

The Impact of Kagan Models in Reducing Disruptive Behaviors and Academic Achievement in Science Education Among Jordanian Eighth Graders

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Abstract

The current study aims at identifying the impact of Kagan Models in reducing disruptive behavior among Jordanian eighth graders and any consequent effect on their school achievement. The study was conducted on a sample of 42 male students assigned randomly into experimental and control groups with 21 students each. Those in the experimental group were taught using kagan models, and those in the control group were taught with the traditional method. Data was collected by using pre- test as a baseline and post- test as summative for both groups; in addition a questionnaire was completed by 12 teachers, to identify Kagan Models. Effect in reducing disruptive behaviors among students. Results showed statistically significant differences ($\alpha = 0.05$) in eighth graders achievement, where experimental outperformed controls. Additionally kagan models effect in reducing disruptive behaviors among eighth graders at ($\alpha = 0.05$) were found.

Keywords: academic achievement, disruptive behaviors, eighth graders, kagan model

Introduction

A characteristic of our current age is rapid development in various areas, particularly in the teaching area, the teaching and learning process, needs to keep up with this development; this could be achieved through the use of teaching methods and techniques capable of providing suitable teaching and learning environment that fosters effective learning including acquiring and using knowledge.

However, despite this rapid societal development, our schools and educational institutions, still depend to a certain degree, on the traditional teaching method, which eliminates the pupil role in the teaching -learning process. Therefore, creating and implementing teaching strategies that foster student motivation in the classroom increase activity in the learning process , increase the exchange of various skills and experience among learners and reduce behavioral problems have become an urgent need.

The Kagan Models are a relatively new strategy, concerned with teaching well increasing the effective control of the lesson procedures, as well as providing the learners with opportunity to share ideas and thought, effectively, with colleagues in cooperative groups.

Meanwhile, Kagan Models aim at constructing and reengineering student thought in a practical way to be utilized in their daily life, these cognitive experiences, aimed at raising student's thought efficiency and thereby raising their study achievement, self-approbation, respect and self-confidence. Kagan Models also contribute to the development of team work in the student positive attitude in the discovery of information, which in turn assists in retaining of learning, Kagan strategies also have a role in helping students developing verbal communication skills and enhancing positive cooperation inside the classrooms (Kagan, 2003).

-Kagan Models for cooperative learning are based on these principles.

-Seeking mutual benefit for all groups to benefit from each other's efforts (your success is mine and my success is yours).

-Individual performance in the team benefit for all other members (No success without you).

-Feeling proud and great full with the success of one member of the team in completing a task (we all congratulate you for your success).

Islam (2014) emphasizes that Kagan Models for learning are among the most successful programs in cooperative learning because they are connected with other aspects such as considering individual differences, social skills, building of team spirit, building classroom environment and other characteristics, This then contributes to classroom management in practical and simple ways, giving the classroom a joyful atmosphere and leading to the development of social values in students such as communication skills, self-confidence, leadership and cooperation among students, freedom . Not to mention its role in adding calmness and tranquility in the classroom and reducing behavioral problem due to beneficial and focused physical activity among students.

Hyperactivity and increased activity problems in students, as well as is one of the most common challenges in the school community, a situation that causes students many difficulties, the most prominent of which are lack

of attention, and subsequent learning difficulties. Additional difficulties include compulsivity, response delay weak listening, inability to complete assigned tasks, hesitation in decision making, consequently, those students often suffer from school based behavioral problems, poor achievement, bad social relationships and fear of school (Al – asimi, 2012;). However hyper Disruptive behaviors in the child is among the major causes influencing poor school achievement, as hyperactivity impairs attention and concentration (Shalabi, 2009).

Doston (2001) emphasizes that Kagan Models were designed to utilize ideal educational strategies in different classroom so that those strategies became part of the lesson, which in turn, ultimately results in effective learning accompanied with less classroom behavioral problems. Furthermore, these models help moderate student's behavior, step by step, to facilitate accomplishing educational tasks (Kagan, 2013).

In addition, Amin (2008) states that Kagan strategies replace the strong dependency on traditional teaching methods that are teacher – centered, instead they contain the largest set of student- centered teaching policies, which strategies produce positive results in academic achievement, developing thinking skills, social skills, as well as emotional intelligence, love of school and class, self and others, as well as learning. Kagan models are also highly related with enjoyment and entertainment, so it is included as educational games strategies due to it pleasant application, simplicity of its constructs, and that these simple used educational, strategies and easy learned one is the best way to enhance educational process.

therefore, these strategies develop students higher order thinking and perceptual developmental level, through complete inclusion in lesson's activities that require different concepts as well as the application of new cognitions, these students gain a complete perception of the curricula they are studying (Kagan, 2002).

However, Sa'dal and Al – harby (2011) believe there is a close relationship between cooperative learning and classroom management, since the successful classroom management is interested in finding interactions with students which leads to positive participation, raises activity and vitality in the lesson, and cause students to respect their teacher and his guidelines, making them perform their educational task, in accordance with the effect caused by cooperative learning approach in the development of classroom management, as an attempt to reach educational goals.

The above discussions showed the importance of using the appropriate and benefit strategy for education and Kagan strategies contribute greatly to finding suitable solutions for classroom problems that takes lessons out of their path and objectives, problems that make education losses its importance and position.

Given the importance of students behavior management and control in schools, making students learn, Positive behaviors built on respect and tolerate other, through the use of different strategies and training students on them, Positive behaviors development in students and making them acquire, became among the most important goals of various curricula development and based on the importance of students supposed positive behaviors, and paucity of studies – as to the best of researchers knowledge – addressing the effect of using kagan models in teaching, and their effects on classroom management effectively, Their influence on raising students' academic achievement, this study came to identify the impact of kagan models in reducing Disruptive behaviors among Jordanian eighth graders, and on their academic achievement.

Ameen (2008) Defines Kagan Models as strategies that replace the heavy dependence on teacher centered traditional teaching methods with the largest set of student – centered educational policies. However, Kagan models, in this study, ever detained as cooperative learning models that largely contribute to finding suitable solutions for classroom problem that make classroom lessons deviates from their way and objectives, increases student desire and motivation, activate his thinking, however, in the current study kagan models were limited to three strategies Numbered Heads together, Fan- N – Pick, and Think – Pair – share strategy.

Disruptive Behaviors defines as acute body and disrupt activity, characterized by being continuous and long term activity among children, so that it is difficult to the child controlling his body motion, but spends most of his time in continuous motion (shea, 1978).

However, researchers define it as body (physical activity results for the students in the classroom and leads to attention distraction, increased disruption and low school achievement) for eighth graders which are students in Jordan education whose age is 14 years old, and their

Academic achievement is the amount of knowledge related to science education subject acquired by a student and is measured by student score on the test. (Khataybeh, 2005).

Limitation of the study

eighth graders in Jordan, in The 2017 / 2018 school year, at al Ashrafieh secondary boy school; As well as constraining the education material on the eighth study unit "Genetics" From science textbook eighth graders for the school year 2017 – 2018.

Research Objectives

This study aims at identifying the impact of Kagan Models in reducing eighth graders disruptive activity and academic achievement, which is – according to the best knowledge of the researchers – the first Arabic study

addressing the role of Kagan Models in reducing disruptive activity among students as well as its role in student's academic achievement.

Significance of the study:

The current study's significance lies in the importance of the potential role of kagan models in reducing disruptive activity of students, its role in increasing academic achievement, and as a potentially practical application in accordance with the previous discussion and general, learning outcomes, especially for science curricula, in Jordan, which calls for the need at using new methods and strategies that help students developing high order thinking, facilitating understanding, enhancing problem solving, raising academic achievement and learning retention (Ministry of Education, 2005).

Benefitting those in charge of science teachers preserve programs by focusing in training teachers in using kagan models in teaching, as well as increasing science supervisors, interest in employing new methods and strategies that raise teachers' classroom management in the classroom and increase academic achievement. Also, it is the first study – as to the best of our knowledge – in the Arab world, addressing kagan models note in reducing Disruptive behaviors among students and their role in academic achievement, and it provides a model to be adopted by science teachers, in general, on the importance of using Kagan Models in teaching.

Research problem and Questions

The research problem lies in answering the following main question: what is the impact of Kagan Models in reducing disruptive behaviors among Jordanian students and academic achievement? Of which the following sub questions are derived.

1. Are there any statistically significant differences at ($\alpha = 0.05$) in reducing eighth graders disruptive behavior in science education, due to the treading methods?
2. Are there any statistically significant differences at ($\alpha = 0.05$) in eighth graders achievement in science education subject, due to teaching method?

Significant previous studies

Researchers could not find any studies that used Kagan Models as a teaching strategy and their effect on students' academic achievement, therefore researchers adopted a number of studies addressing cooperative learning, among which, Hamid (2012) study aimed at identifying the effect of cooperative learning on academic achievement in secondary stage chemistry teaching. The study sample consisted at 50 purposefully selected students who were assigned either experiment al 25 or control group 25; where experimental group were taught using cooperative learning, however, controls were taught by the traditional way. Results showed statistically significant groups differences in student's study level in chemistry.

Gadi (2003) conducted a study aiming at identifying between female student's differences when using cooperative learning approach, in terms of the three achievement levels high, medium, and low, and four language models; general information, vocabulary, grammar and composition, as well as two main questions levels: low cognitive level and high cognitive level. The study was conducted on a sample of 93 first secondary female students in Al-Madinah, Saudi Arabia where two sections were randomly selected one for the experimental (taught by the cooperative method), and the other for control group (taught by the traditional method). Students achievement in English language was measured the pre and post achievement test. Results showed statistically significant differences between experimental and control group achievement where experimental outperformed controls.

Hameed (2011) conducted a study aiming at identifying the effect of using cooperative learning method on Arabic grammar achievement and retention among fifth primary female students, Experimental approach was utilized to collect data. The study was conducted on a sample of 80 female students, assigned into two 40 students each, one as experimental and the other as control groups where experimental were taught by cooperative learning approach, however controls taught by the tradition method Results indicated statistically significant differences between groups in achievement level, indicating the clear effect of cooperative learning in increasing experimental group achievement as compared with controls.

The above previous studies review showed that previous studies were consistent, to some degree ,with the current study in terms of independent variable, which is the use of cooperative learning approach, while current study was inconsistent in terms of its dependent variable, which is the disruptive behaviors accompanied with achievements, where dependent variable for Hamid, (2012) Gadi (2003) and Hameed (2011) ware school achievement, Meanwhile, the current study is not in line with previous studies in terms of their samples, where it is sample consisted of eighth graders however, Hamid, (2012) and Gadi (2003) samples were secondary school students.

This study differs from all previous studies in its using of kagan models and the subject matter studied Hamid (2012) addressed chemistry, and Gadi (2003) addressed English language, and finally Hameed (2011)

subject matter Arabic Language.

Procedures

The following procedures, is carrying out this study, were taken by researchers:

Identify study population and choose its sample, then select grade level and teaching unit, finally prepare achievement test and teacher's questionnaire.

Study population:

The study population consisted of all eighth graders at al Ashrafieh secondary boy school during the 2017 – 2018 school years.

Study sample:

The study sample consists of two class sections for the eighth grade at al Ashrafieh secondary boy school for the 2017 – 2018 School Year. These sections were purposefully selected; their teachers showed complete preparation to cooperate with the researcher, and the desire of social studies teacher in the school to cooper and administer the study.

Forty two graders from two sections, one was assigned as experimental 21, the other was assigned as control 21. Distribution of subjects by group, number of students and section is displayed in table 1; however, teachers sample consisted of 12 science teacher, who used Kagan Models in teaching eighth graders table 1.

Table 1
Sample distribution by group, section and number

Group	Students		Teachers
	No. of students	Number of section	
Experimental	21	1	12
Control	21	1	
Total	42	2	12

-Visiting the sample section to explain the study purpose to science teachers.

-To ensure groups comparability prior to the study, researchers administered the pre- test on both groups and teacher's disruptive behaviors questionnaire using means, standard deviation and t-test of study sample performance according to group (experimental vs. control), as shown in table 2.

Table 2
Means, standard deviations, results of t-value of the sample performance on pre-test by group

Group	Number	Mean	SD	T-value	Sig
Kagan	21	9.20	2.758	0.516	779
Control	21	9.25	2.711		

-Table 2 shows no statistically significant differences at ($\alpha = 0.05$) between subject performance on the pre-test by group (kagan vs. control), indication comparability of the two groups.

- Experimental group was taught using kagan strategies; however controls were taught the same unit using the traditional method. Teaching lasted 14 lessons, 45 minutes per lesson.

- Academic achievement test on both groups, and the questionnaire on teachers, immediately after the teaching was completed.

Study variables:

Independent Variables: Teaching unit (Kagan Models and traditional teaching methods). **Dependent variable:** Disruptive behaviors and academic achievement.

Study instruments

First: Kagan – based teaching material; and was prepared according to the following steps:

Selection of the educational material: the educational material consisted of the fifth unit, Genetics, from eighth school year 2017- 2018. This unit consists of four lessons, inherited trait, Genetic material , Human inheritance, Genetics disease , these lessons was constructed on kagan strategies basis, and after it has been built, the unit was submitted to a panel of five referees, three of them were specialized in science teaching methods, and the other two were specialized in educational measurement and evaluation, whose comments were taken into consideration and their suggested modifications were made, so the unit became in its final version.

Secondly: achievement test.

Researchers prepared achievement test to measure the effect of learning by Kagan strategies on study achievement science education among eighth graders, the test consisted of 20 questions.

Test validity:

To validate the test, it was submitted to a group of seven referees and specialized faculty members, three of them were specialized in science teaching methods and curriculum, other one in measurement and evaluation, one science supervisor were asked to give their opinions regarding suitability of the questions to this grade level,

however majority of their suggestion concentrated an rephrasing some questions, and replacing some answers with others, all their comments were considered.

Test Reliability

To establish the test reliability, it was administered on a pilot study of 15 students from the study population, but not from its sample, moreover (K R 20) formula was used, where reliability coefficient was 0.82, which was considered a suitable value for the study purposes. And the achievement test became ready in its final version.

Thirdly: teachers' questionnaire:

Researchers developed a questionnaire measuring the impact of using kagan strategies in reducing disruptive behaviors among eighth graders, from teacher's point of view, and it consisted of 20 item covering three domains.

Validation of the questionnaire

To validate the questionnaire, it was submitted to a panel of six referees and specialists; three of them were specialized in science education curricula and teaching methods, three in educational measurement and evaluation, and were asked to give their opinions regarding linguistic phrasing and suitability of statements to the study subjects. The majority of their comments and suggestions concentrated on rephrasing some item, and their comments were taken into consideration.

Reliability of the questionnaire

To ensure questionnaire reliability, it was administered to a pilot study of (8) teachers from the study population, but not from its sample, kuder- Richardson KR (20) formula was used, which produces a reliability coefficient of (0.78), which was suitable to use in its final form .

Results:

Post school achievement for the entire study sample, was measured, to answer the study two questions. However, descriptive statistics including means, standard deviations and t-test of experimental and control group scores, were computed, and results are displayed in table 3.

Furthermore, to identify the effect of kagan strategies in reducing disruptive behaviors among eighth graders means and standard deviations of teacher's responses on the questionnaire different domains, were computer, and results are shown in tables 4, 5, 6 and 7.

Table 3
Means, Standard deviation and T-test on Sample's performance on post- test by group (Experimental vs. Control)

Group	Number of student	Mean	SD	T value	Sig
Kagan	21	15.90	1.194	7.851	0.000
Control	21	11.60	2.017		

Table 4
Means and standard deviation of teacher's performance on the role of Kagan models in reducing disruptive behaviors in the first domain.

No	Item	Mean		S.D	
		Pre	Post	Pre	Post
1	I use Kagan Models in teaching science because it renders teaching fun to my students.	3.67	4.77	0.82	0.51
2	Kagan Models increase information retention for long time	3.20	4.87	0.91	0.42
3	I think Kagan Models use leads to student distraction form content.	2.40	1.90	0.51	0.61
4	I think that Kagan Models use affects interaction and team work among student, but negatively.	2.83	4.97	0.83	0.52
5	I feel Kagan Models use increases student's desire and motivation to learning.	3.00	4.51	0.84	0.43
6	I can see Kagan Models use positive effects in student learning.	2.36	4.87	0.73	0.56
7	Usage of Kagan Models constraints the growth of creativity and invention among learners.	2.53	4.79	0.82	0.56
8	Usage of Kagan Models constraints the growth of creativity and invention among learners.	2.87	4.43	0.89	1.21
9	Kagan Models act as reinforces for students.	2.53	4.53	0.73	0.86
10	When resort to use Kagan learning models, students tend to make my class ridicules.	2.15	2.60	0.56	1.60
11	I believe that using Kagan Models gives students more independency and self-reliance.	2.30	4.70	0.67	0.51
12	I use Kagan Models to encourage student's participation in the lesson subject total. First domain (students).	2.16	4.23	0.65	0.39

Total	First domain (students).	2.32	4.58	0.76	0.62
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Table 5
Means and standard deviations of teacher's responses on the questionnaire of the Kagan Model in reducing disruptive behaviors in the second domain

No	Item	Mean		SD	
		Pre	Post	Pre	post
13	Kagan models require much previous scientific preparation for lesson materials usage.	3.30	4.60	0.53	0.31
14	Kagan models usage causes disruption among students	2.20	4.20	1.01	1.16
15	I use Kagan models because they help changing the teacher role form lectures to facilitator and counselor,	2.85	4.57	1.25	5.03
16	I don't use Kagan models because they are time wasting and impair teachers in ages image students.	2.98	1.83	0.81	1.26
Total	Second domain (teacher).	3.22	3.35	0.99	0.654

Table 6
Means and standard deviations of teacher's responses on Kagan Models role in reducing disruptive behaviors questionnaire in the first domain

No	Item	Mean		SD	
		Pre	Post	Pre	post
17	Kagan models reduce time wanted in explanation.	2.90	4.52	0.73	0.58
18	Kagan models are improvements in teaching quality.	2.81	4.78	0.78	0.44
19	I use Kagan models to diversify teaching approaches.	2.91	4.84	0.87	0.54
20	Kagan models fall short achieving their objectives.	3.50	1.67	0.89	0.62
Total	Third domain (techniques and instruments).	2.83	3.83	0.82	0.48

Table 7
Means and standard deviations of teacher's performance on the role of Kagan Models in reducing disruptive behaviors among study sample.

No	Domain	Mean		SD	
		Pre	Post	Pre	Post
1	First domain (students)	2.32	4.58	0.76	0.62
2	Second domain (teacher)	3.22	3.35	0.99	0.654
3	Third domain (approaches and instruments)	2.83	3.83	0.82	0.48
	Total Scale	2.79	3.92	0.86	0.58

First: results related to the first research questions are there any statistically significant differences at ($\alpha = 0.05$) in the reduction of disruptive behaviors among eighth graders in science education due to teaching method?

Table 4 shows that eighth grade teachers post responses towards kagan models and their effect in reducing disruptive behaviors was positive with a response degree of (2.32), where their means for the first domain was (4.58) and a standard deviation of (0.62) compared with pre mean of (2.32) and SD of (0.76).

However, teacher mean response, in the second domain, was (3.35) and SD of (0.654), compared to their pre-test response mean which was (3.22) and SD of (0.99), as was shown in table 5. Table 6 however, showed teachers positive responses in the third domain, approaches and instruments, where this domain mean response was (3.83) and SD of (0.48) as compared to pre- test response for this domain, which was (2.83) and SD (0.82).

Teachers responses, in general, show a significant difference at ($\alpha = 0.05$) in their post responses, meaning that kagan models have an effect in reducing student disruptive behaviors which is clear in table 7.

Second: results related to the second research question: are there any statistically significant differences at ($\alpha = 0.05$) in eighth graders achievement in science education due to teaching methods.

Table 3 shows apparent differences in eighth graders achievement in science education, where experimental group mean was (15.90) and S.D of (1.194) and control group mean was (11.60) and S.D (2.017). That indicating the existence of statistically significant differences at ($\alpha = 0.05$) where experimental out performed controls, meaning that teaching methods has significant differences.

Discussion

First: discussion of results related to the first research questions.

Results showed that teachers post responses on the research questionnaire of Kagan Models effect on reducing students' disruptive behaviors were positive, where there moves statistically significant differences at ($\alpha = 0.05$)

where post responses were higher than pre-responses and this might be attributed to several factors:

-Kagan Models give classroom and atmosphere here of joyful and pleasure, as well as enhancing the 21st century skills: communication, cooperation skills and critical and creative thinking - as well as a role in adding silence and tranquility inside the classroom, reducing behavioral problems resulting from hyper activity between students.

-Kagan Models engage students on a continuous basis, increasing thereby, their assigned tasks, courage in decision making which result in reducing disruptive behaviors among students.

-They give learner the opportunity to share ideas with peers, effectively, in cooperative groups.

Second: discussion of results related to second research question.

Results of this question showed superiority of experimental group, taught by kagan models over the control one taught by traditional method in their study achievement, as there were statistically significant differences at ($\alpha=0.05$) and this result might be attributed to several factors including.

-Kagan Models aim at build and reinforce student thinking, increase their thinking ability and self-respect and confidence building.

-Use of modern teaching strategies – as Kagan one- increase interaction between students through group work, and direct students thinking toward higher order thinking which was confirmed by Barahmeh, Bani hamad and Barahmeh (2017).

Kagan Models contribute to the development of team work among students; achieve learner's activity and his positive attitude in information discovery, which helps him retaining his learning, as well as their role in helping student developing verbal communication skills, enhancing positive relations in the classroom (kagan, 2000).

Conclusion:

The study conducted on a sample of 42 male students at Al Ashrafieh secondary boy school assigned randomly into experimental and control groups with 21 students each. An experimental group was taught "genetics" unit from science textbook using Kagan Models, and control group was taught same unit with traditional method. Data was collected by pre and post achievement test, and questionnaire is administered by 12 teachers to identify Kagan Models effectiveness in reducing disruptive behaviors among students, the study result shows statically significant differences in achievement. Also, the questionnaire results revealed that there is an effect of Kagan Models in reducing disruptive behaviors among Jordanian eighth graders.

Recommendations and suggestions

As a result of this study, the following recommendations are made:

Training science teachers, pre and in service, at use Kagan Models as a teaching strategy. as well as inviting ministry of education, curricula department in particular to utilize Kagan Models in science text books. In addition, training teachers on the use of Kagan Models as assistant factor for classroom management. Finally, Conducting studies on the impact of Kagan Models in other grades, stages and with different dependent variable.

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