

The Impact of Cooperative Learning on Developing the Sixth Grade Students Decision-Making Skill and Academic Achievement

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Abstract

This study aimed at investigating the effect of cooperative learning on developing the sixth graders' decision making skill and their academic achievement. The study sample, which was selected randomly, consisted of (46) students and divided into two groups: the experimental group that taught using the cooperative learning strategy and the control group that followed the traditional method. The students were taught the Geometry unit in mathematics from their mathematics book which required (16) lessons to finish. Then, an achievement and a decision making skill tests were administered. The validity and reliability of the tests were achieved by using suitable methods. The results of the study showed that there were significant statistical differences between the two groups concerning the students' skill in decision making and their results in the achievement test in favor of the experimental group.

Keywords: Cooperative learning, decision-making skill, academic achievement.

1. Background of the study

The third millennium has witnessed an exceptional progress in science, technology, economics and politics as well as the progress in the means of communications. As a result, the world has become a small village open to all these progresses which makes it essential for the educational institutions to positively prepare their individuals to deal with the requirements and complexity of this millennium by fostering the learner's competencies in solving problems and making decisions as important critical thinking skills.

The traditional way of teaching which is based on lecturing and dealing with the classroom problems or the educational situations using common standards, leads to only one correct answer which, in turn, makes the students unable to cope up with the different problems and situations that they face in their life because these situations demand different ways of decision making. In addition, this traditional way deprives students from acquiring the necessary knowledge that they are supposed to rely on later in their everyday life. Unfortunately, the drawbacks of such methods on the learners have increased lately and molded their personalities in a way that impede them from thinking logically and using the in-depth knowledge to get enlightened decisions in their lives (De bono, 2004). Doucet, Purdy, Kaufman & Langille (1998) stated, in their study, that by using the lecture method in teaching, the learner becomes a passive recipient in the learning process.

2. Significance of the study

The standards of the National Council of Teachers of Mathematics (NCTM) in 2000 issued by mathematics teachers, focused on (a) employing strategies that based on thinking and reasoning, (b) communicating mathematical ideas effectively, (c) connecting the mathematical ideas with each other by relating them to the whole picture and using them as problem solving strategies, and (d) trying to employ them in their life as a response to the global evolution movement that reflects the society needs in the era of knowledge, economy and information technology. In accordance with these global needs, it must take into account all aspects of growth.

Thus, the importance of this study lies in the fact that:

- 1- It helps teachers and administrators develop more effective educational strategies that contribute to addressing some of the problems related to the development of the students' ability to think, communicate and connect mathematical ideas which may reflect an improvement in learning mathematics.
- 2-It makes students more capable of recognizing the pros and cons of the alternatives they are provided with and improving their abilities to arrange them according to their importance and priority.
- 3-It offers a new theoretical importance to the educational literature as it sheds light on the consequence of decision making skills on young learners. Provided that the subjects of the study were in sixth grade and they were only 12 years old which means that they were in their late childhood during which they go through a very critical stage on their school education.
- 4-It is designed to teach students how to deal with the information stored in their brains and benefit from previous experiences and use them properly to make appropriate decisions whenever it is necessary.

3. Literature review

The issue of decision-making is generally regarded as the most important element in the lives of the individuals which has a great impact on them as a key factor for problem solving and as a way to help them adapt with their surrounding circumstances. Generally speaking, individuals make daily many decisions varying in the degree of importance and the effort required to make them.

The same applies to the educational institution as the decision-making process becomes more important, more serious and far-reaching; this is ascribed to the fact that the decision making is not about one person but it might influence or include several individuals or groups on several aspects that might have its effect on the economic and social situation as a whole (Ashcraft, 1994).

Recently, the decision-making as a subject of interest has paid the attention of many scholars and researchers in various disciplines, who eventually came up with so many definitions of it. Hodgkinson (2003), for instance, defined the decision-making process as an interactive process between the 'Candidates alternatives' to resolve the problem and between the 'Selectors' who nominate one of the these alternatives. Another definition was given by Chi (2001) who defined decision-making process as an intellectual exercise designed to replace a set of alternatives to face a certain situation or a problem. On their hands, Eysenck & Keane (2000) identified decision-making process as a mental process of a complex psychological behavior, which does not only demand facing multiple choices but also gathering as much information as possible regarding these choices and then selecting the most appropriate strategy among and utilizing it to reach the desired goal. They pointed out that the difficulty lies in the individuals' ability to use their performance skills and their intellectual abilities in a harmonious way to develop distinct strategies and to come up with an innovation of multi-solutions among which they can select the most appropriate one. They added that these appropriate solutions should be in accordance with the individuals' desires and objectives, on one hand, and the requirements of their society along with its values and ethics, on the other hand. Thus, the decision is the point at which, the choice of the most important alternative is taken and which can be viewed as the moving point toward the commitment of scheduling the necessary action steps with the exclusion of other secondary important alternatives since that commitment makes the decision making more meaningful and valuable (Cavalier, 2002). The decision making is more than just choosing what to do since it involves a logical commitment no matter how that commitment was simple. In addition, it often demands making a commitment on behalf of others and ,then, asking them to adhere to it.

As for the empirical studies concerning the decision-making skill, Sohail (2000) conducted a study that examined the effectiveness of a training program to develop the decision-making skill among a sample of 178 male and female students who were in the eleventh-grade in one of the official schools in Damascus. The sample was divided into two groups: the experimental group that was exposed to the training program and the control one which was exposed to the ordinary way. The results showed the superiority of the experimental group in terms of decision-making skill over the control group with no statistically significant differences between male and female students who were trained on the decision-making skill.

Pedretti (1999) researched a sample fifth- and sixth-graders in order to examine how science correlated with society in education. The results showed that school and social environment enhanced students understanding of science through dialogue and decision making skills which help in connecting the students school knowledge with their social life in the world in an early stage of their education.

As a result of the great impact of the positive teaching in raising the learners achievement and their mathematical thinking skills, the emphasis is on increasing the effort to detect more ways to develop the effective learning methods into their maximum levels. The results that Fennema, Carpenter, Frank, Levit, J-Acobs & Empson (1996) emphasized on related to the fact that the teachers should change their pedagogical knowledge in order to help students develop their cognitive thinking skills; otherwise, their negative performance will be reflected on the students' poor knowledge. Subsequently, the teachers should realize that they must focus on the depth of knowledge and adopt the teaching methods that aid in identifying the necessary concepts for the learners to support their way of thinking (Gilland & Billups, 2001). Thus, there is an urgent need to call for inviting the educated researchers to reconsider the traditional methods of teaching and the importance of getting benefit from the experiences of those who were recently expert in teaching mathematics (Stigler, Gallimore & Hiebert, 2000). Accordingly, the teachers and students questionable statements and reactions which depend on the classroom environment, is based on respect and support (NCTM, 1989).

This brings the notion of cooperative learning and its importance in the learning process. This, undoubtedly, is in contradiction with the traditional method of learning that is a mere reflection of lecturing as the teacher does most of the objectives in the learning process. Furtwangler(1992) asserted that although the cooperative learning is outcome of the direct involvement of the students in the learning process, the emphasis is on the role of the learner is not less than the role of the teacher to achieve the objectives perfectly. He identified the roles of the teacher in the teaching process which are represented by his/her way of outlining the lesson plan, ensuring the classroom management, organizing the educational tasks and supervising the group work

participation. The educational research proved that students can learn from their friends as same as their teacher and in some cases they can learn from the former more than the latter (Fitzgerald & Bouk, 1993; Atkins 2010).

Many empirical studies proved the positive impact of cooperative learning on the learners' attitudes, social relations as well as their academic achievement. These studies were not only conducted on students in their elementary stage but also on students in their secondary and high school stages. For example, Miqdadi (2006) investigated two key aspects of using the cooperative learning strategy applied on students from the first elementary stages by trying to solve problems in geometry tasks; while the first aspect was associated with the cooperative learning advantages and the difficulties that accompanied its use, the second was associated with investigating the common verbal communication patterns among the students who were working in cooperative learning groups. The results showed that students pointed to the advantages of cooperative learning rather than the problems accompanied with it. It , also, showed that the students common verbal patterns fell into two main domains: the first domain was connected with the patterns of communication which implied a positive learning that promoted active participation among students and the second domain was associated with the patterns of communication that reinforces negative participation among students. But the average findings of the first domain was higher than the second one.

Furthermore, Mohammad's study (1984) that was conducted on sixth graders from both sexes, proved that students with higher social standards and economic levels outperformed their counterparts in their decision-making skill and taking responsibility. But the results showed that there were no statistically significant differences between males and females in that matter.

Other studies showed that students from the higher stages of school can still benefit from the cooperative learning. This can be illustrated by the study conducted by Miller (1990). The rationale behind Miller's study was to examine the effect of the cooperative learning on the American high school students' acquisition of mathematical knowledge and their attitudes toward it. The study results showed that there was a great impact of the cooperative learning method on the students' attitudes and cognitive achievement.

There are some empirical studies that investigated the impact of using certain educational models to enhance the cooperative learning . One of them is Yusof's study (1998) that aimed to identify the effect of using two models of cooperative learning in the achievement of the ninth-grade students and their attitudes toward them in math. The two models were the 'Jigsaw' Model and the model of 'Learning together'. The study sample was divided into: two experimental groups which used the cooperative learning and one control group that used the traditional method of learning. The results showed that there were significant statistical differences between the experimental groups and the control one in favor of the experimental ones due to using the models of cooperative learning but there were no statistically significant differences between the two models regarding the students achievement or the students attitudes toward using these models of cooperative learning in mathematics.

Similarly, Shamasneh (2001) conducted a study to identify the impact of using the 'Jigsaw' method in teaching the unit of geometry for sixth graders and comparing it with the traditional educational way of teaching the same unit. The results did not only showed the existence of significant differences in the students achievement but also their preferences and attitudes towards mathematics between the experimental and control groups in favor of the experimental one.

In contrast, Colliton's (1997) study came up with different perspectives. His results indicated that there were no statistically significant differences in the students achievement after using the same level of cooperative learning with the fifth graders and the sixth graders. On the other hand, he found out that although there were statistically significant differences in the achievement of the sixth grade students who used the average level of cooperative learning in mathematics, there were no further progress in the achievement of those who used high or low levels of cooperative learning.

4. Problem of the study

The problem of the study stemmed from the lack of the studies that handled the extent to which the decision-making skill aids students in developing their achievement in mathematics, particularly, in Jordan. It also based on the researchers feeling that the learners of all ages virtually have low ability to make decisions.

Accordingly, this study seeks to answer these two questions:

- 1-What is the impact of the cooperative learning strategy on developing the decision-making skill of the basic sixth grade students?
- 2-What is the impact of the cooperative learning strategy on the sixth grade students academic achievement in math?

5. Hypotheses of the study

Based on the statement of the problem, two null hypotheses were formulated in light of the questions of the study and they were tested at the $\alpha=0.05$ level:

H.1: There is no significant difference between the average performance of the experimental group that was

taught with the cooperative learning strategy and the control group taught with the traditional way on the decision-making skill.

H.2: There is no significant difference in the means of the academic achievement test between the experimental group taught with the cooperative learning strategy and the control group that followed the traditional method of teaching.

6. Limitations of the study

The following limitations may affect the generalization of the results:

1-This study was limited to a sample of sixth grade students in one of the UNRWA schools . It has been selected in a deliberate manner as the school principle and the mathematics teacher expressed their interest in the study. Also, the control and experimental groups were taught by only one teacher.

2-This study encompassed Abu Latifa's (2006) Scale of decision-making skill which measures the psychometric characteristics as shown in appendix (1). So the results of this study are associated with the reliability and validity of that scale.

3- The test administered to both groups of the unit that preceded the geometry unit was considered as the pre-achievement test and accredited as the monthly academic achievement exam of mathematics.

7. The methodology

7.1 Sample of the study

This study was conducted in one of the UNRW primary schools in the second semester of the academic year 2015/2016. The subjects of the study consisted of 48 female six grade students whose ages ranged from 12-13 years. They were distributed randomly on two groups: one experimental group and one control group. The educational material was taught by only one teacher. The teacher was a holder of the EP (Educational Psychology) which is an obligatory course at the UNRWA for all of its teachers to make sure that they are qualified for teaching.

7.2 Educational material

The educational material was based on the content of one unit from the sixth-grade math book which is about geometry. The content was from the public math curriculum for both the experimental group and the control group. The educational material was designed according to the cooperative learning strategy. The study plans included a description of the method of teaching and learning as well as advice, guidance and questions for discussion that the teacher might need.

The suitability of the material plan was verified by consulting a committee of experts consisted of (5) supervisors who were the holders of the doctoral degree or the master's degree in mathematics teaching methods and had the experience and competence in that field. In light of the views and suggestions of the committee, the plans were modified to assure the reliability of the study.

7.3 Tools of the study

The researchers utilized these tools:

- A questionnaire of the decision-making scale which consisted of 30 decision-making scales each was followed by four alternative choices. The student from both groups of the study were asked to choose only one alternative as an answer. These alternatives were classified in terms of four levels ranging from 1 to 4 as follows:

1-' No decision has made'

2-'The decision made by others'

3- 'The decision made by the student herself' after consulting others'

4-'The decision made by the student herself'

Consequently the total score of the scale was (120).

-Achievement Test

The achievement test was prepared and developed by the researchers of the study to measure the sixth grade students performance and perception of the geometrical material after the treatment. The test was based on Bloom's taxonomy. It included questions consisted of four multiple choices (alternatives) and written questions. The total score of the test was equal to (30) marks.

The test was verified by experts and specialists in the field of teaching mathematics. To test the reliability of the test, they calculated the value of its coefficient of consistency using Cronbach's alpha which was highly reliable (0.83). The covariance values and the coefficient of difficulty values ranged from (0.24-0.91) and (0.32-0.85), respectively for these paragraphs.

7.4 Design and variables of the study

The variables of the study can be classified into two kinds:

1-The independent variables which were manifested by two teaching strategies: (A) cooperative learning method and (B) traditional method.

2- two dependent variables which are:(A) the decision-making and (B) the academic achievement.

These variables can be represented by this design:

G1: O1 X O1 O2

G2: O1 Y O1 O2

Key:

G1: experimental group, G2: the control group

X: cooperative learning strategy , Y: No treatment

O1: measure of decision-making, O2: achievement test.

7.5 Procedures of the study

The following procedures were carried out:

- the mathematics achievement test was carried out on a pilot sample of 26 students outside the study in order to:

(a) make appropriate adjustments.

(b) determine the time needed for the academic achievement test of the current study.

(c) calculate the value of its coefficient of consistency covariance and difficulty.

-The researchers held regular meetings with the teacher before and during the experiment and after submitting her study plans. The aim behind the meetings was to discuss the plans which adopted the cooperative learning style with the experimental group and the most important characteristics of this strategy and their conditions of use.

-the teacher taught the control group the unit of geometry following the traditional way as stated in the school guidance textbook for teachers and the researchers were provided with the plans.

- the experiment took (4) weeks during which the teacher spent four lessons per week for each group in the same time period to teach the educational material.

-The decision-making scale and the achievement tests were applied on both groups directly after the completion of the experiment and at the same time in order to measure the students performance in the achievement test in math and their skill in decision-making. The researchers supervised how the tests were conducted.

-After administering the post-achievement test, the teacher corrected the test sheets and the marks were distributed evenly in that each item was given one mark . Thus, each item was given the mark "1" in case the answer was correct and "zero" if it was wrong. The maximum mark of the test was 30 and the lowest mark was zero. The results of the test were accredited as the monthly academic achievement exam of mathematics for the students at the school.

8. Results and Discussion

This section consists of two parts. The first aimed to measure the effectiveness of the cooperative learning strategy on the two dependent variables which are:

(A) the decision-making and

(B) the academic achievement.

The second includes the mathematics teacher's observation while teaching the experimental and control groups of the study.

8.1 The descriptive statistics of the dependent variables

To examine the first null hypothesis, the means and standard deviations of each of the two groups performance in the decision-making skill before and after the experiment were calculated and presented in table (1).

Table 1: Sample means (M) and standard deviations (STD) of the two groups pre-test and post-test performance in the decision-making skill.

Group	N	Pre-M	STD	Post-M	Post-STD	Adjusted M	Standard error
Experimental	24	57.50	13.51	69.83	11.68	69.12	0.94
Control	24	55.88	13.28	59.33	13.59	60.05	0.94

The descriptive statistics in table (1) yielded statistically significant differences between the mean scores of the experimental group taught with the cooperative learning method and the control group followed the traditional method. To determine where precisely the significance lays, the source of variance (ANCOVA) between the scores of the experimental group and the control group was calculated.

Table.2. ANCOVA results and descriptive statistics of the experimental group and the control group's scores regarding the decision making skill.

Source of variances	Sum of squares	degrees of freedom (df).	Mean square	F	P-value
Pre	6427.507	1	6427.507	302.816	0.000
Group	982.553	1	982.553	*46.291	0.000
Error	955.160	45	21.226	302.816	0.000
Total	8705.667	47			

*Statistically significant ($\alpha = 0.05$)

Hence, table (2) displays that there were statistically significant differences at the p-value ($\alpha = 0.05$) between the experimental and control groups regarding the decision making skill. By reference to the adjusted means in Table (1), it is clear that the differences were in favor of the experimental group as compared with the control group which means that the cooperative learning strategy played an important role in the development of the students' decision making skill. Consequently, the first null hypothesis is rejected.

To examine the second hypothesis, the means, adjusted means and standard deviations of the academic achievement tests of the experimental group and the control group before and after the experiment were calculated as shown in table (3).

Table (3). The means (M), adjusted means and standard deviations (STD) of the pre- and post- academic achievement tests of the experimental group and the control group.

Group	N	M	STD	Post-M	Post-STD	Adjusted M	St.Error
Experimental Group	24	12.42	5.06	18.21	6.41	17.80	0.80
Control Group	24	11.67	4.83	13.38	6.83	13.78	0.80

As represented in Table (3), the experimental group exposed to treatment had higher mean than the control group. To determine where the statistical difference exists in the mathematics academic achievement test scores among participants, one-way ANCOVA was used and the results were tabulated in table (4).

Table. 4. ANCOVA results and descriptive statistics between the means scores of the achievement test of the experimental group and the control group.

Source of variances	Sum of squares	Degrees of freedom (df).	Mean square	F	P-value
Pre	6427.507	1	1326.986	86.468	0.000
Group	982.553	1	192.657	12.554	0.001
	955.160	45	15.347	86.468	
Total	8705.667	47			

*Statistically significant ($\alpha = 0.05$)

As revealed from Table (4), the findings showed statistically significant differences in the achievement means at the p-value ($\alpha = 0.05$) between the experimental and control groups and by reference to the adjusted means in Table (3), it is clear that the differences were in favor of the experimental group as compared with the control one which means that the cooperative learning strategy played an important role in the development of the students performance in the achievement test. Therefore the second null hypothesis was rejected.

8.2 Teacher's observation

In contrast with the control group, the teacher came up with the following observations after making sure that the students from the experimental group became aware of their roles and tasks while working in groups:

- Students started to listen attentively to each other and respect the views of others.
- The feedback they got from each other in the same group and the members from the other groups led them to come up with better decisions while solving other mathematical tasks.
- letting the students to work with their colleagues encouraged them to do more effort as it ignited their spirit of competence and responsibility which, in turn, provided them with enthusiasm.
- It enabled the students to get the necessary attention from their teacher because they saved her time as a result of their participation in the learning and teaching process.
- It affected the students' motivation in a positive way which was manifested in their classroom performance and participation as each member in the group realized that she had a significant role.
- In spite of their modest participation, weak and shy students became more active and confident. Thus, cooperative learning is proved to suit not only the high-ability students but also the low-ability ones (Johnson & Johnson 1994).

9. Conclusion

The results of this study revealed the positive impact of interaction and cooperation among students on enhancing their decision-making skill in order to achieve their common goals. the decision-making skill is one of the necessary individual skills needed to help the learner (a) adapt with the surrounding environment, (b) achieve

his/her goals and aspirations and (c) be an active participant in any task assigned to him/her. Thus, the educational institutions need to pay more attention to the skill of decision-making and calls for the need to train students on acquiring it due to its efficiency in facing and coping with the technological advances and the explosion of knowledge that we have recently witnessed.

Thus, with the exception of Colliton's results, the findings of the current study agrees with the results reached by Sohail (2000), Pedretti (1999) as well as the ones reached by Miqdadi (2006), Mohammad (1984), Miller (1990), Yusof (1998) and Shamasneh (2001) concerning the decision-making skill and cooperative learning, respectively.

In light of the results and discussion of the study, the following recommendations are made:

-The need for employing the strategy of cooperative learning in teaching mathematics as part of the teachers guidance textbook because of its impact on developing the students decision-making skill and their academic achievement in mathematics.

-Further research is needed in order to investigate the impact of training students on decision-making skill in othersubjects and how it enhances their achievement. Also longitudinal studies are recommended in order to examine the long term effect of cooperative learning on decision-making skill as a high thinking skill.

References

- Abu Zina, F., & Khattab, M. (1995). 'Aththar alta'allum alta'awni a'la tahsil alttalba fi alriadyat wa ittijahatihim nahwa', *Journal of the Faculty of Education, UAE*,10(11), 233 to 268.
- Abu Latifa, L. (2006). 'Athar barnamaj muqtarah litanmiyat maharat tafkir al'awlaviat lada talabat assf alssabi'e al'asasi ala tatwiir maharat tafkir ittikhath alqarar. Unpublished doctoral dissertation, University of Jordan, Amman, Jordan.
- Atkins, J. (2010). 'Creating Collaboration', *English Journal* , 99(5), 12-13.
- Ashcraft, M, H. (1994). *Human Memory and Cognitive*. Harper Collins College Pup: New York.
- Atkinson, A., & Green, P. (1990). 'Cooperative Learning: The Teacher's Role', *Childhood Education*. 19, 8-11.
- Cavalier, R. (2002). *Personal Motivation: A model for Decision Making*. Library of Congress: United States of America.
- Chi, S. (2001). 'A trait Model of Decision Making: Examining the effect of goal orientation', *Genetic, Social & General Psychology Monographs*, 127(3), 319-339.
- Colliton, E. (1997). 'The Effects of Cooperative Learning Strategies on Mathematics Achievement', *Journal of Educational Research*, 78(6), 372-377.
- Curriculum and Evaluation Standards for School Mathematics*. (1989). NCTM
- De bono, E. (2004). De Bono Programs. Available at http://www.mindwerx.com.au/de_bon_programs.htm. (Accessed: 11 November 2015).
- Doucet, M. D., Purdy, R. A., Kaufman, D. M., & Langille, D. B. (1998). 'Comparison of problem-based learning and lecture format in continuing medical education on headache and management', *Medical Education* , 32(6), 590-596.
- Eysenck, Michael, W., & Keane, M. (2000). *Cognitive Psychology a Students Hand book*. Psychology Press: A member of the Tylor & Francis group, London.
- Fennema, E., Carpenter, T.P., Frank, M.L., Levit, L., J-Acobs, V.R., & Empson, S.B. (1996). 'A longitudinal study of learning to use children's thinking in everyday mathematics education', *Journal for Research in Mathematics Education*, 27(1), 403-434.
- Fitzgerald, W., Bouck, M. (1993). 'Models of instruction', in Owens, D. (ed.), *Research ideas for the classroom middle mathematics*. Macmillan Pub. Company.
- Furtwengler, C. (1992). 'How to observe cooperative learning classrooms', *Educational Leadership*, 49, 59-62.
- Gilland, B. A., Billups, L. H. (2001). *The power of thinking in mathematics*. American Federation of Teachers: Washington, D.C.
- Hodgkinson, G. (2003). 'The interface of cognitive and industrial, Work and Organizational Psychology', *Journal of Occupational and Organizational Psychology*, 76(1), (An9382656).
- Johnson, D.W., & Johnson, R.T. (1994). *Learning together and alone*. London: Allyn and Bacon.
- Miqdadi, A. M. (2006) 'Istikhdam istratijiyyat alta'allum alta'awuni lada talabat mu'allim alssff ind hallihim almasa'il alhandasia wa'anmat alttawasul allafathy almustakh dama', *Educational Journal*, 20(80), 183-217.
- Miller, W. (1990). 'Effects of a cooperative learning format on content attitudes and learning preference in mathematics for a population of junior high school summer academy student', *DAI*, 51(5), 1540A.
- Muhammad, N. (1984). *Dirasat ittikhath alqarar watahmol almasouliyyaat lada a:tfal almarhala aabtidaiya*. Unpublished MA Thesis, University of Helwan, Cairo, Egypt.
- Principles and Standards for School Mathematics*. (2000). National Council of Teachers of Mathematics (NCTM).

- Pedretti, E. (1999). 'Decision making and STS education: Exploring scientific knowledge and social responsibility in schools and science centers through an issues-based approach', *School Science and Mathematics*, 99(4), 174–181.
- Shamasneh, Ra'ed Mohammed. (2001). *Istikhdam 'istiratijyyat alohjiya (jigsaw) fi tadrish wihdat alhandasa lissff alssadis ala'asasi: Dirasat hala*. Unpublished MA Thesis, Birzeit University, Birzeit, Palestine.
- Sohail, Randa. (2002). *Faeiliyyat barnamaj tadrabi litanmiat ittith alqarar almihani lada ayina min talabat assff al'awwal alththanawi*. Unpublished MA Thesis, University of Damascus, Syria.
- Stigler, J., Gallimore, R., & Hiebert, J. (2000). 'Using video surveys to compare classrooms and teaching across cultures: Examples and lessons from the TIMSS video studies', *Educational Psychologist*, 35(4), 87-101.
- Taylor, D., & Tashakori, A. (1997). 'Toward an understanding of teacher desire for participation in decision-making', *Journal of School Leadership*, 7, 609-628.
- Yusof, M. (1998). *Athar istikhdam namuthajayn min namathij alta'eallum alta'awuni fi tahsil taliabat alsff alttasi'e al'asasi limaddat alrriadiyyat fi muhafazat tulkarm alfilastinia wa ittijahatihim nahwaha*. Unpublished MA Thesis, An-Najah National University, Nablus, Palestine.

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Appendix (1)

Decision-making Scale for Sixth grade primary students

Dear students,

This scale is designed to recognize your ability in decision-making, and the bases on which you depend during your decision-making process. This measure is of (30) items, including some situations of life that you may encounter and require from you to make decision. Each situation followed by four possible alternatives.

Please read each situation carefully along with its alternatives and write this symbol (×) in front of the alternative that applies to your outlook and actions and that seems to you more influential in the decision-making process.

Please express your opinion, frankly, because this information will be used only for the purpose of scientific research.

Thank you for your cooperation.

1- If you want to choose a friend, your choice will be:

- A- based on your knowledge of her behavior ()
B- based on your consultation with others ()
C- based on the opinion of your parents ()
D - random ()

2- When a new student attends your class, your relationship with her will be based on:

- A- the way he/she deals with others ()
B- your consultation with your teacher ()
C- your friends reaction towards him/her ()

- D - your mood and the lack of any standard
- 3- If your friend asks you to borrow her a book, and you refused , then your refusal would be based on:
- a- a previous experience with her
 - B- your friends opinion of her
 - C- your parents attitude towards such a thing
 - D - your temper/no particular reason
- 4-If you lose your daily allowance during the break, you will:
- a- borrow some money from one of your close friends
 - B- consult your friends
 - C- inform your teacher
 - D- become angry but without doing anything
- 5- When your friend quarrel with another person, your decision to intervene to end the quarrel between the two depends on:
- a -your evaluation of the consequences of the quarrel
 - B- your consultation with others
 - C - the desire of your friend who quarrels
 - D - your mood
- 6- When you want to help a friend at school, you help will be based on:
- a - the extent of her need
 - B- others encouragement
 - C - the request of the teacher
 - D - your psychological state at that moment
- 7- If you want to go on a trip organized by the school, the decision will depend on:
- A- your desire and your own decision
 - B- consultation with your parents
 - C- your friends insistence
 - D - no specific basis
- 8-If you want to buy new clothes for you and your father refuses, then, your reaction to his refusal:
- A- will depend on understanding the reason of his rejection
 - B- will depend on your consultation with your friends
 - C- will depend on your evaluation of the situation
 - D - will reflect your reckless behavior and lack of self-control
- 9- If you find a sum of money in the classroom, you will:
- A- look for its owner
 - B- consult your friends to give you advise
 - C- nform your teacher
 - D- get confused and unable to determine what to do
- 10- When your friend owes you money and does not get it back on time, then, you:
- a- discuss the issue with her/him
 - b-consult your parents
 - C- inform your teacher
 - D - become disturbed without doing anything
- 11- If your friends ask you to play with them, your acceptance will, then, depends on:
- A- your desire and own decision
 - B- your parents' permission
 - C- your friends insistence
 - D - no specific basis
- 12- If the bus driver denied that you paid the bus fare, you would:
- A- discuss that matter with him

- B- consult the passengers
- C- pay the fare again
- D - feel disturbed and unable to determine what to do
- 13- If one of your classmates starts making a noise in the class repeatedly, you will:
- a- give her/him advise
- B- consult your friends
- C- inform your teacher
- D- feel disturbed and unable to determine what to do
- 14- If a stranger asked you in a rainy day, to drive you home,, you will:
- a- refuse his/her request politely
- B- consult your friends
- C- accept his request
- D - feel confused and unable to determine what to do
- 15- If you realized that your father was going through a financial trouble, then, your decision for helping him will be based on:
- A- your potentials and abilities
- B- your friends advice
- C- your parents request
- D- your feeling and sense of responsibility
- 16- If your friend asks you to study together for the exam at his house, then, your decision will:
- A- depend on how much you need to study with her/him
- B- depend on your consultation with your parents
- C- depend on your friend insistence
- D-be based on the fact thatnot need to think and meditate about it
- 17- Your choice of the activities and games that you practice depends on:
- A- your desire and your own decision
- B- consultation with your parents
- C- your friends' desire
- D- mood and random behavior
- 18- If you want to end a relationship with a colleague, your decision will be based on:
- A- your perception of the extent to which you need to end the relationship
- B- your friends' advice
- C- your parents' opinion
- D- your mood and the absence of any specific reason
- 19- If you realized that a low level student has got a score higher than you in any subject, you will:
- A- discuss that matter with your teacher and inquire about it
- B- consult your parents
- C- react just like your classmates
- D- feel disturbed without doing anything
- 20- When you decide to participate in a debate on a certain issue posed by one of your teachers, this participation will be based on:
- A- the extent of your knowledge of the subject
- B- others encouragement to you to participate
- C- the teacher's request
- D - your psychological state on that day
- 21- If you noticed that one of the students deliberately ridicule you as a way of provoking you, then, you:
- A- discuss that matter with him and ask him to stop it
- B- consult your parents
- C- inform your teacher
- D - feel disturbed without doing anything

22- If you do not have money to buy a gift for your friend who is sick, then, the idea of cancelling the visit will depend on:

- A- avoiding embarrassment
- B- consulting your friends
- C- parents' opinion
- D - your psychological state at that moment

23- The quality of the programs that you watch on television depends on:

- A- your interests and tastes
- B- friends encouragement
- C- parental guidance
- D- arbitrariness and lack of certain standards

24- If the teacher keeps constantly ignoring your participation during the class, you will:

- A- discuss that matter with your teacher and inquire about it
- B- consult your friends
- C- inform your parents
- D- feel disturbed and unable to determine what to do

25- If you saw your friend stealing from another classmate, you would:

- A-give her advice
- B- consult your friends
- C- inform your teacher
- D - get puzzled and unable to determine what to do

26- Your choice of the place in which you spend your spare time depends on:

- A- the fun you get in that place
- B- friends encouragement
- C- parents' request
- D- your psychological state at that moment

27- If you visited your friend and felt that he did not welcome you in a proper way, the termination of the visit would depend on:

- A- the extent to which you felt offended
- B- your discussion with her
- C- your choice to go back home
- D- your mood

28- When your friend asks you to invite her to have lunch with you at your home, then, your approval is based on:

- A- your consultation with your parents
- B- the strength of friendship between you and her
- C- your friend's insistence
- D- your feeling at the moment

29- When a stranger knocks the door bell, you will :

- A - not open the door for him
- B- consult your older brother
- C- inform your parents
- D- get confused and unable to determine what to do

30- If you were invited to attend two concerts for friends at the same time, then, your decision to go to one of them without the other would depend on:

- A- the power of friendship between you and your friend that you chose to attend her party
- B- consultation with your friends
- C- parents opinion
- D - psychological state on that day