken either independently or in collaboration (Magrabi, Pasha, & Pasha, 2018). The instruction of critical thinking skills ought to motivate students to pursue precision and structure, approach problem-solving in an impartial manner, possess a fervor for profound reflection, possess a strong inclination to consider opposing viewpoints, have an interest in exploring evidence and reasoning, challenge inconsistencies and intellectual uncertainty, evaluate opposing opinions with a range of criteria, and prioritize truth over personal biases (Nichols & Huff, 2017; cited in Paul, 1999). However, it has been observed that students' intellectual abilities have declined, and existing educational programs have had minimal impact on their critical thinking skills (Del Negro, 2017).

To date, numerous investigations have been undertaken to explore the connection between critical thinking and academic performance. While some studies have identified

a significant correlation between them (Fong et al., 2017; Ghanizadeh, 2017; Ross et al., 2013; Vierra, 2014), others have failed to uncover any association between critical thinking and students' educational attainment (Bakhshi & Ahanchian, 2013; Doleck et al., 2017; Shirrel, 2008). To put it differently, merely obtaining knowledge is inadequate for functioning effectively in society; individuals must also possess the ability to contemplate and assess information and knowledge. This necessitates the need for training (Engholm & Salamon, 2017).

Numerous experts have advocated for the teachability of critical thinking skills (e.g., Hilton, 2018; Othman & Kassim, 2017; Qaderi Gask & Jahani, 2017; Salehi, 2016; Tsarava et al., 2017). In the past, it was commonly held that individuals could not be trained to be innovative or creative, and instead, thinking was believed to be an inherent trait that could not be controlled or modified. However, experts like Maltzman (2010) have demonstrated that thinking, problem-solving, and creativity are not abstract concepts, but rather a natural phenomenon that operates under the same laws, systems, and principles that govern human behavior. Therefore, critical thinking is a learned behavior, and individuals can be taught to think critically and creatively by providing suitable conditions (Stefánsson, 2017). According to Abrami et al. (2008) critical thinking involves the ability to make impartial and self-regulating judgments, which has been widely acknowledged as a fundamental life skill in the current era of knowledge. Consequently, teaching critical thinking is considered a significant and fundamental objective of education.

Insufficient development of critical thinking skills can lead to even more errors, as individuals may mistake the appropriate application of information for mere memorization (Khalili & Sohrabi, 2011). Kelly and Lincona (2018) contend that education fundamentally relies on cognition, with critical thinking necessitating students to engage in thoughtful learning. This entails employing various abilities, approaches, and traits such as rationality and intuition. Under these circumstances, individuals may feel incapable and prone to errors when processing information. It is noteworthy that students devote significant amounts of time in educational settings, often memorizing irrelevant material. Given the current digital age, students must possess critical thinking skills, which, in turn, requires teachers to gain full proficiency in these techniques via training courses (Fathi Azar et al., 2013).

There are various factors that can enhance students' critical thinking skills, including individual factors such as intelligence (Beraten et al., 2017), self-motivation, enthusiasm, focus, accuracy, and self-efficacy (Ghanizadeh, 2017), as well as social factors such as class inequalities, cultural and economic capital, the value placed on knowledge, peer groups, and equal educational opportunities. In addition, educational factors such as the experience of the teacher (Roska et al., 2017; Darling-Hammond, 2017), teaching approaches (Darling-Hammond, 2017; Erickson et al., 2017), curriculum (Erickson et al., 2017), physical environment and resources (Lavi & Nickson, 2017), learning style, and teacher evaluations can also influence students' critical thinking education.

In most primary, middle, and secondary schools, the conventional style of classroom education still prevails. This involves the direct dissemination of information to students, without presenting them with any demanding scenarios to help them accomplish their desired objectives. Typically, the questions posed to students during instruction are aimed at keeping them focused on the teacher's words. Consequently, students have limited opportunities to exercise skills such as critical thinking, research, correlation, categorization, and problem-solving (Emmer & Gerwels, 2013).

Indeed, the Ministry of Education has the duty of educating and equipping the youth for a productive and engaged life in the modern era, while also establishing relationships with other societal organizations. However, it appears that the Ministry of Education in Iran has not adapted its structure and operations to align with the shifting economic, political, cultural, and social landscape, resulting in numerous obstacles. According to Wahyuni et al. (2017), providing education to students, particularly during their initial years in school, can promote their growth as self-sufficient and self-directed individuals. Moreover, it can foster the formation of values and attitudes in children, which can persist throughout their academic journey into higher levels of education.

To date, to the best of researchers' knowledge, there has been no investigation into the teaching of critical thinking skills among students, particularly in high schools. Therefore, this study aims to identify a suitable framework for managing thinking education in high school settings.

2. Literature Review

There has been a plethora of studies on critical thinking (e.g., Ghanizadeh, 2017; Hilton, 2018; Othman & Kassim, 2017; Qaderi Gask & Jahani, 2017; Salehi, 2016; Sepahi et al., 2016; Tsarava et al., 2017). Some researchers focused on the relationship between critical thinking and academic achievement (e.g., Ghanizadeh, 2017; Sepahi et al., 2016). For instance, a study performed by Ghanizadeh (2017), the interaction among reflective thinking, critical thinking, self-monitoring, and academic achievement in higher education was investigated. The research sample comprised 196 university students from Iran, consisting of 75 males and 112 females. Reflective thinking was assessed using the Reflective Thinking Questionnaire, while critical thinking was evaluated through the Watson-Glaser Critical Thinking Appraisal. Self-monitoring was gauged using the Self-Regulation Trait Questionnaire. Results indicated a correlation between critical thinking, reflective thinking, and academic achievement.

Additionally, Sepahi et al. (2016) explored the link between critical thinking disposition and academic performance among preclinical and clinical medical students. The study involved 259 students at the Medical Sciences University of Kermanshah. Critical thinking was measured using the Standard Critical Thinking Disposition Inventory Test, while academic achievement was assessed based on students' grade point average from previous terms. Results revealed a significant relationship between critical thinking and academic performance during the preclinical stage, whereas no significant correlation was observed during the clinical stage.

Some other researchers concentrated on the effect of instructing thinking skills on critical thinking (e.g., Hilton, 2018; Othman & Kassim, 2017; Qaderi Gask & Jahani, 2017; Salehi, 2016; Tsarava et al., 2017). For example, Hilton's (2018) research focused on the engagement of elementary school students in math problem-solving to enhance their cognitive abilities. The findings indicated that involving elementary school students in math problem-solving had a positive impact on their critical thinking skills. In addition, Tsarava et al. (2017) conducted research on the instruction of audit thinking in primary school students using active (involving excitement and participation) and passive (involving individual and seated activities) games. The findings indicated that the use of

active games had a significant impact on the development of audit thinking in students. Similarly, Othman and Kassim (2017) examined the teaching of thinking skills by Islamic teachers among primary school students in Malaysia using a qualitative approach. Their analysis revealed that the teaching methodology of teachers, which was based on Islamic principles, affected the thinking patterns of primary school students. Moreover, Salehi (2016) examined how well sixth-grade elementary school students in Noor city achieved the educational goals of the thinking and research course. The results showed that all the educational objectives were successfully attained. The "self-reflection" skill was found to be the most achieved goal, while the "imagination" skill was the least achieved. Furthermore, Qaderi Gask and Jahani (2017) explored critical thinking skills among second-year primary school students in Birjand city and identified ways to enhance them. The results showed that factors such as providing complete content to students, offering individualized programs, using effective teaching methods, and empowering teachers in all aspects were effective in strengthening critical thinking skills.

Even though several studies have explored the correlation between various elements, critical thinking, and academic attainment, with some primarily concentrating on overall academic performance, the absence of a unified and comprehensive strategy for teaching critical thinking skills to high school students, as perceived by teachers, prompted the researchers to conduct a thorough investigation aimed at addressing these deficiencies. Hence, the primary objective of this study was to ascertain an appropriate framework for administering thinking education within high school environments. Therefore, the following research questions were formulated:

- What factors influence to the successful management of critical thinking education in high schools?

3. Method

3.1. Research Design

As the focus of this study was on how to manage the development of critical thinking skills in high school students, a qualitative research approach was utilized. In accordance with

the principles of this approach, the researchers conducted the study in natural settings, where they engaged with participants and asked them to share their thoughts on the topic of the research, specifically the management of critical thinking. The goal was to identify underlying concepts and relationships in the collected data and then organize them into a theoretical explanatory framework.

3.2. Participants

The research participants were selected based on purposive sampling technique and consisted of experienced professionals and experts in the field of training critical thinking skills, who held decision-making and executive positions in this area. The study participants were categorized into three groups as follows: (1) the first group consisted of school principals, who were responsible for overseeing the management of thinking education; (2) the second group comprised teachers and facilitators who managed thinking education in high schools; and (3) the third group included experts and researchers who specialized in managing thinking education.

The theoretical saturation method was employed in this research, and a total of 23 participants were recruited. The first group of participants was selected based on the criterion that their schools included thinking education in their weekly curriculum. The second group of participants, which comprised teachers and facilitators, were selected based on their experience in implementing thinking training programs. For the third group, which included experts and researchers specializing in managing thinking education, participants were selected based on their publication record, professional experience, academic affiliation, and recognition in the field of thinking education. This approach ensured that the third group was composed of highly knowledgeable and influential individuals who could provide valuable insights into the management of thinking education. Besides, by adhering to these selection criteria, the study ensured a diverse and knowledgeable participant pool, providing valuable insights into the management of thinking education in high schools.

3.3. Data Collection

Initially, document analysis was performed to collect data by reviewing relevant literature, including books, publications, the internet sources, and databases. The selected sources

were carefully examined, and the relevant texts were prepared, scanned, and translated as needed. The purpose of this phase was to identify the main components and indicators of thinking education management, as well as the factors that influenced it. Following the library research method, a field research approach was employed, which included semi-structured interviews with educators, experts, and researchers in the field of thinking education management in Persian. The interview questions were then designed to elicit participants' thoughts and experiences on the topic (See Appendix). These interviews provided a deeper understanding of the topic and practical insights into the implementation of thinking education in primary and pre-primary schools. Each interview lasted approximately 45-60 minutes. This allowed for a comprehensive exploration of each question and enabled follow-up questions for deeper insights. After obtaining the participants' consent, the interviews were recorded to ensure accurate transcription and analysis of the data, maintaining the integrity of the participants' responses. Finally, the interviews were conducted in Persian, the native language of the participants, to ensure they could express their thoughts and experiences comfortably and accurately.

3.4. Data Analysis

Theoretical coding was utilized in this research as the data analysis method. Theoretical coding involves the conceptualization and synthesis of data to develop a new theory. The coding process employed two key techniques: open and axial coding. Open coding was used to identify and categorize concepts in the data, while axial coding was used to establish relationships among these concepts and develop a theoretical framework. This process of theoretical coding ensured that the data were analyzed in a rigorous and systematic manner to generate meaningful insights into the management of thinking education in primary and pre-primary schools (Strauss & Corbin, 1998). To ensure the reliability and validity of the coding process, the following inter-coder reliability measures were implemented:

- **Training of Coders:** The coders underwent thorough training on the coding scheme and procedures to ensure a consistent understanding of the coding process.
- **Pilot Coding:** An initial subset of the data was independently coded by multiple coders to establish a baseline level of agreement and refine the coding scheme if necessary.

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- Regular Meetings and Discussions: Coders held regular meetings to discuss any discrepancies or ambiguities in the coding process, facilitating consensus and alignment.
- Calculation of Inter-Coder Reliability: Cohen's Kappa was used to calculate inter-coder reliability, ensuring that the coding was consistent and reliable across different coders. The reliability index appeared to be 0.839 which was considered as acceptable
- Continuous Cross-Checking: Throughout the coding process, continuous cross-checking of coded data was performed to maintain high inter-coder reliability and address any emerging inconsistencies.

By implementing these inter-coder reliability measures, the research ensured that the data analysis was robust, reproducible, and trustworthy.

4. Results

This section presents the results of the data analysis and evaluation, which were conducted using rigorous qualitative methods. Prior to analysis, the data were subjected to preprocessing to ensure its quality and reliability.

First, the study aimed to identify the central phenomenon of managing critical thinking education among high school students in Kermanshah. Analysis of the data collected from participants revealed that managing critical thinking education was the core of critical thinking education in these settings. This was evident from the responses of the participants, which highlighted key components of management, such as planning, monitoring, evaluation, guidance, and control. These findings suggest that effective management of critical thinking education is crucial for promoting critical thinking skills among high school students.

Besides, the study aimed to identify the causal factors that contribute to the central phenomenon of managing critical thinking education for high school students in Kermanshah. Through data analysis, five main categories of causal factors were identified, each with its own set of sub-categories, as explained below and depicted in the

coded table.

1. Professional qualifications of facilitators: This category underscores the importance of teachers and facilitators having the necessary professional competencies and qualifications in the field of critical thinking education. It is identified as the foremost category of causal factors and a key determinant of the success of managing critical thinking education in high schools. The sub-categories of this category include the necessary skills that facilitators must possess or acquire, as well as their knowledge and attitude towards critical thinking training management.

2. Facilitator personality traits: This category highlights the personality traits that enable facilitators to acquire the necessary abilities to manage critical thinking education. It is further divided into three sub-categories: vigilance and intelligence of the facilitator, honesty and camaraderie of the facilitator in group discussions, and patience of the facilitator in creating a safe space for discussion.

3. Student personality traits: This category is related to the skills, abilities, and talents of students, and emphasizes the importance of them being free from mental and learning disorders.

4. Curriculum: This category is crucial for the success of students in critical thinking education and underscores the importance of having basic principles of philosophy and logic in the curriculum and activities. It also highlights the need for educational materials and exercises that are suitable for practicing critical thinking skills among high school students.

5. Family: This category is based on the opinions of the participants and emphasizes the role of families in supporting and encouraging critical thinking education among high school students.

Overall, these findings provide valuable insights into the factors that contribute to the successful management of critical thinking education in high schools in Kermanshah. The identification of these causal factors can inform the development of effective strategies and policies to improve critical thinking education and promote critical thinking skills among students.

Table 1. Participants' Beliefs Regarding Causal Factors

| Main category | Subcategory | Individual Responses | Individual Mentions | Individual Frequency | Frequency |
|---|---------------------------|----------------------|---------------------|----------------------|-----------|
| Professional qualifications of facilitators | Skill | 5 | 3 | 4 | 12 |
| | Knowledge | 3 | 3 | 1 | 7 |
| | Attitude | 1 | * | 1 | 2 |
| Personality characteristics of the facilitator | Skill | 2 | 1 | 1 | 4 |
| | Mental | 2 | * | 1 | 3 |
| Student personality traits | Skill, ability and talent | 3 | 1 | * | 4 |
| | Mental | * | 2 | 2 | 4 |
| Curriculum | *** | 1 | 1 | 1 | 3 |
| Family | *** | 1 | 1 | * | 2 |

The study also aimed to identify the background conditions that influence the management of critical thinking education. To achieve this, participants were asked about their experiences in successful and enjoyable classes. The analysis revealed five main categories of background conditions that affect the causal factors of the central phenomenon of this research, which are as follows:

- 1. Managers' support:** This category encompasses financial support, moral support, technical support, and provision of physical facilities by the management.
- 2. Professional growth and development:** This category emphasizes the importance of programs that promote professional development for teachers and facilitators.
- 3. Emotional dimension of class:** This category emphasizes the significance of creating a positive emotional environment in the classroom, which fosters students' engagement and motivation in thinking education programs.
- 4. Recruitment of teachers:** This category is related to the quality of teachers recruited for thinking education programs.
- 5. Emphasis of high-level documents:** This category refers to the importance of high-level policy documents and regulations that emphasize the significance of thinking

education in high schools.

Table 2. Participants' Reflections about Background Factors

| Main category | Subcategory | Individual Responses | Individual Mentions | Individual Frequency | Frequency |
|--|-------------------------|----------------------|---------------------|----------------------|-----------|
| Managers support | financial support | 1 | 1 | 1 | 3 |
| | moral support | 1 | * | 2 | 3 |
| | technical support | * | * | 1 | 1 |
| | physical facilities | * | * | 2 | 2 |
| Professional growth and development | teachers (facilitators) | 2 | 2 | * | 4 |
| | School staff | * | 1 | * | 1 |
| Emotional dimension of class | | 1 | * | 3 | 4 |
| Recruitment of teachers | | 1 | * | 3 | 4 |
| Emphasis of high-level documents | | 2 | 1 | * | 3 |

Furthermore, the present study aimed to identify the intervening conditions that could affect the background conditions and the causal factors and processes involved in managing critical thinking education. Intervening conditions are environmental conditions that are more general than background conditions. Through data analysis, three categories of intervening conditions were identified, as outlined below:

1. Awareness, belief, and social attitude: This category includes sub-categories of "managers and officials" and "family," and highlights the importance of the general awareness, belief, and social attitudes towards thinking education.

2. Collaboration of experts: This category emphasizes the importance of collaboration among experts in thinking education programs.

3. Alignment of executives and managers: This category highlights the importance of executives and managers aligning their goals and principles with those of Philosophy for children.

Table 3. Participants' Attitudes towards Intervening Factors

| Main category | Subcategory | Individual Responses | Individual Mentions | Individual Frequency | Frequency |
|--|------------------------|----------------------|---------------------|----------------------|-----------|
| Awareness, belief, and social (general) attitude | Managers and officials | 1 | 2 | * | 3 |
| | family | 1 | * | 2 | 3 |
| Collaboration of experts | *** | * | * | 1 | 1 |
| Alignment of executives and managers with Philosophy for children | *** | * | 1 | * | 1 |

Moreover, the study aimed to examine the ways in which strategies impact the success of interventions by shaping the contexts and conditions in which they take place. Our data analysis identified four key categories of strategies that were relevant to the management of critical thinking training: educational, motivational, facilitation, and evaluation. These strategies play a crucial role in achieving desired outcomes, and our results highlighted the importance of facilitators in developing insights and promoting growth in these areas.

Finally, the participants' statements were analyzed and categorized into six distinct groups, as illustrated in the figure 1. The categories included: strengthening reasoning skills, promoting discussion and logical judgment, enhancing problem-solving abilities, fostering creative and critical thinking, promoting deeper and more sustainable learning, and improving interpersonal relationships, community dynamics, and mental health. They also proposed various mechanisms to ensure the long-term success of the processes discussed, taking into account the causal, contextual, and intervening factors involved. Data analysis was deemed necessary to identify areas for improvement and prevent potential complications. The key components of these mechanisms included raising awareness and developing the skills of parents and facilitators, implementing effective management and structural practices, addressing cultural factors, establishing

programmatic supports, and promoting other forms of support.

Based on the identified categories, we developed a conceptual model, which is presented below.

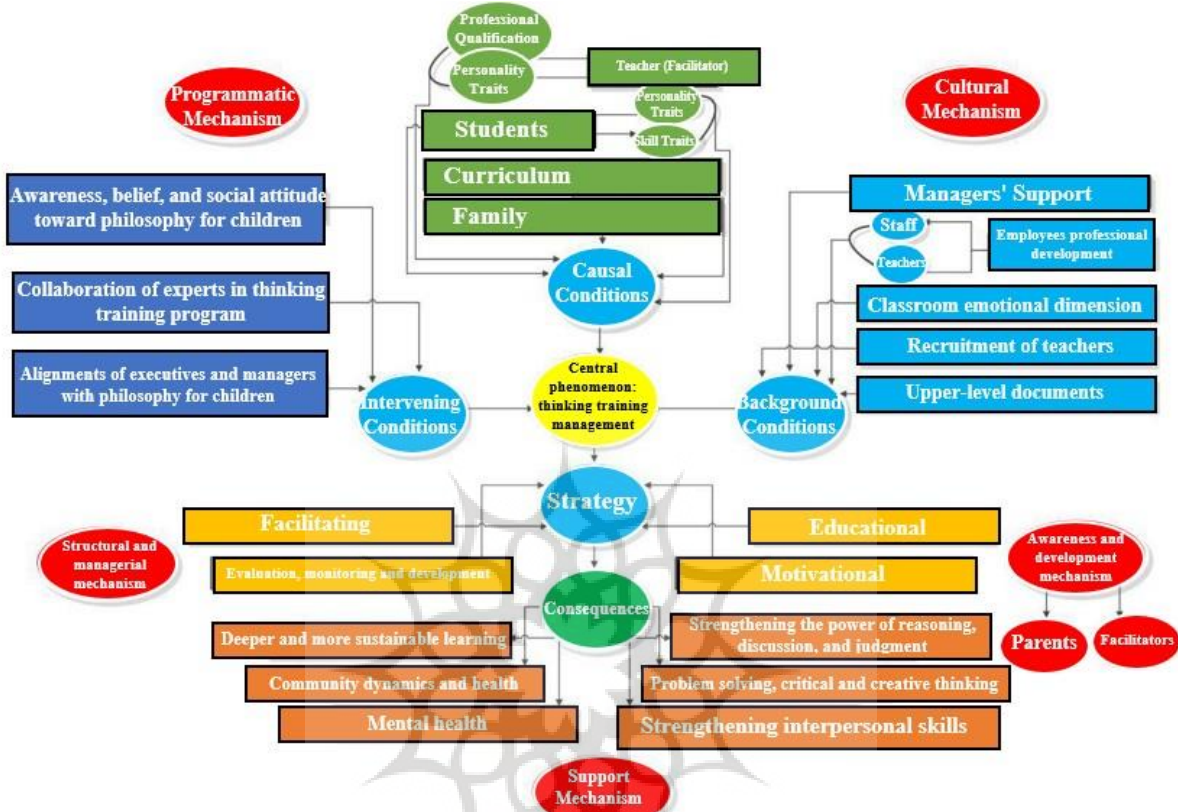


Figure 1. The final model for managing thinking education in high school

5. Discussion

The main objective of the current study was to develop a critical thinking training model for high school students. The findings underscore the importance of human resources as the most valuable organizational resource that can provide a competitive advantage over other organizations. For an organization to create this competitive advantage, it requires efficient and creative human resources with strong critical thinking skills. Therefore, training in logical thinking is vital. This education should commence from the first institution that a child enters after their family, such as preschool or elementary school. At these stages, children's impressionability is higher, and they view their teachers as role models and leaders. Therefore, it is recommended that thinking training management

should begin at these early stages to maximize its positive impact in the future.

The results of this study indicate a significant alignment with existing literature concerning the management of critical thinking education. Educational experts have long emphasized the importance of critical thinking as a fundamental educational objective (Erickson et al., 2017). The findings of this research, which highlight the essential components of effective management—such as planning, monitoring, evaluation, guidance, and control—underscore this emphasis, suggesting that structured management is vital for enhancing students' critical thinking skills.

Studies by Fong et al. (2017) and Sepahi et al. (2016) have underscored the importance of critical thinking in academic advancement. This research aligns with their findings by identifying professional qualifications of teachers, student abilities, curriculum comprehensiveness, and family support as crucial factors influencing the management of critical thinking education. This multifaceted approach corroborates the assertion by Erickson et al. (2017) that a holistic educational ecosystem is necessary for effective critical thinking training.

The background conditions identified in this study—such as managerial support, professional growth opportunities for teachers, and a supportive classroom environment—are consistent with the literature that emphasizes the need for a conducive learning environment for critical thinking (Darling-Hammond, 2017; Roska et al., 2017). These findings suggest that a supportive and well-resourced environment is crucial for the successful implementation of critical thinking training programs, echoing the views of educational experts like Lavi and Nickson (2017). Additionally, these elements are critical for fostering a positive educational atmosphere where students feel encouraged to engage in higher-order thinking tasks.

Intervening factors such as social attitudes and collaboration among educational experts and managers, identified in this study, further highlight the broader socio-cultural context of critical thinking education. This aligns with the findings of Qaderi Gask and Jahani (2017), who emphasized the importance of collaborative efforts and social influences in strengthening critical thinking skills among students. The influence of social attitudes on critical thinking is particularly relevant in a globalized educational landscape,

where diverse perspectives and collaborative learning are increasingly valued.

Moreover, the strategies identified in this study—educational, motivational, facilitation, and evaluation strategies—reflect the comprehensive approach suggested by researchers like Hilton (2018) and Othman and Kassim (2017). These strategies underscore the importance of an integrated approach to critical thinking education, wherein facilitators play a central role in guiding and nurturing students' cognitive development. The emphasis on motivational strategies, in particular, highlights the need to actively engage students and foster an intrinsic interest in critical thinking activities.

This study's findings are also in line with the research by Ghanizadeh (2017), who found a correlation between critical thinking, reflective thinking, and academic achievement. The identification of professional qualifications and mental health of students as key causal factors in this study supports Ghanizadeh's emphasis on reflective and critical thinking as integral to academic success. Reflective thinking, as part of critical thinking, encourages students to assess their thought processes and learning strategies, thereby promoting deeper understanding and retention of knowledge.

The necessity of teaching critical thinking as a learned behavior, as advocated by experts like Maltzman (2010) and Stefánsson (2017), is reinforced by this study's findings. By identifying critical thinking as a skill that can be developed through proper training and supportive conditions, this research echoes the literature's assertion that critical thinking is not an inherent trait but a cultivated one. This perspective is critical in designing educational programs that systematically incorporate critical thinking skills into the curriculum through specific pedagogical approaches and assessment methods.

Furthermore, this study's results contribute to the ongoing debate on the teachability of critical thinking skills. While some researchers have questioned the effectiveness of current educational programs in developing critical thinking (Del Negro, 2017), this research provides evidence that with appropriate management and support, significant improvements can be made. This underscores the importance of continuous professional development for educators to equip them with the necessary skills and knowledge to foster critical thinking in their students.

The broader implications of this research extend to educational policy and

curriculum design. The findings advocate for policies that support ongoing teacher training, adequate resource allocation, and the integration of critical thinking skills across all subjects. Such policies would ensure that critical thinking becomes a foundational element of the educational experience, preparing students not only for academic success but also for active and informed participation in society. Therefore, this study's results are in substantial agreement with existing literature, reinforcing the importance of a well-structured, supportive, and comprehensive approach to managing critical thinking education. By addressing the identified factors and implementing the recommended strategies, educators and policymakers can create an environment conducive to the development of critical thinking skills, thus preparing students for the challenges of the 21st century. The conceptual model developed through this research offers a valuable framework for understanding and implementing critical thinking education management, providing a guide for future efforts in this essential area of education.

6. Conclusion

In conclusion, the management of critical thinking education among high school students in Kermanshah is a complex and multi-dimensional process that requires a concerted effort from all stakeholders involved. The study's findings indicate that effective management is characterized by comprehensive planning, ongoing monitoring and evaluation, active involvement of teachers and parents, and the provision of necessary facilities and resources. The identified causal, background, and intervening factors provide a nuanced understanding of the various elements that influence the success of critical thinking education. By addressing these factors through targeted strategies, educators and policymakers can create an environment conducive to the development of critical thinking skills among students.

The outcomes of implementing critical thinking training include enhanced reasoning skills, improved problem-solving abilities, and better interpersonal relationships, all of which contribute to students' overall cognitive and social development. These outcomes underscore the transformative potential of effective critical thinking education management. To advance the practice of critical thinking education, it is

essential to overcome obstacles such as the lack of adequately trained teachers, insufficient support from educational administrators, and limited resources. By fostering a collaborative and supportive educational environment, schools can enhance the critical thinking capabilities of their students, thereby preparing them for the challenges of the 21st century. The conceptual model developed through this research offers a valuable framework for understanding and implementing critical thinking education management. This model can serve as a guide for educators and policymakers in their efforts to promote critical thinking skills, ensuring that students are equipped with the cognitive tools necessary for academic and personal success.

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Appendix (Interview prompts)

1. What is the main aspect or core concept related to the management of critical thinking education for high school students in Kermanshah?
2. What are the background factors influencing the management of critical thinking for high school students in Kermanshah?
3. What are the intervening factors that influence the management of cognitive processes for high school students in Kermanshah?
4. What approach is used to manage the development of critical thinking skills among high school students in Kermanshah?
5. What are the outcomes of administering the training of critical thinking skills among high school students in Kermanshah?
6. What are the mechanisms of implementing critical thinking training management for high school students in Kermanshah?

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