

Promoting Critical Thinking Skills in Students in Middle and High School to Achieve the Kingdom of Saudi Arabia's National Vision 2030

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Abstract : This article explores how to promote critical thinking skills in students in middle and high school to achieve the Kingdom of Saudi Arabia's National Vision 2030. It defines critical thinking, discusses the importance of critical thinking skills, identifies barriers to critical thinking, explores strategies and methods to enhance critical thinking skills, and examines the educational reform plan. Critical thinking is defined as the ability to analyze information, evaluate arguments, and make decisions based on evidence and logic. The article emphasizes the importance of critical thinking skills in developing students' cognitive abilities, increasing their academic achievement, and preparing them for success in the workforce. However, there are several barriers to critical thinking, including cultural and social biases, lack of exposure to diverse perspectives, and the dominance of rote learning in traditional educational systems. The article discusses these barriers and highlights the need for strategies and methods to enhance critical thinking skills. Strategies to enhance critical thinking skills include promoting inquiry-based learning, encouraging active student participation, developing problem-solving skills, and providing opportunities for collaborative learning. The article explores these strategies in depth and provides examples of how they can be implemented in Saudi middle and high schools. Finally, the article examines the educational reform plan and its goals for promoting critical thinking skills in Saudi students. The plan includes initiatives to improve teacher training, promote student-centered learning, and integrate critical thinking skills into the curriculum. The article discusses the potential impact of these initiatives and their alignment with the Kingdom of Saudi Arabia's National Vision 2030. Overall, the article emphasizes the importance of promoting critical thinking skills in Saudi middle and high schools to achieve the goals of the National Vision 2030. By addressing the barriers to critical thinking and implementing effective strategies and methods, Saudi Arabia can develop a generation of critically-thinking students who are prepared for success in the 21st century.

Keywords: Policies for enhancing critical thinking - Critical thinking skills -Educational reform plan - Barriers to critical thinking - Middle and high school students.

1 Introduction

I aspire to promote critical thinking skills in middle and high school students in Saudi Arabia, especially since students are lacking critical thinking skills, one of the challenges that the Ministry of Education in Saudi Arabia is currently facing. Furthermore, I noticed through the classes that I have attended back in Saudi Arabia that teachers heard a lot about critical thinking skills and how important they are as one of the 21st-century skills but unfortunately, one of the most notable weaknesses that we have in Saudi Arabia is the gap between theory and practice.

During my school placement at Excel Academy in Chelsea, Massachusetts, I observed many classes in different subjects and have had the chance to interview with Emily Lupo, the Dean of Curriculum and Instruction, about promoting critical thinking skills in their students. Therefore, it was a great chance to

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collect some data that helped to create a logical conception of the methods and strategies used by teachers to stimulate critical thinking skills in their students. To be more precise, the educators follow the standards that were set by the state of Massachusetts. The state have shifted the Common Core standards and focused on skills to learn the content and put much more emphasis on how to obtain information and use this information instead of what the information is. Everything included in the curriculum when they create their assessments, unit plans, and daily materials is geared to help students master the state standards which are skill-based.

There are some key skills laid out in those standards. They have some practices that focus on the values that they want their students to be able to gain, such as asking good questions, having an opinion, and arguing and defending it by using evidence. In addition to that, their skill to debate in a satisfactory manner with one another where students demonstrate their ability to analyze, research, argue, evaluate, and make decisions. For example, in reading and social studies classes, everything relates to analysis so students need to understand the author's purpose, write their claims and thesis and support their opinions by providing evidence from the text and how this evidence proves their answers or helps clarify their opinions. Moreover, in science, students learn how to explore the facts and information and interpret data that qualify them to solve real-world problems. Moreover, in math, students practice how to solve many problems by using critical thinking skills so that they will be able to apply what they already know in upcoming problems. That being said, their focus is on how they can develop a skill to learn content instead of just being able to understand what the content is. I'm also interested in learning more about the state standards and how we can foster critical thinking skills in a way that is relevant to students because the key to engagement is relevancy, and how we get students to be critical consumers. Therefore, the school immersion experience was meaningful and beneficial to me because the teachers represent a practical model that focuses on promoting critical thinking skills. In fact, I believe this is going to work for us in the Kingdom of Saudi Arabia. However, there are many factors that impact the application of these methods in teaching such as a large number of students in the classroom—which , would affect giving each student the opportunity to share their perspectives. In addition to that, the level of the teachers' expertise varies from one another; in other words, their level of performance is different in which there are multiple ways one can perform their task nevertheless their strategies are diverse.

2 Literature Review

Educators have long been mindful of the significance of critical thinking skills as a result of student learning. More as of late, the association of the 21st-century skills has distinguished critical thinking as one of the few learning and development aptitude fundamentals to get the student ready for post-secondary education and the workforce. The purpose of this literature review is to (a) illustrate the definition of critical thinking, (b) demonstrate the importance of critical thinking skills, (c) explain the barriers to critical thinking, and (d) explore methods and strategies to foster critical thinking skills in students.

3 The Definition of Critical Thinking

One of the essential skills required for 21st-century learning is critical thinking. Critical thinking as one part of higher-order thinking has various definitions. Several authors agree that critical thinking can be defined as the intellectual skills connected to logic. This includes the process of analyzing, making conclusions, evaluating, and reflecting^{(1),(2),(3)}. Furthermore, some researchers added to this definition.

(1)Irwanto, I., Saputro, A. D., Rohaeti, E., & Prodjosantoso, A. (2018). Promoting Critical Thinking and Problem Solving Skills of Preservice Elementary Teachers through Process-Oriented Guided-Inquiry Learning (POGIL). *International Journal of Instruction*, 11(4), 777–794. doi: 10.12973/iji.2018.11449a

For example, Cottrell⁽⁴⁾ defined critical thinking as “A complex process of deliberation which involves a wide range of skills and attitudes.” Other writers interpreted critical thinking as a process of conceptualizing, and decision making (Jerome, Lee, and Ting, 2017). In addition, Watanabe-Crockett (2019)⁽⁵⁾ emphasized that critical thinking is based on formulating opinions and to be open to other perspectives. Also, Parker⁽⁶⁾ and Watanabe-Crockett⁽⁷⁾ (2017, 2019) noted that critical thinking is based on making judgments after logical thinking. Despite the differences between the definitions of critical thinking, there exist areas of agreement. To further elaborate, critical thinking researchers regularly concur on several capacities enveloped by the definition. Lai’s (2011) study elaborated on these similarities by pointing out that the critical thinking process consists of questioning, analyzing, argument, claims, or evidence, judging or evaluating, reflecting, synthesizing, making decisions or solving problems, and making inferences using inductive or deductive reasoning.

4 The Importance of Critical Thinking Skills

As the world shifts to ‘creative jobs’, there are areas of agreement among educators about the criteria for students graduating into the workforce that include the capacity to recognize and unravel complex problems, think critically about data, work viably and communicate clearly about their thinking. D’Alessio, Avolio, and Charles (2019)⁽⁸⁾ found in their study that critical thinking has a positive impact on the average academic performance of students. Engaging critical thinking skills in students is one of the fundamental skills that educators have been advocating for over a long period of time, as it is believed that it can lead to higher academic performance. Simply put, students who are able to think critically are able to interpret issues more deeply and accurately. That being said, having information or data alone is insufficient. To be successful within the workplace (and in their individual lives), students must be able to solve problems and to make compelling arguments; they must be able to think critically and ingeniously⁽⁹⁾. Critical thinking not only expands our life expertise and helps us obtain diverse viewpoints, but also helps us deal with future obstacles (Parker, 2017)⁽¹⁰⁾.

Likewise, Cottrell⁽¹¹⁾ described the importance of critical thinking in three points, which are the following:

1) honing our minds, 2) benefiting one’s academic and professional life, and 3) boosting one’s practical selfexamination. Muhlisin et al. (2016)⁽¹²⁾ reported that the lack of the students’ abilities to communicate and argue is closely related to their inability to trigger their critical thinking skills.

(2) Snyder, L. G., & Snyder, M. J. (2008). Teaching Critical Thinking and Problem Solving Skills. *The Delta Pi Epsilon Journal*, L, No. 2, 90–97.

(3) Joseph, M. (2019), November 19). Strategies to Increase Critical Thinking Skills in students. Retrieved May 15, 2020, from <https://www.teachbetter.com/blog/strategies-to-increase-critical-thinking-skills-in-students/>

(4) Cottrell, S. (2017). *Critical thinking skills: effective analysis, argument and reflection*. Basingstoke: Palgrave Macmillan.

(5) Watanabe-Crockett, L. (2019, October 16). 12 Solid Strategies for Teaching Critical Thinking Skills. Retrieved from <https://wabisabilearning.com/blogs/critical-thinking/teaching-critical-thinking-skills>

(6) Parker, J. (2017). Critical thinking & problem solving - 2019 Technology Toolbox For Educators. Retrieved from <https://sites.google.com/site/technologytoolboxforeducators/pedagogies/critical-thinking-problem-solving>

(7) Watanabe-Crockett, L. (2019), **Opcit**

(8) D’Alessio, F. A., Avolio, B. E., & Charles, V. (2019). Studying the impact of critical thinking on the academic performance of executive MBA students. *Thinking Skills and Creativity*, 31, 275–283. doi: 10.1016/j.tsc.2019.02.002

(9) Snyder, (2008),. **Opcit**

(10) Parker, J. (2017). **Opcit**

(11) Cottrell, S. (2017), **Opcit**

(12) Muhlisin, A., Susilo, H., Amin, M., & Rohman, F. (2016). Improving critical thinking skills of college students through RMS model for learning basic concepts in science. *Asia-Pacific Forum on Science Learning and Teaching*, 17(1), 1–24.

Furthermore, Watanabe-Crockett (2019, p.1)⁽¹³⁾ explained that “Teaching critical thinking skills is a necessity with our students because they are crucial for living life.” Therefore, based on the aforementioned quote, all educators are compelled to include critical thinking skills in their lessons, regardless of the subject or grade being taught.

5 Barriers to Critical Thinking

Researchers agreed on the fact that the reasons why teachers lack the ability to foster critical thinking skills in their students are due to their lack of training and time constraints. To further elaborate, a study conducted by Razzak (2014) reported that when it comes to implementing these new curricula that are rich with content, exercises, and evaluations that address profound learning and critical thinking, the teachers’ implementation is lacking due to several factors. The experienced senior teachers mentioned that the lack of time to plan and cover activities that address higher-order thinking skills, lack of know-how and expertise on how to execute such exercises, the pressure to cover content in terms of quantity at the expense of quality, the enormous classroom sizes and the fact that there is not enough time with the students elucidate why teachers lean towards skipping these skills. Moreover, Jerome, Lee, and Ting (2017) pointed out in their research that students lack critical thinking skills because of two main factors. Numerous students are lazy who have little inspiration to think and develop cognitive aptitudes that permits them to be more inventive and analytical. Teaching critical thinking skills at all levels of education may not be as simple as one considers because of the need for information, mindfulness, and preparation among students, instructors, and administrators. In addition to that, Snyder⁽¹⁴⁾ illuminated in their study that limited resources—as in the lack of diverse methods—and biased perceptions—where people are acting on their prejudice thoughts—conspire to hinder the learning environment that overall helps stimulate critical thinking skills. Cottrell⁽¹⁵⁾ brought to light the following obstacles to applying critical thinking skills among the teachers: confusing data with comprehension, over-assessing one’s own thinking capacities, and the misconception of what is implied by criticism—in other words, whatever feedback they receive would be misinterpreted. The constraints that affect the application of critical thinking skills should be taken into account by educators when planning to incorporate critical thinking skills into their lessons.

6 Strategies and methods to enhance critical thinking skills

“Our job is to teach students how to think not what to think⁽¹⁶⁾. In order to be critical

thinkers, educators need to provide students with the strategies they need which means focusing on the process of learning instead of the content⁽¹⁷⁾. Within the setting of 21st-century teaching and learning, lecturers are required to supply more complex and dynamic learning opportunities than conventional lecturing—where it is too long and boring therefore students would eventually zone out, hence, why they would not be able to obtain all of the information provided by the lecturer⁽¹⁸⁾.

7 Effective Questions

Several authors argue that the usage of strategies and methods such as “effective questions”—questions that challenge students’ intellectuality and concentrate on the open-ended questions—focuses on teaching students how to be pensive while thinking. Effective questioning is one of the most

(13) Watanabe-Crockett, L. (2019), **Opcit**

(14) Snyder, (2008),. **Opcit**

(15) Cottrell, S. (2017), **Opcit**

(16) Joseph, M. (2019) **Opcit**

(17) Snyder, (2008),. **Opcit**

(18)Irwanto,. (2018). **Opcit**

powerful teaching tools that stimulate brainstorming and as a result inspires students to make connections to real issues (Watanabe-Crockett, 2019⁽¹⁹⁾; Snyder, (2008)⁽²⁰⁾; Parker, 2017⁽²¹⁾; Nappi, 2017⁽²²⁾; Gul et al., 2014⁽²³⁾; Liewellyn, and Adams, 2013⁽²⁴⁾; Shing, and Seepho, 2017⁽²⁵⁾). Researchers have noticed a connection between the kind of questions posed by educators and the students' ability to develop critical thinking skills (Gul et. al, 2014)⁽²⁶⁾.

8 Problem-Based Learning

Watanabe-Crockett⁽²⁷⁾; Gul⁽²⁸⁾ et al.; Jerome, Lee, and Ting; Lai; Joseph⁽²⁹⁾, (2014, 2017, 2011, 2019) suggested

encouraging critical thinking skills by implementing problem-based learning that requires real-life solutions and thus helps engage students who struggle to get a handle on theoretical concepts. In other words, problem-based learning is a teaching strategy where intricate real-life problems are used to enhance student learning of concepts and fundamentals in contrary to direct demonstration of facts and notions.

9 Discussions /Cooperative learning

Planning lessons that provide opportunities for discussions allows building critical thinking skills in students where students will learn how to critique and heighten their thinking. Moreover, critical thinking allows students to examine, criticize, and validate the ideas that are being discussed, and give students the opportunity to understand challenges and problems more thoroughly. Furthermore, discussions help enhance students' intellectual agility in order for them to face real-life related challenges. To add on to that, students also compare their ideas to their peers so they are more open to other peoples' critiques and opinions (WatanabeCrockett, 2019⁽³⁰⁾; Jerome, Lee, and Ting, 2017; Parker⁽³¹⁾, 2017; Lai, 2011; Perin, 2019⁽³²⁾; Chowning, and Peterman,2015⁽³³⁾; Wang, and Sepho, 2017⁽³⁴⁾). According to the study *Instructional Strategies That Enhance Higher Order Thinking Skills (HOTS)* conducted by Jerome, Lee, and Ting (2017) at the University of Malaysia at Sarawak (UNIMAS) the data that was collected from 120 undergraduates, students pointed out specific forms of

(19) Watanabe-Crockett, L. (2019), **Opcit**

(20) Snyder, (2008).. **Opcit**

(21) Parker, J. (2017). **Opcit**

(22) Nappi, J. (2017). The Importance of Questioning in Developing Critical Thinking Skills. *International Journal for Professional Educators* , 30–39

(23) Gul, R., Khan, S., Ahmed, A., Cassum, S., Saeed, T., Parpio, Y., ... Schopflocher, D. (2014). Enhancing Educators' Skills for Promoting Critical Thinking in Their Classroom Discourses: A Randomized Control Trial. *International Journal of Teaching and Learning in Higher Education*, 26, 1,37–54.

(24) Joseph, M. (2019) **Opcit**

(25) Wang, S., & Seepho, S. (2017). Facilitating Chinese EFL Learners' Critical Thinking Skills: The Contributions of Teaching Strategies. *SAGE Open*, 7(3), 1–8. doi: 10.1177/2158244017734024

(26)Gul, R (2014), **Opcit**

(27) Watanabe-Crockett, L. (2019), **Opcit**

(28) Gul, R (2014), **Opcit**

(29) Joseph, M. (2019) **Opcit**

(30) Watanabe-Crockett, L. (2019), **Opcit**

(31) Parker, J. (2017). **Opcit**

(32) Perin, S. (2019). Relating research to practice. National Science Foundation, DRL-1224135, 2.

(33) Chowning, J., & Peterman, T. (2015). Beyond the Written C-E-R: Supporting Classroom Argumentative Talk about Investigations : *StemTeachingTools*. Retrieved May 15, 2020, from <http://stemteachingtools.org/brief/17>

(34) Wang, S., & Seepho, S. (2017). **Opcit**

instructional strategies such as Problem-based Learning, Cooperative Learning, and Discussion that they agree are most effective in enhancing their HOTS--in other words, their critical thinking skills. (click-on [figure 1](#)). The bar graph highlights the students' views on the strategies they think are most useful in helping them enhance their HOTS. 25% of students agree that Discussion enhances their HOTS, 27.5% agree that Cooperative Learning enhances their HOTS, while 30.8% agree that Problem-based Learning is much more efficacious.

10 Argumentation

(Mesa, Pringle & Hayes, 2013⁽³⁵⁾; Cottrell, 2017⁽³⁶⁾; McNeill, 2011⁽³⁷⁾; Perin, 2019⁽³⁸⁾; Chowning and & Peterman, 2015⁽³⁹⁾; Llewellyn, & Adams, 2013)⁽⁴⁰⁾ proposed the argumentation method where

Students can collect data and evaluate evidence for their claims that are related to their conclusions.

11 Challenge their assumptions

Researchers encourage educators to boost high-order thinking skills by teaching students to challenge their assumptions, which in turn teaches them how to search for facts in order to broaden their horizons (Cottrell, 2017⁽⁴¹⁾; Heickp, 2019; Llewellyn & Adams, 2013⁽⁴²⁾). A study by Irwanto⁽⁴³⁾ claims that information acknowledged by the students is narrow and hence they are less competent in generating selfsufficiency. In this manner, students tend to face difficulties in comprehending the issues that require thinking and investigating abilities, difficulties in clarifying concepts and thus having the tendency towards being detached. The aforementioned strategies and methods can be very effective in enabling educators to activate critical thinking skills among their students, therefore resulting in the production of a generation that is capable of utilizing the knowledge they have gained instead of simply consuming it and thus rendering them capable to keep up with the pace of knowledge in the modern world.

(35) Mesa, J., Pringle, R., & Hayes, L. (2013). Show Me the Evidence! Scientific Argumentation in the Middle School Classroom. *Science Scope*, 036(09), 61–64. doi: 10.2505/4/ss13_036_09_60

(36) Cottrell, S. (2017), **Opcit**

(37) McNeill, K., & Martin, D. (2011). Claims, Evidence, and Reasoning. *National Science Education Standards*, 52–56

(38) Perin, S. (2019). **Opcit**

(39) Chowning, J., & Peterman, T. (2015). **Opcit**

(40) Llewellyn, D., & Adams, A. (2013). Turning the Science Classroom Into a Courtroom: Engaging in Argument From Evidence. *Science Scope*, 036(09), 15–20. doi: 10.2505/4/ss13_036_09_14

(41) Cottrell, S. (2017), **Opcit**

(42) Llewellyn, D., & Adams, A. (2013), **Opcit**

(43) Irwanto (2018), **Opcit**

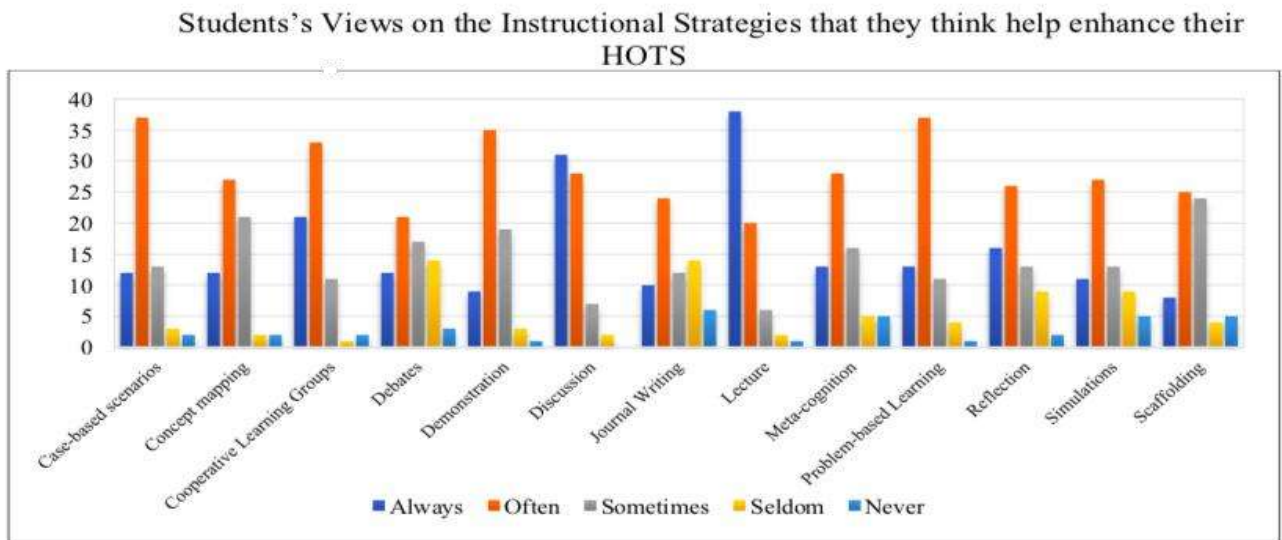
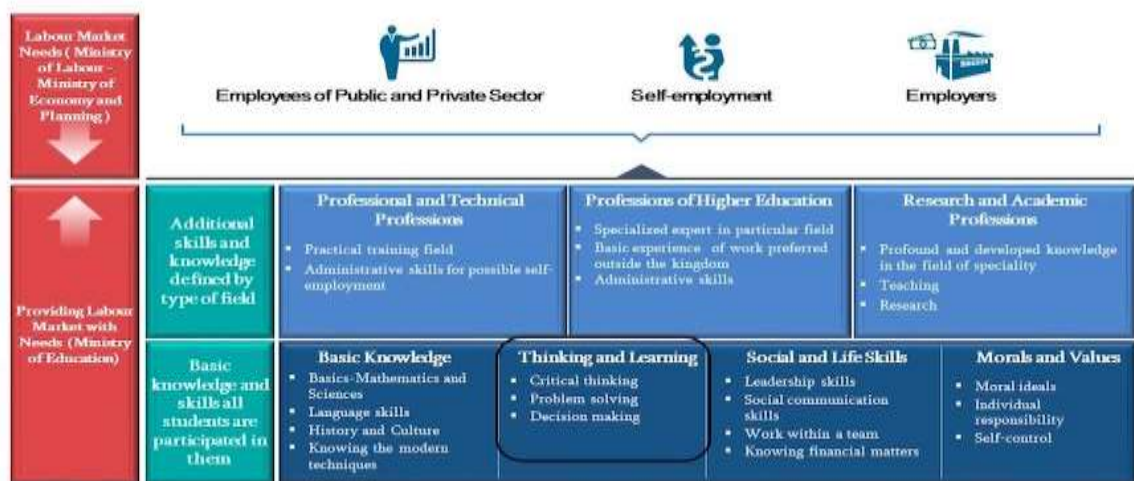


Fig. 1:

12 Educational Reform Plans

This is a proposal for a change in Saudi Arabia to enhance critical thinking skills in students. This proposal was based on the distribution of a practical model that supports the application of intellectual abilities as one of the basic skills of the 21st-century. These skills are considered one of the challenges the Ministry of Education in Saudi Arabia is currently facing, and one of the basic pieces of knowledge and skills that all students should acquire as mentioned in the Education plan to achieve Vision 2030 and in the general objectives of education 2020 (click-on figures 2, 3, and 4). Hence, critical thinking is an essential skill in order to reach the ministry’s vision. Furthermore, students must master these skills in order to be prepared for workforce needs.

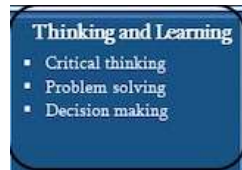
This diagram is from the Ministry of Education and it represents The Intended Objectives of Education.



System

Fig. 2: The Intended Objectives of Education System.

<https://www.moe.gov.sa/en/Pages/vision2030.aspx>



The diagram below is from the Ministry of Education and it represents the Challenging Facing Education in KSA

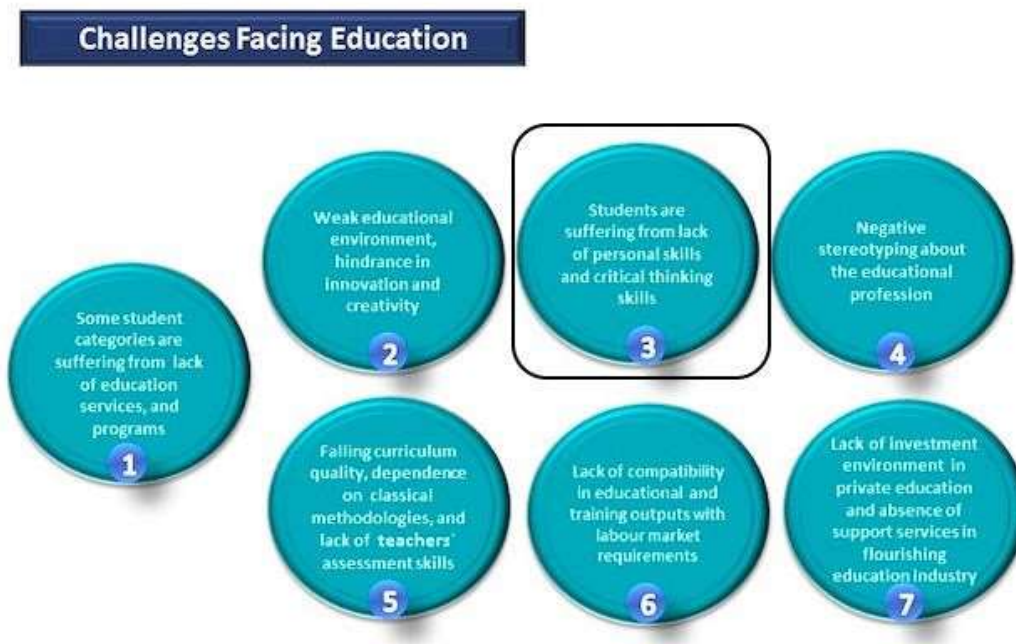


Fig. 3: Challenges Facing Education in KSA
<https://www.moe.gov.sa/en/Pages/vision2030.aspx>



As you can see in the diagram below, the Ministry of Education has indicated that the development of teachers, methods of education, and improving of students' values and skills are some of general objectives of Education 2020.

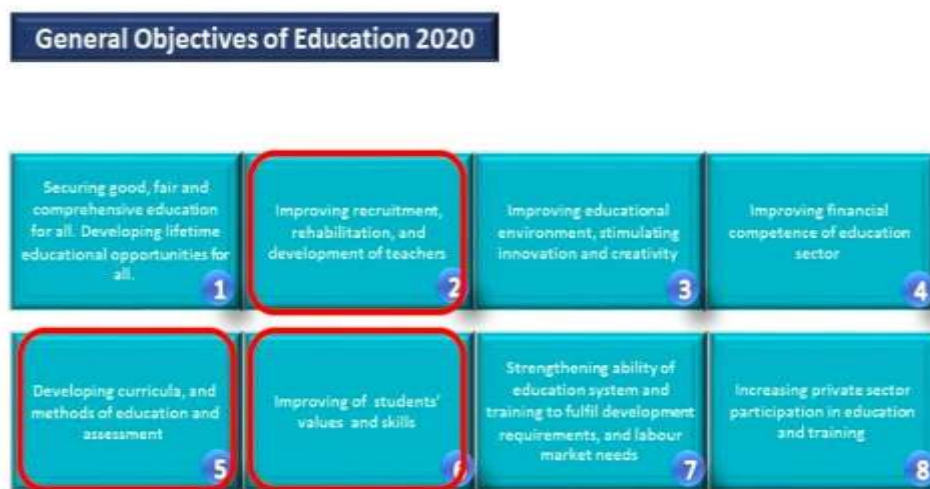


Fig.4: General Objectives of Education 2020
<https://www.moe.gov.sa/en/Pages/vision2030.aspx>

1) **Rationale:**

It is the objective of the ministry of education is to supply the Saudi labour market with the skills it needs. While Basic knowledge and skills such as basic mathematics and sciences are highly valuable, other thinking and learning skills are becoming hiring criteria for many employers. These skills include critical thinking, problem solving, and decision making. This enforces the needs of at least piloting the suggested program, where the potential to get desirable output is high. The collective research emphasized the importance of enhancing students' critical thinking skills as it is essential for everyone. As the world moves to 'creative jobs', there are areas of agreement among educators that the criteria for students graduating into the workforce include the capacity to recognize and disentangle complex issues, think critically about information, work suitably, and communicate clearly. D'Alessio, Avolio, and Charles, (2019)⁽⁴⁴⁾ recommend critical thinking skills as one of the fundamental skills that educators have been advocating to achieve for a long time, as it is believed that they can lead to higher academic performances. Students who are able to think critically are able to interpret issues more thoroughly and accurately. That being said, having information or data alone is insufficient. To be successful within the workplace--and in their individual lives--students must be able to solve problems and make informed decisions; they must be able to think critically and ingeniously.

The following points suggested by David Hitchcock strongly support the argument for critical thinking skills as essential for preparing young people to enter the future workforce (2018):

- In Glaser and Watson (1941), the experimental group of students received 8 lessons in critical thinking while the control group received regular lessons. A pre-test and post-test of the students utilizing the Otis Quick-Scoring Mental Ability Test and the Watson-Glaser Tests of Critical Thinking (created in collaboration with Glaser's paper support, Goodwin Watson) were administered. "The average gain in scores on these tests was greater to a statistically significant degree among the students who received the lessons in critical thinking than among the students

44) D'Alessio, (2019). **Opcit**

in a control group of four grade 12 high school classes taking the usual curriculum in English” (Hitchcock, 2018, p.1)⁽⁴⁵⁾.

- Modern political and business commanders express support for critical thinking as an educational goal. In his 2014 State of the Union address (Obama 2014), U.S. President Barack Obama mentioned critical thinking as one of six abilities for the new economy that is focused on his Race to the Top program.
- In an article in the business magazine, *Forbes*, it was reported that the number one work skill, found in nine out of ten of the foremost in-demand employments, was critical thinking, characterized as “using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems” (Hitchcock, 2018, p.1)⁽⁴⁶⁾.
- In reaction to the two points mentioned above, the European Commission has financed “Critical Thinking Across the European Higher Education Curricula”, a nine-country study that aims to create rules for quality in critical thinking instruction in European establishments of higher education, on the premise of the researchers’ discoveries of the critical thinking abilities and dispositions that employers anticipate of later graduates (Hitchcock, 2018,p.1)⁽⁴⁷⁾.
- The Centre for Educational Research and Innovation of the Organization for Economic Development (OECD) in early 2018 issued a call for teachers of higher instruction to take part in a two-year study, with control groups, of mediations in undergraduate or instructor instruction outlined to progress imaginative and critical thinking (OECD Centre for Educational Research and Innovation, 2018).

2) Implementation Plan:

The Implementation Plan will focus on computer classes for the both middle and High schools, as they fall under my expertise and authority. The implementation plan for the proposed project is based on several stages and procedures (click-on the attached link bellow to see table 1, and 2)

13 Implementation Plan

The implementation time for the whole project will be 4 years. The stakeholders that will benefit from this proposed model will be all segments of the educational community—students, teachers, educators, administrators, and parents.

Examples to demonstrate how critical thinking has been used to teach standards in Excel Academy Middle School in Chelsea, Massachusetts, U.S:

According to the interview with the Dean of Curriculum in Excel Academy in Chelsea Middle School,

Ms. Emily Lupo, the skills that the state wants students to master are the following :

1. Use patterns
2. Use Data
3. Ask good questions
4. Have an opinion, argue, and defend their position
5. Use evidence from the text or the problem to be able to back themselves

(45) Hitchcock, D. (2017). Supplement to Critical Thinking. Retrieved from <https://plato.stanford.edu/entries/criticalthinking/history.html>

(46) Opcit

(47) Opcit

6. Persevere when something is tough
7. Take something they know and apply it in a new situation

Example: The teacher has required the students to write an essay. In this essay, students should have a thesis, write claims—support their claims with evidence from the text or data, then give

Explanations—in this stage, the students will be able to demonstrate how that evidence justifies their answer. Thus, students seek explanations and make decisions. Additionally, for students to learn how to practice, argue constructively, and analyze information, is also very important.

Examples from our experience through school immersion:

(Excel Academy Middle School in Chelsea)

I have created a video to demonstrate examples of teaching strategies that lead to critical thinking that I observed at my placement at the Excel Academy Middle School in Chelsea, MA. Please click on the link below to view these examples.

<https://drive.google.com/open?id=1m9gnJ2ICqvsILbyPI3pHUIJZrXvFMjQfI>

Strategies and Methods that promote Critical Thinking Skills in Students

The effective teaching strategies that focus on the process of learning instead of concentrating on the content. That being said, the focus will be on the skills that students will gain through the learning process.

Effective Questions

Questioning is often used by educators as an effective teaching strategy to foster critical thinking:

- The goal of “effective questioning” is to use the various cognitive taxonomies such as analyzing, synthesizing, evaluating, and creating. These are the ‘higher-order thinking skills’ which should be applied instead of the ‘lower-order thinking skills.’
- Effective questioning focuses on stimulating brainstorming and having the ability to back their claims and find solutions for the problems mentioned.
- Concentrate on the open-ended questions such as (Who, What, Where, When, Why, and How) which are essential and more-likely to foster critical thinking skills rather than the ‘yes or no’ questions.
- Ask questions that require an extended response.
- Use some strategies such as the NUMBERED-HEADS-TOGETHER or THINK-PAIR-SHARE, to involve everyone.

For more details please watch the attached link from the San Bernardino Unified School District

<https://www.youtube.com/watch?v=DVfOJjKV5QE&feature=share>

Problem-Based Learning

With the help of ‘problem-based learning’, educators are now able to have a powerful tool on their side. It's a technique that will support students well in and out of school. Problem-based learning is entirely characterized by the 6 Ds—Define, Discover, Dream, Design, Deliver, and Debrief. Watch the short video below to learn more about these from Watanabe-Crockett :

<https://youtu.be/6tGN8wnJ2eE>

Discussions /Cooperative learning:

It is one of the strategies that can strongly impact students' thinking skills. Therefore, discussions ought to be used as a culture rather than just an activity, in other words, teachers need to plan how students will be conducting the discussion.

The following are some strategies and tips that will help lead discussions successfully as mentioned in the Center for Teaching Excellence, University of Waterloo website (2020):

- Set up ground rules for the students' participation in discussions
- Clearly communicate how much time you've got for questions or discussion, and what you're trying to achieve within this range of time.
- Make a list of key points.
- Partner students up and give them the chance to brainstorm their ideas.
- Divide students into little groups to examine a particular question or issue sometime before inquiring them to share with the class as a whole.
- Pose a controversial issue and organize a casual debate about it.
- Allow students to ask questions or share their thoughts in lessons anonymously, such as writing them down on a piece of paper.
- Use online resources and content management frameworks to amplify lesson discussions.
- Optimistically reinforce student contributions by emphasizing the value of their responses by restating their comments, writing their ideas on the board, and/or making connections between their comments and the discussion in general.

For more details please watch the attached link from Michigan Department of Education.

<https://m.youtube.com/watch?v=BGBLMdXnTmoandfeature=share>

Argumentation

An argument is a claim that legitimizes conviction of information and evidence. “The *claim* is an assertion

or conclusion that attempts to answer the original question or summarize the findings of a scientific inquiry. The *evidence* is extracted from all the data collected in the form of observations and measurements. The *evidence* supports the legitimacy of the stated claim. The *explanation* summarizes the claim and provides an interpretation of the newly acquired knowledge. These element play an important role in designing argument-based investigations” (Llewellyn, and Adams, 2013, p.3)⁽⁴⁸⁾.

Steps to engage in a debate in the classroom as mentioned by Llewellyn, and Adams in their article entitled

Turning the Science Classroom into a Courtroom (2013) are featured below

1. Asking questions
2. Creating and utilizing models

(48) Llewellyn, D., & Adams, A. (2013), **Opcit**

3. Planning and carrying out investigations
4. Analyzing and evaluating data
5. Utilizing arithmetic, data and computer technology, and computational thinking
6. Developing explanations
7. Engaging in arguments from evidence
8. Collecting, assessing, and communicating information

To learn more you can watch this video from the University of California, Berkeley :
<http://www.argumentationtoolkit.org/session-11.html>

Challenge Assumptions

It is significant that students' assumptions are always being challenged. In addition, it is a good idea to Show an often-debated issue and question students about their assumptions on the topic. The teacher can show a well-argued, objective video on the topic and after that asks the students to revisit their presumptions in a group.

At last, the teacher shares the students' thoughts with the whole class (Erik, 2016)⁽⁴⁹⁾.

3) Analysis and Evaluation:

- *Analysis:* In order to measure the impact of strategies and methods on students' acquisition of critical thinking skills, the data will be collected through multiple tools such as observations, field notes, assessments (rubrics), interviews, surveys (teachers, students, parents, and administrators), student work samples, photographs, audio or video excerpts, and reports. Following, the quantitative and qualitative data will be analyzed.
- *Evaluation:* In this process, we will be using those tools before implementing the proposal and after, to compare how well students have improved their critical thinking skills after applying those strategies and methods. Accordingly, the results will be drawn to determine the success of the project.[\(click-on table 3\)](#).

Example:

If the expectation is to teach students how to argue, they are supposed to learn how to analyze information, seek explanations, look up claims, support their claims with evidence from investigating and interpreting data to persuade their peers, and give reasoning by explanations, to defend their position. During this process, the evaluator can interview the students, observe how students argue in any case, record their answers, write down the students' answers to be assessed by a rubric. That being said, if seven out of ten students are able to argue supporting their claims with evidence, back up their claims with some facts, and are able to reason with that, then the evaluator would be able to determine whether or not the students have reached the requirements the project has set out.

Table: 3

General Objective	Educators apply strategies and methods that enhance students' critical thinking.	
Objectives	Analysis	Evidence

(49) Erik-john. (2016). Notes on Teaching and Learning. Retrieved May 15, 2020, from <https://sites.nd.edu/kaneb/2016/10/31/challenging-assumptions>

1) Educators and students can ask questions that will effectively foster critical thinking.	<ul style="list-style-type: none"> ● Observations. ● Rubrics. 	70% of educators and students ask effective questions in order to promote critical thinking.
2) Activating problem-based learning in lessons efficiently.	<ul style="list-style-type: none"> ● Observations. ● Student work samples. ● Checking teachers' lesson plans. 	50% of the lessons are based on activating a problem-based learning method.
3) The ability of teachers to lead classroom discussions that successfully promotes critical thinking.	<ul style="list-style-type: none"> ● Observations. ● Rubrics. ● Audio or video excerpts. 	70% of educators can lead classroom discussions successfully.
4) Help students master the skill of debating by obtaining claims and supporting them with evidence.	<ul style="list-style-type: none"> ● Observations. ● Rubrics. ● Reports ● Fieldnotes. ● Checking teachers' lesson plans. audio or video excerpts. 	70% of the students can master debating by using claims and supporting their claims with evidence.
5) Educators can challenge the students' assumptions skillfully.	<ul style="list-style-type: none"> ● Observations. ● Checking teachers' lesson plans. 	70% of educators can challenge their students' assumptions skillfully.

4) Resources:

Source of Project Funding	Cost
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1-Professional Development place (Educational Training Center, Schools)	0 Saudi Riyals
2-hiring experts from the educational field.	0 Saudi Riyals
3-Training Guidance, Practices (electronic copies)	0 Saudi Riyals
4-Training Requirement (will be provided by the host)	0 Saudi Riyals
5-Technology (will be provided by the host)	0 Saudi Riyals
Total	0 Saudi Riyals

From my experience as a supervisor the ministry prefers to establish projects with minimal costs. What was challenging is that how can we convince them. So we worked hard to set up an implementation plan that mostly utilizes internal resources.

14 Conclusions

As an administrator, it is my first time working on such a detailed project. I always had a passion to explore new and unique trends. I was honored to work with educational professionals in one of the most valuable and strongest universities in the United States. Through my research on critical thinking, I have learned a lot about what critical thinking is, and its impact on our personal and professional lives. Surprisingly, I figured out that this topic is quite broad and profound compared to my previous understanding of it. Therefore, I look forward to establishing the project and applying it to other subjects for all academic levels. Moving on to my experience in one of the greatest schools_ Excel Academy Middle School in Chelsea in Boston, I was amazed by how sincere the administrative and educational staff were while performing their job. Being around such an encouraging and supportive environment helped me a lot in expanding my educational knowledge. Nevertheless, the duration was

quite short—which in my opinion took its toll on my overall perception of the whole school immersion experience, especially since I wasn't granted the chance to thoroughly acquire the teaching techniques. Nonetheless, I am pleased by the amount of information I have obtained through the learning strategies and methods that I'm unequivocally planning to apply to our educational system. Furthermore, I consider this experience to be very precious to me—especially because of the reputation that the American educational system upholds—and to be granted the chance to explore and encounter new cultures, and in addition to that, develop my English skills is undoubtedly enrapturing. In addition, this experience had a great impact on me as it refined my personality and made me a stronger and independent person. Another advantage during my stay in the United States is getting the chance to make new acquaintances that in return improved my communication skills. To wrap up, I would highly recommend educators in Saudi Arabia not to hesitate to take this opportunity and get the most out of it as it will enhance both their and our beloved country's future.

Personal Biography of Researcher / Educator:

Wallaa Mohammed AlShakhis got a bachelor's degree in Education in Computer from Imam

Abdulrahman Bin Faisal University. She has worked as a computer supervisor and the head of the Computer and Information Technology Department at Alqatif Educational Office in the eastern province in the Kingdom of Saudi Arabia for eight years. Ms.Alshakhis has many certificates in the profession and in personal development. She has a certified trainer license from the World Board for Human Development and certification as a trainer from the Gulf Council for Human Development. In addition, she has a diploma in INLPTA (INTERNATIONAL NEURO-LINGUISTIC PROGRAMMING TRAINERS ASSOCIATION) that qualifies her to work as a teacher professional development trainer by coaching and leading computer teachers to achieve her vision, which is “Contribution to assemble an innovative generation that is capable of achieving the national vision.” She has several notable achievements. She received the Award for the Best Quality Initiative at the Regional Level in 2015-2016 and 2019. She co-authored a book entitled, *Self-management for Computer Lab* with the help of the Computer Department staff in 2019. She presented a paper, “The Art of Leadership and Effectiveness” at the Second Education Management Forum 2019, and she presented another paper, “Smart Lessons” at the Arab Innovations Conference 2018 in Dubai. Furthermore, she has led many initiatives such as the Creathon (Competition) Technological Innovations in 2019. It is a competition for students interested in creating entrepreneurial technological ideas and turning them into innovative technical projects. Which, in return would help contribute to enhancing the ability of the education system to meet the requirements of the labor market—in order to reach the vision 2030 in KSA. In 2015, she established the idea of Smart Lessons. Smart Lessons is a project that introduces teachers to the use of technology to assist in lesson planning. Currently, she is dispatched to Boston University, Boston, MA by the Ministry of Education for one of their programs to achieve the national Vision 2030 for the Kingdom of Saudi Arabia, entitled, *Building Leadership for Change Through School*

Immersion: Innovative Approaches to Education Reform in the 21st Century.

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