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IMPACT OF BRAINSTORMING STRATEGY IN DEALING WITH KNOWLEDGE RETENTION SKILL: AN INSIGHT INTO SPECIAL LEARNERS' NEEDS IN SAUDI ARABIA

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The present study aimed to identify the effect of the brainstorming strategy in the treatment of some memory disorders among special learners in Saudi Arabia. The researcher followed a semi-experimental approach to achieve the goals of research. The sample consisted of primary school students who had been identified as having learning difficulties. The control group was taught in a traditional way. Both validity and reliability of the tools were checked by the researcher. The results revealed significant differences between pre and post measurements of the performance of the group which had been exposed to brainstorming strategy. The results also showed significant differences between the mean scores obtained by students of both control and experimental groups.

KEYWORDS: Brainstorming Strategy, Memory Disorders and Learning Disabilities

INTRODUCTION

Oshborn (1938) first used the term 'brainstorming' for the sessions organized by a business group to deal with issues wherein all the members sit together to find the most effective solution to the issues. He later credited this origin to Hindu teachers in India who used this method almost 400 years ago where the members got together neither to discuss nor to pass judgement on various issues but to evaluate the possible opinions or views on certain issues

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(Oshborn, 1979). However, the theoretical basis of brainstorming technique which leads to learning was developed much later (Wang, Rose, & Chang, 2011). Later the term became very popular and showed its relevance in an educational process as well. It is well known that memory-based learning contributes to the formation of knowledge among students, especially those with learning difficulties. It helps to develop their thinking skills and paves the way for the growth of thinking and memory skills on their part. Because they are exposed during this early stage of their development to inadequate experiences of integration that would adversely affect their subsequent learning, and their way of thinking, this is reflected in their memory and becomes a feature of their thinking. The mental structures control the thinking and behavioural patterns of an individual (Paulus & Yang, 2000). There are two ways human behaviour is organized i.e. the images of the overall schemes and mental processes or operations. The first serves as the structure governing the behaviour where an individual realizes his thoughts in an environment where he can do some mental processes of tangible things such as changing the form, or regulate, or undergo some different cognitive processes or process information gathered from the outside world.

The brainstorming strategy is one of the latest trends in teaching, which stimulates students' activity, emphasizes their positivity in the educational situation, trains them to link their information, draws the right results, and helps them to gain as much information as possible about the context. The students in the strategy of brainstorming are facilitators of learning and not just the recipients. They develop memory and increase the processes of linking facts, events etc. and improve remembering by stimulating their ideas. Their involvement in such activity is an integral part of the educational learning (Salma & Harithi, 2004). This technique provides opportunity for a learner to make assumptions, experiment and observe, and make inferences based of measurements with flexibility (DeHaan, 2009; Mohammad, 2010).

Learning difficulties can interfere with the growth of verbal and non-verbal abilities. Learning disabilities are a clear disability with normal mental capacity, integrated sensory motor systems and adequate learning opportunities. This situation varies in degree of appearance and severity. This condition affects the individual's life and self-esteem, education, occupation, social adjustment, and daily life activities (Nubian, 2011). According to Joseph Torgesen (2003), learning difficulties are often viewed as problems faced by students due to dysfunction of the central nervous system. So, they are taught to acquire academic knowledge and associated skills, mainly with various intervention techniques. Therefore, these deficiencies are usually viewed as neurotic. On the other hand, the cognitive processes that experience such a

deficiency are only certain public behaviours that convey that it occurs as specific responses made against a particular stimulus. Therefore, it was necessary to search for a strategy to stimulate this information and take students out of the framework of rigid education and to teach free and student-based education in particular, a strategy of brainstorming, which includes methods that encourage the potential of students in an atmosphere of freedom and security. It allows for the emergence of all opinions and ideas. This method is based on freedom of thought and is used to generate the greatest number of ideas to deal with an open topic.

Research Problem

Individuals with learning difficulties are usually normal. Teachers or parents do not notice any abnormal phenomena that require special treatment, so teachers do not understand what kind of instructions they have to give them. Large number of children are reuniting with their peers without the ability to study, which places researchers with a huge responsibility in determining the child with learning difficulties, and what would be the best intervention programmes and treatments (Ghazal, 2011). The Kingdom of Saudi Arabia has always sought to improve and reach a better level in the field of education. Therefore, it is constantly developing comprehensive programmes, rethinking the educational strategies and curricula, developing educational environments suitable for students and ensuring the preparation and training of teachers. The Ministry of Education outlined in its circular (No. 1239/31 dated 26/2/1420 AH), to set up a project to develop teaching strategies adopted by the general administration of educational supervision. The overall objective of the project was to develop teaching practices in order to obtain the desired outputs. The development of teachers' teaching practices can be achieved through teachers training about new interactive teaching strategies that encourage students to discover and build knowledge. It included activities, direct sensory experiences, activities that allow for free and active thinking in different directions, and stimulate them to question and research (TSDP, 2005). So, the researcher sought to study the effect of brainstorming strategy in the treatment of some memory disorders in learning difficulties in Saudi Arabia.

Research Questions

The research questions of the study are:

1) Are there statistically significant differences between the mean scores of the experimental group members and the mean scores of the control group

members in the pre and post measurements? and

2) Are there statistically significant differences between the mean scores of the experimental group members and the average scores of the control group members in the post-measurement of brainstorming strategy?

IMPORTANCE OF THE STUDY

The research sheds light on more recent studies and trends in this area. The importance of the study is also attributed to the importance of the brainstorming strategy, a strategy that helps us to identify the best method which reduces the memory disorder in students by relying on the optimal employment of memory by stimulating their ideas. The treatment of memory disorder in students with learning disabilities contributes to overcome many problems they face. The results of the study will help the curriculum designers in the area of special education to include brainstorming strategies within the curriculum. The importance of the study can be determined as follows:

Theoretical Importance

It tries to present the concept of brainstorming strategy in line with modern educational thinking and diversity in learning strategies. It is hoped that this study will serve as an important scientific addition in the field of learning difficulties. This group in the society requires efforts and intensive research to identify its characteristics and thus meet its academic and psychological needs.

Practical Importance

The present research provides teachers with practical descriptive procedures for brainstorming strategy, and it is hoped that this study will improve the performance of teachers in schools. It is hoped that this study will help to develop learning resources for students with learning disabilities from a teacher's point of view that includes strategies for brainstorming.

REVIEW OF LITERATURE

Several studies have highlighted the importance of brainstorming and have identified it as an effective tool to deal with many instruction related issues for superior learning outcomes of the learners (Wood, 1970; Paulus & Paulus, 1997; Butler & Kline, 1998; Hobson, 2001; Harbi, 2002; Jessop, 2002; Wang, Rose, Li, & Chang, 2006; Cheng, 2004, 2011; DeHaan, 2009; Holubova, 2010; Mased & Yamin, 2012; Alrubaie & Daniel, 2014; Karim, Abu, & Khaja, 2016).

Brainstorming is a technique in which a particular domain of knowledge is activated or stimulated for the learners to explore in depth and generate new

ideas (Strebe, Nijstad, & Rietzschel, 2010). The main advantage of this activity is that it gives flexibility and intellectual fluency to the learners to generate creative ideas which in turn improves learners' attitudes towards learning as well (Cheng, 2011; Mased & Yamin, 2012).

Selim (2011) examined the difference between the methods of brainstorming in the cognitive achievement and the development of scientific thinking. The experimental method was used, and the sample of the research consisted of third year students (n = 40) from the faculty of physical education. Out of two groups (control and experimental), the experimental group was exposed to the method of brainstorming and the control group was taught according to the lecture method. The results of the study recommended that the method of brainstorming was a better mode of instruction than the traditional one in the development of scientific thinking skill. In the similar tone, Agha (2009) aimed to know the effect of using brainstorming strategy in developing mathematical thinking skills on both sides of the brain of the students of the 11th grade. The researcher used the experimental method. The sample consisted of two groups (n = 30) of students from the 11th grade. The tools used were a brain control test, and a test of the researcher's design related to some mathematical thinking skills: induction, inquiry, reasoning, rationalism, problem solving, and symbolization. The differences between the experimental and control groups confirmed the positive use of brainstorming strategy in the development of mathematical thinking skill. The study recommended using brainstorming strategy in teaching mathematics in order to enhance the mental capacities of the learners.

Abu Sinayna (2008) aimed to uncover the effect of the use of brainstorming method in the development of critical thinking so as to improve the achievement level of students in geography subject. The experimental sample consisted of all third-year students (n = 131). The results of the study showed statistically significant differences in the level of significance (α = 05.0) in favour of the experimental group that was exposed to brainstorming method, and there were no statistically significant differences in the skills of inference. The study recommended that university as well as school faculty members should employ the method of brainstorming in the teaching of different courses.

Al–Dulaimi (2005) studied the similar effect on the middle school students (n = 54) of the Mosul Governorate for the academic year 2003 - 2004. The research tools consisted of the Creative Thinking Scale and the Biology Achievement Test. The researcher prepared an educational programme according to the method of brainstorming which consists of ten plans. After

completing the programme, the researcher conducted the daily test and then processed the collected data. The results revealed the impact of the method of brainstorming in improving the creative thinking of the students which further reflected in students' achievement in biology subject. Not only this, Wang (2011) also showed that this technique is quite effective in science education. This process includes inference generation and building on prior knowledge from another's idea. These cognitive and collaborative processes are now further reinforced as critical thinking ability is also stimulated in this process (Mased & Yamin, 2012; Mohammad, 2010). Overall, it can be summarized that brainstorming improves critical thinking skill, problem solving skill, attitude towards learning, and subsequently the achievement of the learners in a study programme (Cheng, 2011; Fanona, 2012). Jack and Kyado (2017) conducted a study to enhance academic achievement, attitude, motivation and knowledge retention in electrochemistry and concluded that Brain-Based learning strategy was more effective than the traditional way. Similar study was conducted to check the impact of this strategy in teaching chemistry to secondary school students, and the results supported the effectiveness of brainstorming strategy (Wisdom, Victoria & Emmanuel, 2016). Not only concept building but in writing skills development as well, one can see its implications. In pre-writing activity, it has been found to be very effective (Hashempour, Rostampour, & Behjat, 2015).

Nevertheless, it is quite clear that the technique is very helpful in all areas of study, though the studies have been conducted mostly with reference to science education. There are a very few studies which have shown its implications in social science and arts/humanities education (Alshammari, 2015). However, there is a dearth of research studies which have checked its modalities for learners with learning difficulties.

RESEARCH METHODOLOGY

In this research, the researcher followed the semi-experimental approach to achieve the goals of the study and revealed the impact of brainstorming strategy in the treatment of some memory disorders.

SAMPLE

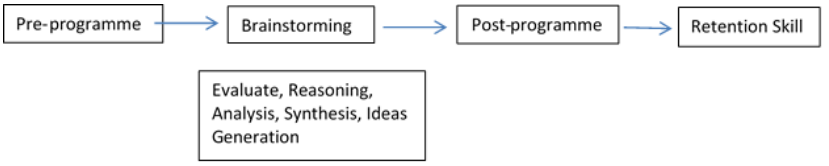
The research sample was deliberately selected from primary school students with learning disabilities from the various centres to assist in implementing the strategy as they include many classes of learning difficulties. The sample was divided into two groups: the first group was an experimental group exposed to the brainstorming strategy and the second group i.e. the control group which

was taught in the traditional way.

Research Procedure

After taking the necessary formal approvals a random distribution of the sample to the experimental and control groups were made. The memory test was applied to the sample of the study groups (control and experimental groups both). The strategy of brainstorming was applied to the experimental group. After the application was completed, the memory test was applied to the experimental and control groups (post-application). Appropriate statistical analysis using SPSS programme was conducted in order to interpret the results of the study.

The researcher conducted a preliminary survey to ascertain the adequacy of the strategy for students learning difficulties in terms of activities and tools and time allocated for each session. Then a pre-measurement was conducted to ensure parity between the control and experimental groups, in order to ensure that the improvement in the variables of the study was due to the strategy followed. The flow of the study plan was as follows:



Results Of The Study

This section includes the answers to the questions of the study, as well as the parity procedures carried out by the researcher before starting the study on the selected sample.

Group Parity:

In order to ascertain the equivalence of the groups, a pre-test was conducted for the control and the experimental groups. The results ae given in Table 1.

Table 1

Independent Sample t-test for Pre-Test Comparisons to Ensure Group Equivalence.

Groups	SMA	Standard Deviation	*t*-value	Statistical Significance
Normal	0.41	0.12		
Brainstorming	0.41	0.13	0.048	0.96

The table 1 shows that there are no statistically significant differences at α = 0.05 level between the arithmetic averages in the study scale for the control and the experimental (brainstorming) groups. It indicates the equivalence of the two groups in the study scales.

To answer the first research question, the paired sample t-Test was applied to detect the differences between the arithmetical averages between the control and experimental groups in the pre and post measures on brainstorming strategy. Results are presented in Table 2.

Table 2

Paired Sample t-Test Results Between the Control and Experimental Groups in Pre and Post Measurements on the Strategy of Brainstorming.

Strategy	Measurement	Arithmetic Mean	Standard Deviation	*t*-value	Statistical Significance
Brainstorming	Pre test	0.41	0.13	16.076	0.00
	Post test	0.77	0.13		

Table 2 shows that there are statistically significant differences (α =0.01) between the Control and Experimental Groups in Pre and Post Measurements on the Strategy of Brainstorming. The arithmetic average of pre measurement was 0.41, while the mean of the post-measurement was 0.77. Through these results, the clear impact of the brainstorming strategy is evident in improving students' memory level. This strategy is one of the most important learning strategies that helps to generate and create ideas and information for students.

To answer the second research question, the independent sample t-Test was applied to detect the differences between the arithmetic averages between the control and experimental groups in telemetry on the treatment of some memory disorders due to brainstorming strategy. Results are given in Table 3.

Table 3

Independent Sample t-Test Results to Detect the Differences Between the Control and Experimental Groups in Brainstorming Strategy.

Strategy	Groups	Arithmetic Mean	Standard Deviation	*t*-value	Statistical Significance
Brainstorming	Control	0.73	0.12	2.207	0.031
	Experimental	0.80	0.12		

Table 3 shows the existence of statistically significant differences (α = 0.05) between the arithmetic mean of the control and experimental groups in telemetry on the treatment of some memory disorders due to brainstorming strategy. The value of "t" is 2.20, and the differences in the scale were in favour of experimental group members.

The results show that brainstorming strategy is easy to apply as it neither

requires a long training, nor does it require great learning potential. It develops useful thinking habits, especially innovative thinking. Moreover, it also keeps students from expressing freely and developing self-confidence.

The results of the current study are consistent with the results of a study conducted by Salim (2011) showing the superiority of the experimental group. The results of the current study also agree with the results of Aga (2009), which showed differences between the experimental and control groups in favour of the experimental group, which confirms the positive use of the strategy of brainstorming on the development of mathematical thinking. The results of the current study are also consistent with the results of the Abu Sneineh (2008). The study concluded that there were differences in favour of the experimental group which studied through the brainstorming method.

Conclusions

The study proposes that the use of brainstorming is necessary for the development of innovative thinking among the learners with learning difficulties. It also develops the mental abilities of students and encourages them to actively participate in this strategy to remove confusion in their thoughts. Brainstorming sessions can be a very encouraging tool for collaboration and interaction in a classroom setting. Putting together a well-stated problem and careful planning strategies can lead to meaningful idea generation and idea building which can be used in solving problems or addressing specific course-related issues. It encourages the various stakeholders, be it parents, professionals, teachers, educators, policy makers etc. to take it into consideration while dealing with various learning difficulties issues.

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