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The Impact of Using the 5E Learning Cycle on the Development of Habits of Mind and Critical Thinking Skills for the Primary Stage Students in Jordan

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Abstract: This study aims to detect the impact of the modified learning cycle strategy on the development of habits of mind and skills of critical thinking in the 'Islamic Education' subject for 10th grade students in Jordan. To achieve this goal, the researcher used the semi-experimental approach, hence dividing the students into two groups: a control group and an experimental group. Each group consisted of (31) students. The modified learning cycle was applied to teach the experimental group, and the regular traditional strategy to the control group. The researcher prepared two studying tools: a measure of the habits of mind which consisted of (25) paragraphs, and a critical thinking skills test which included (28) paragraphs. Both tools were applied after assuring their validity and reliability. The results indicated a statistically significant difference for using the modified learning cycle strategy in the development of habits of mind and skills of critical thinking for the experimental group students compared to the control group students. The study, thus, stresses the need to apply the modified learning cycle in teaching the 'Islamic Education' subject due to its effectiveness in developing habits of mind and skills of critical thinking. The researcher also recommends conducting more research on the effectiveness of the modified learning cycle that concentrates on different variables.

Keywords: Modified learning cycle; Habits of mind; Critical thinking skills; Islamic education Subject.

1. Introduction

The technological challenges and the knowledge flow force the educational institutions to cope with the rapid changes, and thus make qualitative changes in the teaching methods and approaches. The aim of these methods and approaches is to create a generation capable of dealing with the challenges that the knowledge society faces (Fulford, 2016). They also aim to provide suitable opportunities for meaningful learning and developing the students' thinking skills so as to reach at a meta-thinking process.

The ideas of constructivist theory have inspired many educators to design and develop models and strategies that are learner-centered. Learning, then, is conducted in an active adaptable way that enables the learners to balance between cognitive and psychological aspects. The strategy of learning cycle was first created by Karplus (1977) and was based on Piaget's theories of cognitive development. Here, the curriculum content was designed in the form of meaningful situations and experiences. Upon its inception, the learning strategy included three stages: Exploration phase, Concept introduction, and Concept application.

Models of the three-stage learning cycle were developed by many educators, e.g. the 4E cycle. The most famous 4E model was Barman's which included: the study phase, the dialogue phase, the application phase, and the evaluation phase. Lorsch's 5E cycle included: exploration, engagement, explanation, expansion and evaluation (Blank, 2000).

One of the 5E cycles which received much attention from educators and attracted the attention of the researcher in this study is the modified learning cycle (Bybee, 1993). This cycle goes through five stages as shown below (Blank, 2000; Bybee, 1993; Hayes and Eick, 2005).

1. *Engagement:* this phase aims to arouse students' attention and motivate their curiosity and interest. It also gives the teacher a good opportunity to learn the alternative (false) concepts adopted by the students. It is useful here to engage students in the subject of the lesson through exposing them to contradictory situations and confusing incidents that make them lose their cognitive balance. This is all done through asking some questions and presenting problematic situations in a way that leads student to immerse in learning tasks and direct their attention and arouse their motivation towards these tasks.

2. *Exploration:* at this phase physical objects and direct experiences are provided as much as possible. The teacher also designs a series of interactive activities which aim to provide students with a rule of thumb that enables them to continue building concepts, processes and skills, discover the concept they want to learn, test their

expectations and assumptions, discuss alternatives with their peers, and write down the best provided solutions. These all increase the students' level of comprehension of the text and give them new experiences as a result of their engagement in guided activities.

3. *Explanation*: in this stage the teacher seeks to guide the students' efforts and follow up their responses in order to explore the curiosity which helps them to overcome the difficulties that may hinder the comprehensions of the text or understanding the situation. The teacher encourages students to explain concepts, incidents and experiences using their own words, starting from previous experiences that were built in the previous two stages in order to gain more meaningful cognitive development.

4. *Elaboration/ Extend*: this stage aims to help the learner to organize the experiences that were gained through connecting them to previous experiences and applying them to new learning situations. The aim is to develop and extend the students' understanding of concepts, operations and skills and modifying the wrong ones they have. Then, they become prepared to move to a new cycle of engagement where they can process the problems and incidents which appeared recently, hence creating a spiral curricula that develop concepts and experiences.

5. *Evaluation*: evaluation plays a main role in the 5E cycle since it interacts with all stages in an expansive, sequential and integrated manner. In this step, the teacher must allow the students to evaluate their knowledge and skills, and receive feedback about the suitability of their explanation, and their advancement to achieve the desired goals. This, in turn, helps them to construct knowledge in vertical, horizontal and sequential manners.

A lot of studies such as (Aledwan, 2011; Alhusayni, 2008; Almajali, 2016; Babatin, 2010; Blank, 2000; Hayes and Eick, 2005) pointed out the effectiveness of the modified learning cycle in the development of several variables such as: attainment, acquiring concepts, scientific intelligence, creative and inductive thinking, habits of mind, social skills as well as other variables. This strategy, thus, captured the attention of a lot of educators since it goes beyond the interest in the content of the subject. It focuses on the scientific side and the ways through which students learn. It is a way which gives the learner wide educational prospects and broad mental skills. Therefore, this strategy goes well with the educational thought which appeared in the latest of the 20th century during the intense attention devoted to developing the student's thinking. This strategy is now known as "habits of mind" or "the theory of habits of mind". The strategy diverted from focusing on the quantity of the information gained to how these information are gained, stored and employed. This drives the individual to keep up with the latest development in different fields through acquiring certain habits of the mind (Niemi, 2004).

Habits of mind are defined as a pattern of smart behaviors which lead the learner to productive actions. Habits of mind arise as a result of the individual's responses to specific problems and questions that need thinking, research and contemplation (Perkins, 2001). According to Campell-Sills *et al.* (2006) habits of mind are smart behaviors that aim at solving problems, and organizing one's learning.

Many researchers such as Queen Elizabeth School Staff (2004); (Colin, 2005); Costa and Kallick (2009) believe that habits of mind are patterns of performance and constant work to cope with different life situations efficiently. It is capable of learning and training, especially in educational environments. It is characterized by perseverance, control of the rush, listening to others, flexibility, questioning, having pleasure when solving problems, applying knowledge in life situations, thinking clearly and accurately, collecting data by using one's senses, innovation, creativity, accepting risk responsibility, having sense of humor, cross-thinking, continuous education, considering situations in non-conventional way, imagination, curiosity, and openness to new ideas.

Burgess J. (2012) stresses the need for continuous development of the learners' mental habits, and practicing them in their educational and practical life. In the same vein, Steinkuehler and Duncan (2009) believe that implementing habits of mind enables learners to connect the concepts they learnt to their daily lives. They expand their perceptions and help them to retain learning and knowledge for a long time.

Therefore, modern educational methods call for making habits of mind a major goal in all stages of education, whether at school or at university (Colin, 2005; Marzano, 2000) because they can be learnt through practice and training. So, these habits become a constant feature of the mindset of the individual (Alnady, 2009).

On the other hand, the importance of critical thinking is highlighted in the priorities of modern teaching strategies. Learning critical thinking skills and developing them among students is of great interest to many education scholars. Therefore, the need to achieve it becomes an essential goal for most educational policies and an objective that curricula seek to instil in students. As a result, many studies in educational literature such as (Boghossian, 2006; Burgess M., 2009; Newman, 2008) have pointed out the effectiveness of critical thinking in the development of many variables including decision making, problem solving, social skills, academic attainment, retention of learning, and motivation development.

Beyer (1985) defines critical thinking as: determining the truth, accuracy and value of knowledge, judging news based on acceptable sources, examining materials in light of evidence, comparing incidents and news, and finally inference. Halpern (1998) sees critical thinking as a series of auto processes that are self-guided that encompass mental skills governed by rules of reasoning and inference in order to examine facts, analysis, testing, inference and evaluation of arguments and discussions that aim at distinguishing between opinions and facts, right and wrong ideas, and generating options that were not previously known. These all contribute to decision-making and issuance of judgments.

Bailin and Case (1999) define critical thinking as a purposeful process governed by rules of reasoning and inference, based on a set of skills that help the individual to assess knowledge in light of clear criteria, sufficient

evidence, convincing proofs, and accurate arguments that support the validity of the results, reaching at right decisions and finding effective solutions to the problems that man faces in his life.

It clear from the above definitions that critical thinking is a mental process through which learners examine a specific situation and try to understand it. Then, they try to analyze it and link its elements to be able to make a decision by choosing the best available solutions. Critical thinking, in the end, is the ability to examine the available solutions and evaluate them.

The researcher believes that the importance of critical thinking stems from the skills that it includes, and on top of these skills are: the skill of distinguishing facts and determining the accuracy and reliability of the news, detecting bias, distinguishing relevant information from others, making predictions, accounting for phenomena, coming at inferences, discussing and interpreting information, evaluating the effectiveness of discussion and information, and coming up with generalizations.

The California form (2000) included five basic mental skills that constitute the most important steps and bases of critical thinking (Boghossian, 2006; Burgess M., 2009):

- 1) *Analysis*: it is the ability to segment information into smaller parts, labelling and categorizing them in order to identify the relationships in and between sentences, concepts or explanations, or any other form of beliefs, experiences, reasons or information.
- 2) *Deduction*: it is the ability to make expectations based on the rules and laws and a set of observations in order to issue a judgment by referring to the similarities of situations, or by determining some of the consequences of certain incidents or prior information.
- 3) *Conclusion*: it is the ability to deduct and analyze results according to data, phrases, evidence, beliefs, opinions, or explanations. The individual becomes able to determine the in(accuracy) of the results in light of the given facts.
- 4) *Inference*: it is the ability to execute or practice processes that depend on generating arguments and assumptions, examining evidence, and learning about correlations and causal relationships with an intention to come to conclusions.
- 5) *Evaluation* (Evaluating Arguments): it is the ability to evaluate the credibility of phrases, and issuing judgments on issues found in the text and clarifying strengths and weaknesses in light of the available evidence.

Many Studies in 'education' literature such as (Boghossian, 2006); Burgess M. (2009); Andres and Pablo (2011) pointed out the effectiveness of critical thinking in developing many variables such as making decisions, solving problems, social skills, academic achievements, learning retention, and development of motivation.

Habits of mind are congruent with critical thinking as they both aim to train individuals to use the supra-mental cognitive processes, interact positively with life requirements, solve problems and take decisions that are more likely to be right. Here comes the importance of using new teaching methods and strategies in order to meet students' tendencies and needs in the third millennium that is characterized with knowledge and technical improvements (Clarc and Zimmerman, 2002; Newman, 2008).

The 'Islamic Education' subject is considered one of the most important subjects because it is the main source for the students to learn the rules of their religion principles and legislations related to their life. This, in turn, requires the people who are responsible for this education to give the right meaning of it and organize the knowledge, skills and experiences that are mentioned in it. The great interest in the 'Islamic Education' goes well with the cognitive and technical progress in order to move from the traditional method of teaching to providing students with effective training that enables them to acquire the skills of the habits of mind and critical thinking. Thus, they can face the challenges of their time effectively.

2. The Study

2.1. Questions and Problem of the Study

The development of the students' habits of the mind and critical thinking is a major requirement in the learning process. Therefore, it is essentially to keep these habits present in the classroom environment, whether in 'Islamic Education' or other subjects. The studies and educational research in general, such as Colin (2005); Aljallad (2006); Smith (2008); AlKhalwaldeh (2015) concluded that the use of habits of mind and skills of critical thinking is very limited in class. This study, therefore tries to uncover the effectiveness of using the modified learning cycle in developing habits of mind and skills of critical thinking for 10th grade students in the "Islamic Education" in Jordan.

Thus, the study tries to answer the following questions:

Question one: Are there significant differences when ($\alpha \leq 0.05$) between the control group and the experimental group in developing habits of mind that can be attributed to the effect of the teaching method (the modified learning cycle vs. the traditional learning method.)?

Question two: Are there significant differences when ($\alpha \leq 0.05$) between the control group and the experimental group in developing skills of critical thinking that can be attributed to the effect of the teaching method (the modified learning cycle vs. the traditional learning method)?

2.2. Study Objectives

The study aims to:

- 1- Detect the impact of using the modified learning cycle strategy in learning habits of mind and skills of critical thinking for 10th graders in "Islamic Education".
- 2- Develop habits of mind and skills of critical thinking for the target group.

2.3. Importance of the Study

The present study is congruent with the educational trends that call for using teaching models and strategies derived from modern teaching theories. The aim is to benefit from the educational applications of those models which consider the modified learning cycle one of the most important methods. Therefore, the importance of the present study lies in the following:

- 1- Directing the view of 'Islamic Education' teachers and supervisors as well as curricula planners to become interested in training students to use habits of mind and skills of critical thinking through applying a teaching strategy that is characterized by sequential phases and clear and flexible steps.
- 2- Enriching the 'Islamic Education' theoretical literature because of the lack of studies in any branch of the 'Islamic Education' – to the best of the researcher's knowledge – which addressed the subject of using habits of mind and skills of critical thinking in the modified learning cycle strategy. Therefore, the study will add a cognitive and applied dimension in this regard.
- 3- The possibility to add new research and studies in learning programs that are based on the modified learning cycle strategy in 'Islamic Education'.
- 4- Meeting the need to review the methods of teaching 'Islamic Education' as well as enhancing its role in embedding new teaching methods that provide students with an opportunity for different teaching methods which make them more positive and interactive with surrounding environment variables.

2.4. Study Limitations

- 1- *Topic* limitations: the modified learning cycle strategy was applied to the prophet's life and Islamic legislation (fiqh) lessons in the 'Islamic Education' for 10th grade students.
- 2- *Human* limitations: the sample of study was taken from 10th grade students studying at Abi Hurrayra Primary school in Amman.
- 3- *Spatial* limitation: the study was conducted in Amman district.
- 4- *Temporal* limitations: the study was conducted in the second semester in the academic year 2016-2017.

2.5 Procedural Definitions

- *Modified learning cycle*: a learning strategy that includes five consecutive stages: engagement, exploration, explanation, expansion, and evaluation. These stages are applied to small groups supervised by the teacher (Bybee, 1993). The researcher defines the cycle procedurally as a set of learning situations and experiences through which the teacher prepares and organizes the cognitive content within five consecutive stages according to the theoretical literature of this strategy.
- *Habits of mind*: smart thinking behaviors that the individuals follow to solve their problems and organize their learning (Campbell-Sills et al., 2006). These behaviors are defined procedurally according to the level the students obtain on the measure of habits of mind which is prepared for the purposes of the present study.
- *Critical thinking*: determining the truthfulness and precision of knowledge, judging the news based on acceptable resources, examining materials in light of evidence, as well as comparing incidents and news, then coming at inferences (Beyer, 1985). Critical thinking is determined procedurally according to the level the student obtains in the critical thinking skills test which is prepared for the purposes of the present study.

3. Methodology

3.1 Methods and Procedures

The researcher used the semi experimental approach which is congruent with the nature of this study. The aim was to identify the impact of using the modified learning cycle in developing habits of mind and skills of critical thinking for 10th grade students in 'Islamic Education'.

3.2. Sample of the Study

The sample of the study consisted of (62) students divided into (2) sections selected randomly from 5 sections of boy students in the second semester of the academic year 2016-2017 at Abi Hurrayra Primary school in Amman district/ Jordan. One of the sections was chosen randomly to be the control group whereas the other section was the experimental group. Each consisted of (31) students.

3.3. Study Tool

3.3.1. The Educational Program

A set of learning activities and experiences designed according to the modified learning cycle (5Es) in 'Islamic Education' taken from the prophet's life and Islamic legislation lessons. A suitable configuration of activities, experiences, exercises and thinking- stimulating situations was chosen after reviewing the educational literature

related to the topic. A training module was designed to analyze the target lessons and identify the main ideas in them as well as the outcomes that the students are expected to achieve. These were rephrased according to the modified learning strategy through a group of homework assignments, materials and tools that can help students achieve the study goals. The researcher trained the teachers who taught the experimental group to apply the learning situation in light of the target strategy. The application took (14) classes in addition to pre- and post-test classes. The study sample applied the strategy to the measure of habits of mind, and the test to critical thinking skills.

To ensure credibility, the action plan was judged by a committee of (9) faculty members who teach 'Islamic Education', 'teaching methods', 'education psychology', 'measurement and evaluation', and 'Islamic Education' teachers and supervisors. The recommended modifications were applied to the action plan within the topics that the reviewers agreed upon.

3.3.2. Measure of the Habits of Mind

After reviewing the relevant education literature such as (Campbell-Sills *et al.*, 2006; Colin, 2005; Niemivirta, 2004), the researcher designed a measure for habits of mind which consisted of a preliminary questionnaire of (33) paragraphs distributed on the target students.

3.3.2.1. Measure Validity

To ensure the virtual validity of the measure, the questionnaire was judged by (9) reviewers working as faculty members at Jordanian universities and 'Islamic Education' teachers and supervisors. The reviewers were asked to give their opinions about the suitability of the measure paragraphs and their structure. If the paragraph had a census of 80% of the reviewer, it was considered acceptable. The structural and language modifications were adopted based on the reviewers' comments. Thus, the final study tool consisted of (25) paragraphs. The positive and negative paragraphs were distributed randomly. They were given the following marks: strongly agree (5), agree (4), neutral (3), disagree (2), strongly disagree (1). The reverse order was given to the negative paragraphs.

The researcher ensured the validity of the measure by using two ways:

3.3.2.1.1. Internal Consistency

To ensure the internal consistency of the measure of habits of mind, the measure paragraphs were first applied to a pilot sample from the study population. The pilot sample consisted of (30) 10th grade students. Pearson correlation was calculated to measure the correlation coefficients between each paragraph's mark and the overall mark of the measure. The questionnaire paragraphs were found significant at ($\alpha \leq 0.01$) since the correlation coefficients were between (0.69-0.87). This indicates that the questionnaire paragraphs were reliable and thus could measure the aspects meant to be measured.

3.3.2.1.2. Measure Reliability

The measure reliability was calculated using Cronbach Alpha through applying it to the pilot group whom the internal consistency was applied to. Cronbach Alpha was (0.82). This value was counted acceptable for the purpose of the study.

3.3.3. Test of Critical Thinking Skills

The test was designed based on the education literature and previous studies relevant to the present study. The researcher benefited especially from (Aljallad, 2006; AlKhawaldeh, 2015; Andres and Pablo, 2011; Khazer and Alqudha, 2012). The researcher structured the questionnaire in a multiple-choice form which preliminarily had (31) paragraphs.

3.3.3.1. Test Validity

To ensure the virtual validity of the critical thinking test, the test was judged by (9) reviewers working as faculty members at Jordanian universities and 'Islamic Education' teachers and supervisors. The reviewers were asked to give their opinions about the suitability of the test paragraphs and their structure. If the paragraph had a census of 80% of the reviewer, it was considered acceptable. The structural and language modifications were adopted based on the reviewers' comments. Thus, the final test consisted of (28) multiple-choice paragraphs.

The researcher examined the validity of the critical thinking test through two ways:

3.3.3.1.1. Internal Consistency

To ensure the internal consistency of the test, the paragraphs were first applied to a pilot sample from the study population. The pilot sample consisted of (30) 10th grade students. Pearson correlation was calculated to measure the correlation coefficients between each paragraph's mark and the overall mark of the measure. The test paragraphs were found significant at ($\alpha \leq 0.01$) since the correlation coefficients were between (0.73-0.91). This indicates that the test paragraphs were reliable and thus could measure the aspects meant to be measured.

3.3.3.1.2. Test Reliability

The test reliability was calculated using Cronbach Alpha through applying it to the pilot group whom the internal consistency was applied to. Cronbach Alpha was (0.85). This value was counted acceptable for the purpose of the study.

4. Results

To answer the questions and test the hypotheses of the study, the researcher conducted an analysis of variance (ANCOVA) to the internal variables that can affect the results.

4.1. Results Related to the Measure of Thinking Habits

In order to answer the research question “Are there significant differences when ($\alpha \leq 0.05$) between the control group and the experimental group in developing habits of mind that can be attributed to the effect of the teaching method (the modified learning cycle vs. the traditional learning method)?” the researcher used the means and standard deviations for the marks of the study sample on the pre- and post-measure of habits of mind in accordance with the modified learning cycle strategy as shown in Table (1).

Table-1. The means and standard deviations for the study sample students of the pre-and post-measure of habits of mind

Group	Pre-measure			Post-measure		
	No. of students	The mean value	The standard deviation	No. of students	The mean value	The standard deviation
Control	31	8.07	0.91	31	9.62	0.97
Experimental	31	9.72	2.05	31	15.03	2.12

Table (1) shows that the mean value of the marks of the experimental group students on the post-measure of habits of mind was (15.3) with a (2.12) standard deviation; while the mean value of the marks of the control group students on the post-measure of habits of mind was (9.62) with a (.97) standard deviation. The difference between the means was (5.41).

In order to know whether the difference between the mean values of control and experimental study groups was significant at ($\alpha \leq 0.5$), an ANCOVA test was applied to the control and experimental groups’ marks on the post-measure of habits of mind after considering their marks on the same measure, which was applied before starting the experimental processing, as an accompanying variable. The results of this process are shown in table (2).

Table-2. ANCOVA analysis: means of the experimental and control groups on post-measure of habits of mind according to ‘teaching strategy’ variable

Variance source	Total square	df	Mean of squares	F-value	Sig.
Pre-test	179.87	1	179.78	413.48	0.000
Teaching strategy	225.88	1	225.88	519.240	0.000
Error	33.49	58	0.34		
Total	349.24	61			

It is evident from table (2) that there is a significant difference between the means of the experimental and control groups for the post-measure of habits of mind. The F-value was (519.240) with a significant difference value of (0.000). To measure the effect of ‘learning strategy’ on developing habits of mind, we calculated eta². The modified $\eta^2 = 0.81$, which points out that the difference in total degree between the two groups can be referred to the modified learning cycle.

Accordingly, this result indicates that the strategy of the modified learning cycle has played an active role in developing many habits of the mind such as: perseverance, control of the rush, listening to others, flexible thinking, questioning, having pleasure in solving problems, applying knowledge in real life situations, imagining and other mind habits. The researcher ascribes this result to the fact that this strategy consists of organized sequential stages that engage students into a learning environment that is based on intellectual interaction, knowledge reconstruction, and achievement of meaningful self-understanding that enables the individual to gain mental learning processes such as comprehension and organization, assimilation and accommodation. This is the focus of the adaption process, which is considered as the pyramid of growth development and the ultimate objective of learning because it aims to achieve the psychological and cognitive balance of the individual (Alnady, 2009; Babatin, 2010; Costa and Kallick, 2009; Hayes and Eick, 2005).

4.2. Results of the Test of Critical Thinking Skills

In order to answer the second research question “Are there significant differences when ($\alpha \leq 0.05$) between the control group and the experimental group in developing skills of critical thinking that can be attributed to the effect of the teaching method (the modified learning cycle vs. the traditional learning method)?”, the researcher used the means and standard deviations for the marks of the study sample on the pre- and post-test of the critical thinking skills in accordance with the modified learning cycle strategy as shown in Table (3).

Table-3. Means and Standard Deviations of the marks of the sample group students for the pre- and post-test of critical thinking skills

Group	Before			After		
	Number of Students	Mean	Standard Deviation	Number of Students	Mean	Standard Deviation
Control	31	9.63	5.79	31	14.2	3.2
Experiment	31	9.91	4.73	31	19.87	3.9

Table (3) shows that the mean value of the marks of the experimental group students on the post-test of the critical thinking skills was (19.87) with a (3.9) standard deviation; while the mean value of the marks of the control group students on the same post-test was (14.2) with a (3.2) standard deviation. The difference between the means was (5.67).

In order to know whether the difference between the mean values of control and experimental study groups was significant at ($\alpha \leq 0.5$), an analysis of variance ANCOVA test was applied to the control and experimental groups' marks on the post-test of the critical thinking skills after considering their marks on the same test, which was applied before starting the experimental processing, as an accompanying variable. The results of this process are shown in table (4).

Table-4. ANCOVA analysis: means of the experimental and control groups on post-test of the critical thinking skills according to 'teaching strategy' variable

Variance source	Total square	df	Mean of squares	F-value	Sig.
Pre-test	484.025	1	484.025	81.078	0.000
Teaching strategy	120.981	1	120.981	20.889	0.000
Error	304.840	58	5.177		
Total	972.486	61			

It is evident from table (4) that there is a significant difference between the means of the experimental and control groups for the post-test of the critical thinking skills. The F-value was (20.889) with a significant difference value of (0.000). To measure the effect of 'learning strategy' on developing the critical thinking skills, we calculated η^2 . The modified $\eta^2 = 0.85$, which points out that the difference in total degree between the two groups can be referred to the modified learning cycle.

Accordingly, this result indicates that the strategy of the modified learning cycle gives the students the opportunity to analyze, deduct, and infer through generating the maximum number of ideas related to the subject matter under discussion. The modified learning cycle also free and launch students' ideas in an atmosphere of freedom and intellectual interaction. The students can, then, evaluate arguments and opinions in order to arrive at the most reasonable ones. Thus, this strategy has combined the content and method of knowledge in one frame since it is a personal activity that gives more opportunities for growth development, developing ability to face life problems, and making the right decisions. These all are prominent features of critical thinking which, in turn, makes the results congruent with the body of research about critical thinking skills in education literature (Alhusayni, 2008; AlKhawaldeh, 2015; Dhufiri, 2010; Kassa, 2017; Khazer and Alqudha, 2012; Mumford, 2010).

5. Recommendations

In light of the results of the study, the following are some conclusions, recommendations and suggestions for future research:

5.1. Conclusions

1. The modified learning cycle was found very effective in developing habits of mind and skills of critical thinking.
2. The modified learning cycle can be applied in teaching 'Islamic Education'.

5.2. Recommendations

1. Conducting training courses for 'Islamic Education' teachers to train them to use modern models and teaching methods such as the modified learning cycle strategy.
2. The importance of using the modified learning cycle strategy in 'Islamic Education' curriculum because of its effectiveness in developing habits of mind and skills of critical thinking
3. Raising awareness of teachers to use interactive teaching models such as the modified learning cycle strategy due to its effectiveness in developing habits of mind and skills of critical thinking

5.3. Suggestions

1. Conducting studies to investigate the impact of using other variables in the modified learning cycle strategy such as the retention of the education effects, making decisions, and developing many kinds of thinking as the scientific and contemplative ways of thinking.

2. Conducting similar research on university students and other fields of knowledge.

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