

Shaping High School Critical Thinking Policies, Cognitive Standards, and Skill Development

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Abstract

Research Aim: *The study aimed to identify the policies, skills, cognition, and attitudes to teach critical thinking at the high school.*

Methodology: *Using the descriptive method, the researcher prepared a list of policies and standards and presented it to a group of arbitrators to ensure its validity. The standards were then transferred to an electronic questionnaire according to Likert's scale and were validated using a coefficient Alpha Cronbach and Spearman-Brown, and included four domains: the policies (22 policies), the skills standards (40 standards), cognitive standards (15 standards), attitude standards (14 standards).*

Results: *According to the sample's responses which are (39) specialists of the questionnaire, it was indicated that some policies obtained (strongly approval on two policies, and approval on 11 policies). There were 13 policies with 59%, and the non-approved policies were only 4%, and the rest of the policies which are neutral with 36%. It was also indicated that the following order highly approved the sample's approval average on critical thinking standards: emotional standards (4.58), cognitive standards (4.55), skills standards (4.53), and they are high percentages that they are appropriate standards*

for teaching critical thinking at the high school.

Conclusions: *To sum up, the findings have enlightened the need that Education Ministry and Related organizations should adopt the critical thinking Policies at the high school, and develop the critical thinking teaching content at the high school according to the attitude, cognitive, and skills standards, and evaluate the extent of compliance with the critical thinking teaching at the high school in the light of the policies and standards.*

Keywords: *critical thinking; policies and standards; teaching thinking; high school*

Introduction

Cognitive development is a basic target in building the human, and it is a major source of producing cognition, dealing, managing, and evaluating it. Human is distinct from other creatures by knowledge. It is one of the standards that discriminate people from other creatures.

With its different stages, all the educational system seeks to develop thinking different types as creative, critical, and logical thinking, problem-solving, and decision-making. All the resources enable

students to use different thinking skills.

In light of global openness and the large information communication between people of the same global village, and the context of the information resources, news variety, and the difference of its reliability, accuracy, and probability of sincerity and propriety, the students' thinking skills should be increased, especially critical thinking skills. (Hutt, 1998) mentions that critical thinking is one of the important educational issues, and it is an essential feature of progress and success in the twenty-first century.

Study Problem

Students are exposed to a lot of information instantaneously through social communication means, channels, and various media means; this information includes beneficial issues for students and other issues bad that contain advertisements and promote harmful things to the student in his health, morals, behavior, interests, and priorities, and in the formation of consciousness and building his cognitive system. Therefore, the student's possession of the examination, evaluation, testing, and selecting tools of what displayed on him from information is necessary and urgent; Kettler (2020, p.14) admits that in the current era of immediate

information and technology everywhere, the critical thinking development for all students on a wide range of important educational result.

Critical thinking extends students with internal impedance system that enriches the great need for external monitoring, as well as providing them with tools that discriminate views and perspectives of the facts and the hypothesis, and helping them to discover errors and logical fallacies, and to analyze and distinguish relationships and links, and to sort and make the right decision and make them more wisdom and prudence in response to stimuli foreign propaganda, and further from the intellectual stagnation and extremism in opinion, (Al-Raqqas, 1436, p.4) states that "critical thinker confront many selected thinking methods in society as intellectual closure, extremism in opinion, and unknown attitudes towards a subject, and unilateral vision .."

Dwyer and Hogan and Stewart (2014, p.43) assure that there is a need for more critical thinking skills than ever to help individuals to become more adaptable and more able to deal with this rapidly developing information.

Education ministries and organizations seek to teach critical thinking among students with its policies and multiple ways. Some

countries teach critical thinking from the educational ladder beginnings. Some of them teach critical thinking at the advanced stages as intermediate or high school, some of them teach critical thinking as an independent curriculum. Others that integrate critical thinking teaching within the curriculum's contents and other countries are considered more by teaching critical thinking.

Research Questions

The following question can highlight the title of the study:

RQ: What are the policies and cognitive, skill, and emotional standards and to teach critical thinking at the high school?

The sub-questions are as follows:

- (1) What are the best policies to teach critical thinking at the high school?
- (2) What are the cognitive, skills, and emotional standards of teaching critical thinking standards at the high school?

Study Aims

The study seeks to identify the collective opinion of the specialists in the curricula and teaching methods of universities' staff for the best critical thinking

education policies and cognitive, skills, and emotional standards of teaching critical thinking at the high school.

Study Importance

The researcher hopes that the study results can help the decision-makers to make decisions related to the policies and the critical thinking learning content at the high school, according to the collective opinion of the curricula, teaching method, educational policies, and psychology specialists that will be approached to the right and the benefits to the student.

Study Limitations

The study focused on the high school only, and it aims to study the policies related to teaching critical thinking choices and limited to the identification of public standards for teaching critical thinking, whether cognitive, skills, or attitudes.

The study is limited to the educational context in Pakistan at the time of the study in the first semester of the academic year 2021.

Theoretical Framework

The researcher sought to return to the literature related to the main study variables to examine the components of each variable

so that subsequently subjected to the expert referendum and find out their views, and the theoretical framework will show the following:

Critical Thinking Concept

Critical thinking concepts vary due to the different dealing schools; the three main schools that deal with critical thinking are psychology, philosophy, and education. (Lai, 2011)

Although controversy continues to define critical thinking and basic skills necessary for critical thinking, there is one definition and a list of skills that stand out as a reasonable constituency of critical thinking. In 1988 a team of 46 experts in humanitarian, social science, and education for two years sought to define critical thinking and identify its skills. The team reached the definition of critical thinking as:

"A benefit judge and self-regulation resulting in an interpretation, analysis, evaluation, and indication, as well as an explanation of the proof, conceptual, methodology, standard, or contextual considerations of this provision" (Facione, 1990b)

Critical Thinking Policies

The report of the Assessment and

Training Commission (1439) referred to the policies of some countries in terms of learning skills in general, including critical thinking, and the report has made clear the learning method of the critical thinking skills and if it is integrated or independent thinking? If it is taught with its name or it is taught integrated with other skills? This is according to Table 1 which presents the data of countries other than Pakistan teaching critical thinking.

Table 1. The method of teaching critical thinking and its name in a group of countries

| Country | Learning method | The course name which contains critical thinking |
|------------------|-----------------|--|
| Australia | integrated | Critical and creative thinking |
| New Zealand | integrated | Thinking |
| Finland | integrated | Think and learn |
| Singapore | integrated | Life Skills |
| Hong Kong | integrated | Critical thinking |
| Malaysia | Integrated | Thinking and problem solving |
| British Columbia | Integrated | Critical thinking |
| Japan | Integrated | Collaborative thinking and problem-solving ability |
| Britain | Integrated | Twenty-first-century skills |
| Qatar | Integrated | Creative thinking and critical thinking. |
| Alberta - Canada | Separated | Twenty-first-century skills |
| Korea | Separated | Creativity |

It is noted from the Table that 10 countries out of 12 countries learn critical thinking integrated with the curriculum, and

two countries learn it independently and that two countries have learned it under the critical thinking name, and two others under the name of critical and creative thinking, and other countries have learned under different names as thinking in general, or under the name of life skills, or the 21st skills and others.

The researcher reviewed, as well as in the critical thinking learning policies variable, some studies that aimed to analyze and review critical thinking studies in specific periods and concluded the critical thinking is learning policies. (Lai, 2011) and (Alsaleh, 2020) found that some important policies in teaching critical thinking, including:

Basic knowledge is necessary, although it isn't enough to enable critical thinking within a particular topic.

Critical thinking includes cognitive skills or abilities and behaviors that can be called mental habits, including openness, integrity, curiosity, flexibility, and the tendency to look for reasons, and the desire to see the new, the respect, and the willingness to receive diverse views.

Critical thinking learning requires two main things. First, prepare students on the public critical thinking principles and practice the application of critical thinking

skills in the context of specific areas. Second, teach students the transfer of critical thinking skills to new contexts by making them aware of the deep structure's problems and providing them with sufficient opportunities to practice critical thinking skills in various fields.

Students who have learning motivation are more likely to continue in tasks that require critical thinking. (Jamil et al, 2020)

Experimental research in the field of perception suggests that people begin to develop critical thinking skills at a very early age and continue to improve (or not) all his life. One must include explicit education in critical thinking in the curriculum, whether learning occurs as a path stand-alone or be integrated into the subject content, or both.

Critical Thinking Skills Standards

Smart (2008) mentioned that critical thinking consists of skills, knowledge, and attitudes. Critical thinking skills were numerous, according to the foundations and the concept that stems from it from the identification of critical thinking skills, and even the researcher determines the appropriate skill standards for the high school curriculum by analyzing the most prominent skills tests of critical thinking and analyzing the main thinking lists which include most of

the critical thinking skills lists in literature which was reviewed in a comprehensive collective effort in its preparation as Cambridge Assessment test as stated at (Black, 2008, p. 9-10), California Critical thinking skills test according to (Fawkes, O'meara, Weber, Flage , 2005) study, the critical thinking skills test for (Watson & Glaser, 1964), Faicone test (1998), and thinking skills among the Delphi Committee. (Facione, 1990b) mentions that the Delphi Committee - consisting of 46 experts in the critical thinking field - approved by an overwhelming majority (ie the agreement of 95%) on that the analysis, evaluation, and inference are the basic skills necessary for critical thinking.

As well as the critical thinking skills list that the Educational Research Australian Council identified as stated (Heard, Scoular, Duckworth, Ramalingam, Teo, 2020), namely:

- The cognitive structure includes: (1. Identification of knowledge gaps. 2. The distinction between information. 3. Identifying patterns and links)
- Evaluation logic includes: (1. application logic. 2. Identification of assumptions and motives. 3. Justifying arguments)
- Decision-making includes: (1. Identification of standards for decision-

making. 2. Assessment options. 3. Testing and observing application)

From these main inputs of the critical thinking skills and others, the researcher defined the skills standards that will be presented to the experts and specialists.

Cognitive and Emotional Standards of Critical Thinking

The researcher presented many documents of teaching critical thinking to identify the most important appropriate criteria to teach critical thinking in the secondary stage, and these documents: life skills standards (New Jersey State Department of Education, 2020), critical thinking standards in the modern Australian Curriculum (McIlvenny, 2013) & (Victorian Curriculum, 2016), critical thinking efficiency standards guide, Paul, Elder, 2006).), critical thinking study inside the classroom and outside Murawski, 2014), critical thinking review study in literature (Lai, 2011). The critical thinking book (Moore, Parker, Rosenstand, Silvers, 2012), critical thinking in the Islamic Education book (Rashdan 2012), a book of critical thinking is an entrance to the nature of argumentation and its types (Yasin, 2015), and the national framework for the education curriculum.

The researcher benefited from these and other sources when preparing the cognitive and emotional standards that will be included in the tool that will be sent to specialists to explore the extent of their agreement to teach critical thinking in high school (Ali et al, 2021).

Previous Studies

The researcher reviewed some documents and reference frames that include some teaching critical thinking standards in many countries, but he did not find specific studies that dealt with defining policies or standards for teaching critical thinking as the following:

Bailin et al. (1999) developed a concept of critical thinking and to clarify that critical thinking is a normative project in which we apply appropriate standards to a greater or lesser degree to what we or others say, do, or write. The critical thinker necessarily has acquired intellectual resources, basic knowledge, operational knowledge of appropriate standards, knowledge of basic concepts, possession of effective reasoning, and some vital mind habits (Naseer et al, 2020). The study showed that we could best teach critical thinking by inculcating it in any systematic practice that our students participate in.

Lai (2011) sought to explore the methods of defining critical thinking by researchers, investigate how to develop critical thinking, how teachers can promote critical thinking development among their students, and review the best practices in assessing critical thinking skills.

Alsaleh (2020) discussed the various issues in teaching computerized thinking skills by conducting a systematic review of the literature in the Google scientific researcher and digital databases that focused on a description and discussion of critical thinking from theoretical and conceptual views, and thus by reading summaries to examine the initial list of articles on the five major topics (teaching critical thinking skills, evaluation of critical thinking skills, teaching strategies of the critical thinking skills, classification of the critical thinking skills, and using technology in teaching critical thinking skills). The researcher found that most researchers agreed that computerized critical thinking refers to the use of skills or cognitive strategies, and through teaching and training, the students can master critical thinking.

Methodology

The researcher used the descriptive method to elucidate the best policies, skills,

cognitive, and emotional standards to teach critical thinking in high school where the researcher prepared a list of policies and standards and then presented them to a group of specialist curriculum and educational policies arbiters to ensure their suitability and clarity of their formulation and the relation of each standard to its domain. The arbitration results showed that some standards need modification of its formulation and to add new criteria and deleting others; after the modification to the policies and standards list, the researcher set up an electronic questionnaire that includes all policies and standards according to Likert's scale (strongly approve - approve - neutral - Disagree - strongly Disagree). The researcher assured from the questionnaire stability using Alpha Cronbach coefficient, and the value of stability coefficient was (0.86), and the questionnaire stability was also examined using Spearman Brown and the value of the coefficient stability was (0.92), which indicated that the stability of the current study questionnaire. After that, the researcher sent the electronic questionnaire to an intentional sample of specialists in curricula, psychology and educational policies who have an interest in critical thinking, whether in their participation or scientific research or through their teaching of the thinking course at the

university, and the researcher chose this sample intentionally, because arbitration for policies and standards requires the arbitrator's precise and direct awareness with the requirements of critical thinking which may not be available to all specialists in curricula, psychology, or politics, and the total sample that the researcher was able to identify through the sites of faculty members at the randomly selected universities or through direct question, or tracking scientific production, 117 faculty members, 20 of them participated in calculating the questionnaire stability, 39 faculty members responded to the questionnaire distributed on the following ranks (8 professors - 10 associate professors - 21 assistant professors) to identify their collective attitude towards these policies and standards.

The researcher used the distribution period of arithmetic means to calculate the approval degree (Table 2).

Table 2. Degree of Approval

| No. | Mean | Approval Degree |
|-----|-----------|-------------------|
| 1 | 1-1.80 | Strongly Disagree |
| 2 | 1.81-2.60 | Disagree |
| 3 | 2.61-3.40 | Neutral |
| 4 | 3.41-4.20 | Agree |
| 5 | 4.21-5 | Strongly Agree |

Results

After collecting the sample responses

to the electronic questionnaire, responses showed the following results:

Results Related to the First Question

(1) What are the best policies to teach critical thinking at high school?

To answer this question, the means, standard deviations, and the approval degree of the study members' responses on each item of the questionnaire items, as it was illustrated in Table 3.

From Table 3, it was noted that two policies that have got the strong approval degree, the number of policies that have got the approval degree (11) policies, the number of policies that have got a neutral degree (8) policies, the number of policies that have obtained the disapproval degree is one policy only, and the number of policies which got strongly disagree is (zero).

In general, we can say that the policies that have obtained the approval are 13 policies with 59% and that the number of policies that haven't been approved is only one policy with 4%, and the rest of the policies which are neutral with 36% and with a more accurate analytical look, the following can be concluded:

The importance of teaching critical thinking through the school curriculum,

whether incorporated or linked with examples and the curriculum subjects that support the approval degree of policy no. (3), (4), and (6).

This supported the analytical study results of a group of critical thinking studies carried out by (Lai, 2011) which reached that the explicit education of critical thinking in the curriculum, whether education as a path stand-alone, or included in the subject content, or both.

This agreed with what was indicated by (Alsaleh, 2020) study, which found that critical thinking must be integrated into the curriculum content and teaching methods.

Promoting critical thinking education through workshops and enrichment courses and supporting the approval degree of policy no.5 is enhanced by (Alsaleh, 2020) study that students can master critical thinking skills through teaching and training.

The requirement of sufficient qualification for critical thinking teachers through academic specialization, or adequate rehabilitation, supports the policy's approval degree (10) and (12).

Care for teaching critical thinking skills of all the cognitive, skill, and emotional fields were supported by the policies' approval degree no. (13) and (14).

Dissemination of teaching critical

thinking at all stages of public education starting from the primary stage, and it was supported by the approval degree of the policies no. (18), (19), (4), and (5). Alsaleh (2020) study indicated that critical teaching thinking should be sequential at all grade levels.

Confirmation of the presenting education, whether full or partial in teaching critical thinking, was supported by the approval degree of the policies no. (20) and (22).

Results Related to the Second Question

(2) What are the skills, cognitive, and emotional standards of teaching critical thinking at high school?

The means, standard deviations, and the approval degree of the study members' responses were extracted on each item of the questionnaire items according to each domain: Table 4 shows the sample response according to each domain. As per the data in Table 4, the approval degree of the study members on the skills standards was very high where all the items strongly agree with an average of 4.53, and this refers to the appropriate of the chosen skills standards to teach critical thinking at high school.

Table 3. Means, standard deviations, and the approval degree of the study members' responses on the best policies to teach critical thinking at high school

| No. | Item | Approval degree | | | | | | Mean | Std. Dev | Approval degree |
|-----|--|--------------------|----------------|------------|------------|------------|-------------------|-------|----------------|-----------------|
| | | Freq. | Strongly agree | agree | neutral | disagree | Strongly disagree | | | |
| 1 | Teaching critical thinking at high school through a stand-alone curriculum | Freq. 4 % 10.3 | 9 23.1 | 4 19.3 | 13 33.3 | 9 23.1 | 3.36 | 1.347 | Neutral | |
| 2 | Teaching critical thinking as part of a stand-alone curriculum for teaching skills in general | Freq. 3 % 7.7 | 12 30.8 | 6 15.4 | 11 28.2 | 7 17.9 | 3.18 | 1.275 | Neutral | |
| 3 | Teaching critical thinking at high school integrated into other curricula (as appropriate) | Freq. 2 % 5.1 | 4 10.3 | 2 5.1 | 11 28.2 | 20 51.3 | 4.10 | 1.209 | Agree | |
| 4 | Teaching critical thinking at high school in a stand-alone course and integrated into other curricula (as appropriate) | Freq. 3 % 2.7 | 5 12.8 | 5 12.8 | 13 33.3 | 13 33.3 | 3.72 | 1.276 | Agree | |
| 5 | Teaching critical thinking at high school through enrichment programs and training courses | Freq. 0 % 0 | 1 2.6 | 3 7.7 | 15 38.5 | 20 33.3 | 4.38 | 0.747 | Strongly agree | |
| 6 | Teaching critical thinking as an independent curriculum through a context of curriculum-related examples and topics | Freq. 1 % 2.6 | 7 17.9 | 4 10.3 | 15 38.5 | 21 30.8 | 3.77 | 1.158 | Agree | |
| 7 | Teaching critical thinking as a stand-alone curriculum through a context of non-curricular examples and topics | Freq. 4 % 10.3 | 9 23.1 | 8 20.5 | 11 28.2 | 7 17.9 | 3.21 | 1.281 | Neutral | |
| 8 | Teaching critical thinking - as an independent curriculum - in one academic year at high school | Freq. 7 % 17.9 | 11 28.2 | 8 20.5 | 8 20.5 | 5 12.8 | 2.82 | 1.315 | Neutral | |
| 9 | Teaching critical thinking - as an independent curriculum - in all high school years | Freq. 5 % 12.8 | 11 28.2 | 4 10.3 | 10 25.6 | 9 23.1 | 3.18 | 1.412 | Neutral | |
| 10 | Restricting the teaching of critical thinking - as an independent curriculum - at high school to teachers specializing in psychology and related subspecialties. (Example: a master's degree in the field of thinking - mental abilities.) | Freq. 4 % 10.3 | 7 17.9 | 7 17.9 | 9 23.1 | 12 30.8 | 3.46 | 1.374 | Agree | |
| 11 | Availability of teaching critical thinking - as an independent curriculum - at high school by any teacher in any discipline after qualifying him with training programs that do not exceed a month | Freq. 12 % 30.8 | 15 38.5 | 4 10.3 | 6 15.4 | 2 5.1 | 2.26 | 1.208 | Disagree | |
| 12 | Availability of teaching critical thinking - as an independent curriculum - at high school by any teacher in any discipline after qualifying him with training programs for no less than a semester | Freq. 4 % 10.3 | 5 12.8 | 7 17.9 | 17 43.6 | 6 15.4 | 3.41 | 1.208 | Agree | |
| 13 | Focusing on the skill area in teaching critical thinking to high school students | Freq. 0 % 0 | 6 15.4 | 4 10.3 | 16 41.0 | 13 33.3 | 3.92 | 1.036 | Agree | |
| 14 | Including the skill, cognitive, and emotional domains in teaching critical thinking to high school students | Freq. 0 % 0 | 0 0 | 0 0 | 20 51.3 | 19 48.7 | 4.49 | 0.506 | Strongly agree | |
| 15 | Teaching critical thinking - as an independent curriculum - for the high school by copying and translating international programs specialized in teaching critical thinking | Freq. 8 % 20.5 | 11 28.2 | 7 17.9 | 11 28.2 | 2 5.1 | 2.69 | 1.239 | Neutral | |
| 16 | Teaching critical thinking - as an independent curriculum - to the high school by translating international educational curricula and adapting them locally | Freq. 7 % 17.9 | 6 15.4 | 5 12.8 | 11 28.2 | 10 25.6 | 3.28 | 1.468 | Neutral | |
| 17 | Teaching critical thinking - as an independent curriculum - for high school by preparing a national curriculum for critical thinking | Freq. 3 % 7.7 | 2 5.1 | 2 5.1 | 16 41.0 | 16 41.0 | 4.03 | 1.181 | Agree | |
| 18 | Beginning to teach critical thinking from intermediate school | Freq. 1 % 2.6 | 7 17.9 | 3 7.7 | 15 38.5 | 13 33.3 | 3.82 | 1.167 | agree | |
| 19 | Start teaching critical thinking from the primary stage | Freq. 5 % 12.8 | 7 17.9 | 2 5.1 | 15 38.5 | 10 25.6 | 3.46 | 1.393 | agree | |
| 20 | Using the presence learning style to teach critical thinking - as an independent curriculum - to high school students | Freq. 3 % 7.7 | 1 2.6 | 10 25.6 | 16 41.0 | 9 23.1 | 3.69 | 1.104 | agree | |
| 21 | | Freq. 8 | 7 | 9 | 12 | 3 | 2.87 | 1.281 | Neutral | |

| | | | | | | | | | | |
|----------------------------------|---|-------|------|------|------|------|------|------|-------|-------|
| | Using the distance learning style to teach critical thinking - as an independent curriculum - to high school students | % | 20.5 | 17.9 | 23.1 | 30.8 | 7.7 | | | |
| 22 | Using the blended learning style to teach critical thinking - as an independent curriculum - to high school students | Freq. | 3 | 1 | 7 | 17 | 11 | 3.82 | 1.121 | Agree |
| | | % | 7.7 | 2.6 | 17.9 | 43.6 | 28.2 | | | |
| The general mean of the policies | | | | | | | | 3.50 | 1.196 | |

Table 4. Means, standard deviations, and the approval degree of the study members' responses on the skills standards for teaching critical thinking at high school

| No. | Item | Approval degree | | | | | Mean | Standard deviation | Approval degree | |
|---|---|-----------------|-------------------|-----|---------|-------|------|--------------------|-----------------|----------------|
| | | Freq. | Strongly disagree | | neutral | agree | | | | Strongly agree |
| | | % | disagree | | | | | | | |
| Developing the analysis skill | | | | | | | | | | |
| 1 | Analysis of the relationship between cause and effect | Freq. | 0 | 0 | 0 | 14 | 25 | 4.46 | 0.468 | Strongly agree |
| | | % | 0 | 0 | 0 | 35.9 | 64.1 | | | |
| 2 | Analysis of the relationship between reason and result | Freq. | 0 | 1 | 1 | 12 | 25 | 4.56 | 0.680 | Strongly agree |
| | | % | 0 | 2.6 | 2.6 | 30.8 | 64.1 | | | |
| 3 | Analyze the relationship between hypothesis and conclusion | Freq. | 0 | 1 | 1 | 12 | 25 | 4.56 | 0.680 | Strongly agree |
| | | % | 0 | 2.6 | 2.6 | 30.8 | 64.1 | | | |
| 4 | Analyzing the relationship between idea and proof | Freq. | 0 | 0 | 3 | 12 | 24 | 4.54 | 0.643 | Strongly agree |
| | | % | 0 | 0 | 7.7 | 30.8 | 61.5 | | | |
| 5 | Analyze the relationship between premise and conclusion | Freq. | 0 | 0 | 3 | 11 | 25 | 4.56 | 0.641 | Strongly agree |
| | | % | 0 | 0 | 7.7 | 28.2 | 64.1 | | | |
| 6 | Decomposition of an object into specific parts and elements | Freq. | 0 | 0 | 3 | 11 | 25 | 4.62 | 0.544 | Strongly agree |
| | | % | 0 | 0 | 7.7 | 28.2 | 64.1 | | | |
| 7 | sequencing of events analysis | Freq. | 0 | 0 | 0 | 20 | 19 | 4.49 | 0.506 | Strongly agree |
| | | % | 0 | 0 | 0 | 51.3 | 48.7 | | | |
| 8 | Distinguish the similarities and differences | Freq. | 0 | 0 | 1 | 17 | 21 | 4.51 | 0.566 | Strongly agree |
| | | % | 0 | 0 | 2.6 | 43.6 | 53.8 | | | |
| Develop proof-evaluating skills | | | | | | | | | | |
| 9 | Determine the allegation (problem) on the topic | Freq. | 0 | 0 | 1 | 16 | 22 | 4.54 | 0.555 | Strongly agree |
| | | % | 0 | 0 | 2.6 | 41.0 | 56.4 | | | |
| 10 | Distinguishing the type of proof (opinion or fact) | Freq. | 0 | 0 | 0 | 16 | 23 | 4.59 | 0.498 | Strongly agree |
| | | % | 0 | 0 | 0 | 41.0 | 59.0 | | | |
| 11 | Validation of the proof in and of itself | Freq. | 0 | 1 | 2 | 12 | 24 | 4.51 | 0.721 | Strongly agree |
| | | % | 0 | 2.6 | 5.1 | 30.8 | 61.5 | | | |
| 12 | Examination of the validity of the proof against the objection | Freq. | 0 | 1 | 3 | 12 | 23 | 4.46 | 0.756 | Strongly agree |
| | | % | 0 | 2.6 | 7.7 | 30.8 | 59.0 | | | |
| 13 | Evaluation of the degree of independence of proof in proof | Freq. | 0 | 0 | 4 | 15 | 20 | 4.41 | 0.677 | Strongly agree |
| | | % | 0 | 0 | 10.3 | 38.5 | 51.3 | | | |
| 14 | Determining the degree of consistency or contradiction between arguments and proofs | Freq. | 0 | 0 | 5 | 14 | 20 | 4.38 | 0.711 | Strongly agree |
| | | % | 0 | 0 | 12.8 | 35.9 | 51.3 | | | |
| 15 | Checking the reliability of the information source | Freq. | 0 | 0 | 2 | 14 | 23 | 4.54 | 0.600 | Strongly agree |
| | | % | 0 | 0 | 5.1 | 35.9 | 59.0 | | | |
| 16 | Determine the appropriate criteria for evaluation | Freq. | 0 | 0 | 2 | 17 | 20 | 4.46 | 0.600 | Strongly agree |
| | | % | 0 | 0 | 5.1 | 43.6 | 51.3 | | | |
| Improving the skills of discovering logical fallacies and errors | | | | | | | | | | |
| 17 | Distinguish reference fallacies | Freq. | 0 | 1 | 3 | 14 | 21 | 4.41 | 0.751 | Strongly agree |
| | | % | 0 | 2.6 | 7.72 | 35.9 | 53.8 | | | |
| 18 | Expose irrational generalizations | Freq. | 0 | 0 | 2 | 16 | 21 | 4.49 | 0.601 | Strongly agree |
| | | % | 0 | 0 | 5.1 | 42.0 | 53.8 | | | |

| | | | | | | | | | | |
|--|--|-------|---|-----|------|------|------|------|-------|----------------|
| 19 | Identify inaccurate exaggerations | Freq. | 0 | 0 | 1 | 18 | 20 | 4.49 | 0,556 | Strongly agree |
| | | % | 0 | 0 | 2.6 | 46.2 | 51.3 | | | |
| 20 | Detecting false causation | Freq. | 0 | 1 | 1 | 16 | 21 | 4.46 | 0,682 | Strongly agree |
| | | % | 0 | 2.6 | 2.6 | 41.0 | 53.8 | | | |
| 21 | Sorting out all kinds of affective bias | Freq. | 0 | 0 | 2 | 17 | 20 | 4.46 | 0.600 | Strongly agree |
| | | % | 0 | 0 | 5.1 | 43.6 | 51.3 | | | |
| 22 | Identifying false and misrepresented information | Freq. | 0 | 0 | 2 | 15 | 22 | 4.51 | 0.601 | Strongly agree |
| | | % | 0 | 0 | 5.1 | 38.5 | 56.4 | | | |
| 23 | Distinguish similes and false comparisons | Freq. | 0 | 0 | 2 | 14 | 23 | 4.54 | 0.600 | Strongly agree |
| | | % | 0 | 0 | 5.1 | 35.9 | 59.0 | | | |
| Developing critical thinking tools | | | | | | | | | | |
| 24 | Ask a variety of questions | Freq. | 0 | 0 | 1 | 9 | 29 | 4.72 | 0.510 | Strongly agree |
| | | % | 0 | 0 | 2.6 | 23.1 | 74.4 | | | |
| 25 | Distinguish the inductive construction in the argument | Freq. | 0 | 0 | 3 | 9 | 27 | 4.62 | 0.633 | Strongly agree |
| | | % | 0 | 0 | 7.7 | 23.1 | 69.2 | | | |
| 26 | Note the evidence | Freq. | 0 | 0 | 1 | 11 | 27 | 4.67 | 0.530 | Strongly agree |
| | | % | 0 | 0 | 2.6 | 28.2 | 69.2 | | | |
| 27 | Build appropriate justification and reasoning | Freq. | 0 | 0 | 2 | 11 | 26 | 4.62 | 0.590 | Strongly agree |
| | | % | 0 | 0 | 5.1 | 28.2 | 66.7 | | | |
| 28 | Correct formulation (hypotheses - conclusion.) | Freq. | 0 | 0 | 3 | 13 | 23 | 4.51 | 0.644 | Strongly agree |
| | | % | 0 | 0 | 7.7 | 33.3 | 59.0 | | | |
| 29 | Understand the context and its various components | Freq. | 0 | 0 | 2 | 15 | 22 | 4.51 | 0.601 | Strongly agree |
| | | % | 0 | 0 | 5.1 | 38.5 | 56.4 | | | |
| 30 | Use language accurately and clearly | Freq. | 0 | 0 | 2 | 12 | 26 | 4.64 | 0.537 | Strongly agree |
| | | % | 0 | 0 | 5.1 | 30.8 | 66.7 | | | |
| Strengthening the Critical Thinker Mental Habits: | | | | | | | | | | |
| 31 | Taking all aspects of the situation equally important | Freq. | 0 | 1 | 3 | 12 | 23 | 4.46 | 0.756 | Strongly agree |
| | | % | 0 | 2.6 | 7.7 | 30.8 | 59.0 | | | |
| 32 | Interest in understanding other points of view | Freq. | 0 | 0 | 0 | 13 | 26 | 4.67 | 0.478 | Strongly agree |
| | | % | 0 | 0 | 0 | 33.3 | 66.7 | | | |
| 33 | Systematic skepticism toward existing assumptions | Freq. | 1 | 3 | 2 | 13 | 20 | 4.23 | 1.038 | Strongly agree |
| | | % | 2 | 7.7 | 5.2 | 33.3 | 51.3 | | | |
| | | | | 6 | | | | | | |
| 34 | Independence in decision making | Freq. | 0 | 0 | 4 | 14 | 21 | 4.44 | 0.680 | Strongly agree |
| | | % | 0 | 0 | 10.3 | 35.9 | 53.8 | | | |
| 35 | Openness and mental flexibility | Freq. | 0 | 0 | 3 | 12 | 24 | 4.45 | 0.643 | Strongly agree |
| | | % | 0 | 0 | 7.7 | 30.8 | 61.5 | | | |
| 36 | Handle the components of a complex situation normally | Freq. | 0 | 0 | 4 | 13 | 22 | 4.46 | 0.682 | Strongly agree |
| | | % | 0 | 0 | 10.3 | 33.3 | 56.4 | | | |
| 37 | Postponed sentence when there is insufficient evidence to support the decision | Freq. | 0 | 0 | 3 | 13 | 23 | 4.51 | 0.644 | Strongly agree |
| | | % | 0 | 0 | 7.7 | 33.3 | 59.0 | | | |
| 38 | Focus on the main idea that represents the core of the topic | Freq. | 0 | 0 | 1 | 12 | 26 | 4.46 | 0.537 | Strongly agree |
| | | % | 0 | 0 | 2.6 | 30.8 | 66.7 | | | |
| 39 | Self-reflection on how logical thinking is | Freq. | 0 | 0 | 2 | 13 | 24 | 4.56 | 0.598 | Strongly agree |
| | | % | 0 | 0 | 5.2 | 33.3 | 61.5 | | | |
| 40 | Conscious listening to information, ideas, and news | Freq. | 0 | 0 | 0 | 14 | 25 | 4.46 | 0.486 | Strongly agree |
| | | % | 0 | 0 | 0 | 35.9 | 64.1 | | | |
| The general mean of the skills standards | | | | | | | | 4.53 | 0.621 | |

This may be due to the diversity of inputs that were used in the preparation of skills standards which were mentioned in the theoretical framework. The main skills that the study reached are: developing analytical

skills, developing the proof assessment skills, the improvement of the discovery of logical fallacies and errors skills, the development of critical thinking tools, promoting mental habits of the critical thinker, with basic skills

that Delphi Commission identified - consisting of 46 experts in the critical thinking field which are analysis, evaluation, and inference, in addition to three main skills mentioned by (Faicone, 1998) and (Alsaleh, 2020) which are analysis, assessment, and inference.

The results found that the study members strongly agreed on adding the critical thinking tools and mental habits as part of the skills standards components, which is not usually mentioned in the critical thinking skills. (Lai, 2011, p.42) also emphasized the importance of mental habits as part of critical thinking, where she pointed out that critical thinking includes mental habits, including openness and integrity, curiosity, flexibility, the tendency to look for reasons, the desire to see the new, respect, and readiness to receive diverse views.

Bailin, Case, Coombs, and Daniels's (1999) study confirmed the importance of mental habits in critical thinking and that one must have certain commitments, situations, or mental habits to use the intellectual resources and the relevant principles of good thinking (p294). Among the mental habits was mentioned in the study openness, the tendency to delay judgment, search for all evidence or points of view when the existing evidence is insufficient or controversial,

willingness to review one's point of view if the evidence justifies it, independence of thought, respect the right of others in inquiry and collective deliberation, and deep listening to others.

Table 5 shows that the approval degree of the study members on the cognitive standards was very high as all items got strong approval with a mean of 4.55, which refers to the appropriate cognitive standards for teaching critical thinking at high school and may be attributed to the quality and diversity of inputs that benefited in the preparation of cognitive standards that previously indicated in the theoretical framework.

It is noted in the cognitive standards that the study members agreed on the standard: Distinguishing the relationship of critical thinking with the world of the occult and the world of materialism, to a highly compatible degree. As if a metaphysical matter is proven in the Noble Qur'an among Muslims, they do not necessarily subject its postulates to critical thinking, and the high degree of approval of this criterion may be due even though it carries cultural dimensions that all the sample members are Muslims and the criterion content is one of the things they believed in.

Table 5. Arithmetic means standard deviations, and the approval degree of the study members' responses to cognitive standards to teach critical thinking at high school

| No. | Item | Approval degree | | | | | Mean | Standard Deviation | Approval Degree | |
|---|--|-----------------|----------------|-------|---------|----------|------|--------------------|-----------------|----------------|
| | | Freq. | Strongly Agree | Agree | Neutral | Disagree | | | | |
| 1 | Explain the concept of critical thinking | Freq. | 0 | 0 | 2 | 10 | 27 | 4.64 | 0.584 | Strongly agree |
| | | % | 0 | 0 | 5.1 | 25.6 | 69.2 | | | |
| 2 | Realizing the relationship of critical thinking with other types of thinking | Freq. | 0 | 0 | 1 | 14 | 24 | 4.59 | 0.549 | Strongly agree |
| | | % | 0 | 0 | 2.6 | 35.9 | 61.5 | | | |
| 3 | Explain the importance of critical thinking in life | Freq. | 0 | 0 | 1 | 13 | 25 | 4.62 | 0.544 | Strongly agree |
| | | % | 0 | 0 | 2.6 | 33.3 | 64.1 | | | |
| 4 | Explain the positive effects of practicing critical thinking and the negative effects of poor practice | Freq. | 0 | 0 | 1 | 12 | 26 | 4.64 | 0.537 | Strongly agree |
| | | % | 0 | 0 | 2.6 | 30.8 | 66.7 | | | |
| 5 | Describe the goals and objectives of critical thinking | Freq. | 0 | 0 | 1 | 12 | 26 | 4.64 | 0.537 | Strongly agree |
| | | % | 0 | 0 | 2.6 | 30.8 | 66.7 | | | |
| 6 | Identify the characteristics of a critical thinker | Freq. | 0 | 0 | 1 | 13 | 25 | 4.62 | 0.544 | Strongly agree |
| | | % | 0 | 0 | 2.6 | 33.3 | 64.1 | | | |
| 7 | Clarify the limits and controls of critical thinking | Freq. | 0 | 0 | 3 | 11 | 25 | 4.56 | 0.641 | Strongly agree |
| | | % | 0 | 0 | 7.7 | 28.2 | 64.1 | | | |
| 8 | Distinguishing the relationship of critical thinking to the world of the unseen and the world of materialism | Freq. | 0 | 3 | 3 | 9 | 24 | 4.38 | 0.935 | Strongly agree |
| | | % | 0 | 7.7 | 7.7 | 23.1 | 61.5 | | | |
| 9 | Describe the methodology for gaining monetary capacity | Freq. | 0 | 0 | 3 | 15 | 21 | 4.46 | 0.643 | Strongly agree |
| | | % | 0 | 0 | 7.7 | 38.5 | 53.8 | | | |
| 10 | Defining specifications for an environment that supports critical thinking | Freq. | 0 | 0 | 5 | 13 | 21 | 4.41 | 0.715 | Strongly agree |
| | | % | 0 | 0 | 12.8 | 33.3 | 53.8 | | | |
| 11 | Inferring obstacles to critical thinking practice | Freq. | 0 | 0 | 3 | 14 | 22 | 4.49 | 0.644 | Strongly agree |
| | | % | 0 | 0 | 7.7 | 35.9 | 56.4 | | | |
| 12 | Explain how to exercise critical thinking on different communication contents | Freq. | 0 | 0 | 3 | 13 | 23 | 4.51 | 0.644 | Strongly agree |
| | | % | 0 | 0 | 7.7 | 33.3 | 59.0 | | | |
| 13 | Presenting the ethics of evaluating and criticizing ideas | Freq. | 0 | 0 | 3 | 10 | 26 | 4.59 | 0.637 | Strongly agree |
| | | % | 0 | 0 | 7.7 | 25.6 | 66.7 | | | |
| 14 | Representation of recurring logical fallacies | Freq. | 0 | 0 | 6 | 8 | 25 | 4.49 | 0.756 | Strongly agree |
| | | % | 0 | 0 | 15.4 | 20.5 | 64.1 | | | |
| 15 | Classification of common thinking errors | Freq. | 0 | 0 | 2 | 11 | 26 | 4.62 | 0.590 | Strongly agree |
| | | % | 0 | 0 | 5.1 | 28.2 | 66.7 | | | |
| The general mean of the cognitive standards | | | | | | | 4.55 | 0.633 | | |

Table 6. Means, standard deviations, and the approval degree of the study members' responses on the emotional standards for teaching critical thinking at high school

| No. | Item | Approval degree | | | | | mean | Standard deviation | Approval degree | |
|-----|---|-----------------|----------------|-------|---------|----------|------|--------------------|-----------------|----------------|
| | | Freq. | Strongly agree | agree | Neutral | disagree | | | | |
| 1 | Enhance control of the response to stimuli and not rush to judgment | Freq. | 1 | 0 | 0 | 16 | 22 | 4.49 | 0.756 | Strongly agree |
| | | % | 2.6 | 0 | 0 | 41.0 | 56.4 | | | |
| 2 | | Freq. | 0 | 0 | 3 | 13 | 23 | 4.51 | 0.644 | Strongly agree |

| | | | | | | | | | | |
|---|--|------------|--------|--------|----------|------------|------------|------|-------|----------------|
| | Awakening awareness of the subjective reaction to the violation of the requirements of correct thin | % | 0 | 0 | 7.7 | 33.3 | 59.0 | | | |
| 3 | Developing good faith in the opposing party when discussing his arguments and evidence | Freq. % | 0 0 | 0 0 | 2 5.1 | 14 35.9 | 24 61.5 | 4.56 | 0.598 | Strongly agree |
| 4 | Support the focus on critiquing ideas, not criticizing their owners | Freq. % | 0 0 | 0 0 | 1 2.6 | 14 35.9 | 24 61.5 | 4.59 | 0.549 | Strongly agree |
| 5 | Emphasis on observing the language used in the critical expression of people and ideas | Freq. % | 0 0 | 0 0 | 1 2.6 | 16 41.0 | 22 56.4 | 4.54 | 0.555 | Strongly agree |
| 6 | Alert to the aspects of inertia (bias - first impression ..) and their impact on the critical thinking path | Freq. % | 0 0 | 0 0 | 3 7.7 | 13 33.3 | 23 59.0 | 4.51 | 0.641 | Strongly agree |
| 7 | Dedicate the importance of using critical thinking with different media content | Freq. % | 0 0 | 0 0 | 3 7.7 | 12 30.8 | 24 61.5 | 4.54 | 0.643 | Strongly agree |
| 8 | Emphasizing the importance of evidence in supporting the viewpoint | Freq. % | 0 0 | 0 0 | 2 5.1 | 11 28.2 | 26 66.7 | 4.62 | 0.590 | Strongly agree |
| 9 | Developing humility for the truth and returning to it | Freq. % | 0 0 | 0 0 | 1 2.6 | 13 33.3 | 25 64.1 | 4.62 | 0.544 | Strongly agree |
| 10 | Emphasizing the acceptance of diversity and difference and understanding the positions of others | Freq. % | 0 0 | 0 0 | 1 2.6 | 13 33.3 | 25 64.1 | 4.62 | 0.544 | Strongly agree |
| 11 | Encouraging the appreciation of the mind and lowering it to its rightful place without exaggeration or negligence | Freq. % | 0 0 | 0 0 | 1 2.6 | 12 30.8 | 26 66.7 | 4.64 | 0.537 | Strongly agree |
| 12 | Emphasizing the importance of expanding and deepening the information before making some judgments | Freq. % | 0 0 | 0 0 | 2 5.1 | 13 33.3 | 24 61.5 | 4.56 | 0.598 | Strongly agree |
| 13 | Strengthening respect for authority (parents - the teacher.) even if their opinions do not agree with the objectivity of critical thinking | Freq. % | 0 0 | 0 0 | 2 5.1 | 11 28.2 | 26 66.7 | 4.62 | 0.590 | Strongly agree |
| 14 | Promote respect for science and that every science has hard parts and other flexible parts that are the subject of critical thinking | Freq. % | 0 0 | 0 0 | 2 5.1 | 10 25.6 | 27 69.2 | 4.64 | 0.584 | Strongly agree |
| The general mean of the emotional standards | | | | | | | | 4.58 | 0.598 | |

It was noted from Table 6 that the approval degree of the study members on the emotional standards with a very high degree where all the items got strongly agree with an

average of 4.58, this refers to the appropriate emotional standards to teach critical thinking at high school, perhaps due to the quality and diversity of inputs that benefited them in the

preparation of emotional standard which already noted in the theoretical framework.

It is noted that the two standards are: 1. promoting respect for authority (parent, teacher, etc.) even if they do not agree in their views with the objectivity of critical thinking, 2. Promoting respect for science and that each science contains solid parts and other flexible parts is considered the subject of critical thinking (Ali, 2021). The approval degree of them came to a degree of strong agreement, even though they carry cultural dimensions in their contents, The first standard makes parental satisfaction and respect their authority, and the teacher's authority is in advance when conflict to win the position, even if that position was supported by the critical thinking data in favor of the son or the student, and this is agreed to some extent with what was mentioned in (Bailin, Case, Coombs, Daniels, 1999) study that respecting the legitimate intellectual authority is one of the habits of the critical thinker.

As well as the second standard which may share a multi-science but in the Muslim's culture, the fixed right religious science and its source are God must be believed in even if it was not perceived completely by the human mind, and may have high approval degree due to the two standards even though they carry the cultural dimensions that all the

Muslim sample and the content of the standard is one of the things they believe in.

In general, the mean of the study members' approval degree average on teaching critical thinking standards was in the following order: emotional standard (4.58), cognitive standards (4.55), and skills standards (4.53). The high average of the emotional standards may be due to the general culture of critical thinking excludes passions, emotions, and attitudes, so the emotional standards highlighted the important dimensions in the emotional aspect related to teaching critical thinking that obtained a strongly agree percentage more than the other aspects, and this interpretation supports that some documents and matrices of teaching critical thinking don't show the emotional aspect as in the context of the critical thinking skills development in Australia (Dwyer, Hogan, Stewart, I. 2014), as teaching critical and creative thinking matrix in the Education Institute curriculum and Assessment Authority document in Victoria (VCAA), as well as in student learning standards document in New Jersey (New Jersey State Department of Education) (2020). The previous documents and others do not clearly include enough care for the emotional aspect when teaching critical thinking.

Conclusion

Teaching critical thinking is not an option but is required by the necessities of daily life and education, and should be started to be taught from the early stages of education its learning should be related to the curriculum in any way and cared for inclusion education process at the high school of the three standards domains which are skills, cognitive, and emotional with the rehabilitation of the teacher and enable the necessary skills to teach critical thinking.

Recommendations

- Education Ministry and Related organizations should adopt the critical thinking Policies at the high school that came the approval degree: strongly approved.
- Education Ministry and Related organizations should develop the content of teaching critical thinking at high school according to the study's skill, cognitive, and emotional standards.
- Evaluating the extent of commitment to teaching critical thinking at high school according to the study's policies and standards of education.
- Conducting further investigation and research to identify the best option of the

policies that were the study sample responses neutral.

- Exploring the impact of cultural dimensions in determining the critical thinking controls and boundaries.
- Conducting a comparative study between the students' results that learned critical thinking integrated and who learned critical thinking independently in terms of the acquisition degree of critical thinking standards with its three domains.

References

- [1] Ali, Ismail Ibrahim (2008). *Critical thinking between theory and practice*, Jordan: Dar Al-Shorouk for Publishing and Distribution.
- [2] Al-Raqqas, Khaled (1436). *Critical thinking - an introduction to individual and societal immunization*, Riyadh: King Saud University Press.
- [3] Assessment organization of the training and education (1439). *Methodology Report building dimensions of the education curricula common standards*.
- [4] Assessment organization of the training and education (1439). *National framework of the general education standards in the Saudi Arabia Kingdom*.
- [5] Bailin, S., Case, R., Coombs, J. R., & Daniels, L. B. (1999). *Conceptualizing*

- critical thinking, *Journal of curriculum studies*, 31(3), 285-302.
- [6] Black, B. (2008). Critical thinking—a definition and taxonomy for Cambridge Assessment: Supporting validity arguments about critical thinking assessments administered by Cambridge Assessment. Retrieved from: <http://www.cambridgeassessment.org.uk/Images/126340-critical-thinking-a-definition-and-taxonomy.pdf>
- [7] Dwyer, C. P., Hogan, M. J., & Stewart, I. (2014). An integrated critical thinking framework for the 21st century, *Thinking Skills and Creativity*, 12, 43-52.
- [8] Elder, L & Paul, R. (2007). *The Miniature Guide of Critical Thinking: Concepts and Tools*. 4th edition, Berkeley: California university.
- [9] Facione, P. A. (1990b). *The Delphi Report: Committee on pre-college philosophy*, Millbrae, CA: California Academic Press.
- [10] Fawkes, D., O'meara, B., Weber, D., & Flage, D. (2005). Examining the exam: A critical look at the California Critical Thinking Skills Test. *Science & Education*, 14(2), 117-135.
- [11] G Ali, RN Awan - *Journal of Innovative Sciences*, 2021 Thinking based instructional practices and academic achievement of undergraduate science students: Exploring the role of critical thinking skills
- [12] Heard J., Scoular, C., Duckworth, D., Ramalingam, D., & Teo, I. (2020). *Critical thinking: Skill development framework*, Australian Council for Educational Research. https://research.acer.edu.au/ar_misc/41
- [13] Huitt, W. (1998). *Critical thinking: An overview*, Interactive Educational Psychology, Valdosta, GA: Valdosta State University. Retrieved [date] from, <http://chiron.valdosta.edu/whuitt/col/co-gsys/critthnk.html>. [Revision of paper]
- [14] H Naseer, Y Muhammad, S Masood - sjesr, 2020 Critical thinking skills in a secondary school Pakistan studies textbook: A qualitative content analysis
- [15] Joe loe, Jonathan chan, "What is critical thinking?" philosophy. Hku.Hk, Retrieved 28-11-2019.
- [16] Kettler, Todd. (2020). *Critical thinking in curriculum design a differentiated approach to critical thinking in curriculum design*, 10.4324/9781003236696-8.
- [17] Lai, E. R. (2011). *Critical thinking: A literature review*, Pearson's Research

- Reports, 6(1), 40-41.
- [18] Liu, O. L., Frankel, L., & Roohr, K. C. (2014). Assessing critical thinking in higher education: Current state and directions for next-generation assessment, ETS Research Report Series, 2014(1), 1-23.
- [19] McIlvenny, L. (2013). Critical and creative thinking in the new Australian curriculum part one, *Access*, 27(1), 18-22.
- [20] M Jamil, Y Muhammad, S Masood, Z Habib - ... Reflections in Education, (2020). Critical thinking: A qualitative content analysis of education policy and secondary school science curriculum documents
- [21] Moore, B. N., Parker, R., Rosenstand, N., & Silvers, A. (2012). Critical thinking (pp. 185-194), New York: McGraw-Hill.
- [22] Murawski, L. M. (2014). Critical thinking in the classroom and beyond, *Journal of learning in higher education*, 10(1), 25-30.
- [23] New Jersey State Department of Education. (2020). New Jersey student learning standards – career readiness, life literacies, and key skills introduction, Trenton, Nj: author.
- [24] Norman Herr, "Elements of Critical Thinking" csun.edu, Retrieved 28-11-2019.
- Sandra Wiley (17-9-2015), "5 strategies to grow critical thinking skills", www.journalofaccountancy.com, Retrieved 30-11-2019.
- [25] Paul, R., & Elder, L. (2006). Critical thinking competency standards, Dillon Beach: Foundation for critical thinking, presented at the Critical Thinking Conference sponsored by Gordon College, Barnesville, GA, March 1993.
- [26] Rashdan, Lubna Mohamed (2012). Critical thinking in Islamic education, Jordan: Dar Criterion for publication and distribution.
- [27] S Ali, SB Qutoshi, Z Jabeen - (2021). The Perceptions and Practices of Secondary School Teachers for Developing Critical Thinking Skills in Students. *Pakistan Journal of Social Research*
- [28] Smart, J. C. (Ed.). (2008). Higher education: Handbook of theory and research (Vol. 23), Springer Science & Business Media.
- [29] Watson, G. & Glaser, E. M. (1964). Watson-Glaser critical thinking appraisal manual, Psychological Corporation.
- [30] Yassin, Amr Saleh (2015). Critical

thinking in the entrance to the nature of argumentation and types, Lebanon: Arab Network for Research and Publishing.