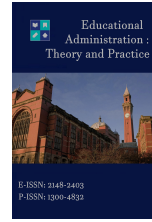




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Effective Teaching Strategies for Students with Learning Disabilities in Inclusive Classroom: A Comparative Study

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	Abstract
<p>Article History</p> <p>Article Submission 08 November 2022</p> <p>Revised Submission 28 December 2022</p> <p>Article Accepted 27 January 2023</p>	<p>Teachers use different strategies to enhance the learning abilities of their students, especially those with learning disabilities. For this purpose, various theories and leading schemes have been introduced in the literature, each indicating a different perspective regarding the effectiveness of inclusive classrooms for students. In this regard, this research aimed to compare two strategies based on widely reported theories, including Constructivism and behaviorism. The experimental research design is employed. By exposing two groups to two distinct teaching methodologies and then comparing the performance of each group before and after the intervention, as well as any intergroup differences, the pre-and post-test results were then examined. The collected information is analyzed through paired t-tests using Statistical Package for the Social Sciences (SPSS). The findings of this study suggest that while both instructional strategies are effective in inclusive classrooms, constructivism-based methods are the most beneficial. By using these techniques, students with learning difficulties learn more effectively. Future directions for research, policy ,and practices are presented.</p> <p>Keywords: Behaviorism; Constructivism; Inclusive Classroom; Learning Disabilities; Teaching Strategies</p>

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Introduction

Inclusive education incorporates the placement of students having special education needs in ordinary (mainstream) settings along with their normal peers (Artiles, Elizabeth, Kozleski & Christensen, 2006). It entails using proper teaching methods often used in mainstream classes and schools, with various educational services to help students with special learning needs learn best, given their conditions, requirements and skills (McLeskey, Hoppey, Williamson & Rentz, 2004). Inclusive education is defined by Salend (2011) as "a philosophy that brings stakeholders together to create a school environment based on acceptance and belongings within the school and the community" (p.5). Ertmer and Newby (2013) argued that learning theories provide instructional strategies to the teachers and instructors that facilitate their teaching and students' learning in classrooms. In this regard, researchers report several methods to ensure effective teaching sessions for students with learning disabilities. They also highlight the importance of teachers' attitude toward "learning how to learn". As a result, they can be better capable of enabling such students to compete with others and hold their own (Akpan & Beard, 2016). Theoretical perspective, including two widely reported theories in this area, i.e. constructivism and behaviorism, is mainly focused on in this paper. Teachers employ different instructional strategies to enhance their students' learning, especially those with special needs. However, constructivism and behaviorism can be utilized efficiently when teaching students with special needs. However, there is still a need to highlight the comparative effectiveness of both theories in inclusive classrooms so that teachers can find effective teaching strategies. Therefore, the paper sought to compare the instructional methods in light of both approaches and highlight the fact that instructional actions are optimized when these theories are practically applied while focusing on their essential aspects (Ertmer and Newby, 2013). Therefore, the researchers propose the following research question to be addressed by this research; which instructional strategies are most effective in teaching students with learning disabilities in the inclusive classroom; constructivism-based strategy or behaviorism-based strategy?

Literature Review

Constructivism and behaviorism are two different schools of thought (Bell, 2021; Cansiz & Cansiz, 2019; Farrokhnia, Baggen, Biemans & Noroozi, 2022; Liu & Ju, 2010). Contradictory findings are reported in the literature about using behaviorist and constructivist principles/strategies for teaching students with special education needs. Although most educationists support the use of any particular paradigm, both paradigms have their best and most practical perspectives that must be evaluated critically.

Constructivism emphasizes providing an effective learning environment in which students can construct their own knowledge through their learning experiences. Furthermore, constructivism theory stresses that learning should be relevant to real-life experiences and situations hence should be meaningful (Zhang et al., 2016). Theoretically, the constructivism paradigm focuses on creating cognitive tools that imitate the wisdom of the culture in which they are employed, along with the experiences and insights of learning. Constructivism incorporates an individual understanding of the significance of the social dimension during their learning process via observation, experimentation, interpretation and adaptation of knowledge to establish a cognitive structure (Sakarneh, Paterson & Minichiello, 2016). Al-Shammari (2019) highlighted the social role of learning due to its effect on cognitive development through interaction among children, their parents, peers, teachers, and ultimately their learning. Constructivism focuses on learning, including creation, construction, and invention, primarily for individuals to establish their meanings and knowledge (Sakarneh, 2014b). Lenjani (2016) argues that "constructivists believe that an understanding of the brain informs teaching" (p.18). Akpan and Beard (2016) also argue that constructivism is the best paradigm for teaching all learners, particularly students with special educational needs. Liu and Ju (2010) claim that teachers are facilitators who provide essential information and organize different activities for their students to enable them to discover their learning. Lenjani (2016) highlights the central values of constructivism as; 1) learning is about searching for the meaning to develop own understanding, 2) meaning requires establishing the perceptiveness of the whole and the individual parts constructing it, 3) teachers should have a

complete awareness of the mental models used by learners to distinguish their world and the assumptions made for supporting their models, 4) the purpose of learning should not be just memorizing the information being given by others while to construct individuals' their meanings. The critical focus of constructivism is that learning should incorporate task-based, learner-centered minds and hands-on activities (Sakarneh, 2014a; Shi, 2013) while being meaningful and relevant to real-life practical experiences (Lenjani, 2016). Moreover, the application of constructivist-based classroom activities is focused on providing external and internal scaffolding strategies for all learners that are essentially required for students with special needs and learning disabilities (Shi, 2013).

From a practical perspective, inclusive education practices based on constructivism are the implementation of constructivism in inclusive classroom settings, which incorporate the strategies and teaching methods to facilitate learners in an exploration of multifaceted topics effectively (Hickey, 2014). Possible scenarios for exploring such issues comprise; employing real-life experiences and examples and situating activities in a real-world context, presentation of multiple perspectives (e.g. collaborative learning for developing and sharing alternative visions), provision of sufficient guidance for using the constructive process, utilization of cognitive apprenticeships (e.g. coaching and modeling), encouragement of reflective awareness, and inclusion of social negotiations (e.g. discussions and debates) (Ertmer & Newby, 2013).

Botha and Kourkoutas (2016) argued that having a constructivist perspective, children with behavioral difficulties receive support in establishing and applying innovative practices. They further say that students having behavioral difficulties sometimes develop different psychological symptoms, including lack of motivation, learning difficulties, social withdrawal, and disengagement from school. Therefore, in an inclusive classroom, teachers should also focus on establishing constructive relationships with these students, which leads to coping with their anti-social behaviors (Sakarneh & Al-Swelmyeen, 2021). Hence, students with special learning needs can benefit most from the practices implemented in constructivist inclusive classroom settings, including cooperative learning and peer tutoring (Hattie, 2008; Sakarneh & Al-Swelmyeen, 2020).

Cooperative learning and peer tutoring allow them to interact with others and learn actively in a real-world setting (Sakarneh, 2015). However, these collaborative and peer learning groups may be formally structured according to students' interests and abilities. The informal ones may be designed spontaneously by asking students to pair and brainstorm on a particular topic. The core purpose and underlying assumption of constructive inclusive classrooms are to make the students learn from their experiences and real-life applications. behaviorist strategies focus on students' learning through observation of experiences of themselves and others. behaviorist strategies are applied in classroom settings as direct or explicit instruction (Botha & Kourkoutas, 2016). Despite criticism for their application in general education, behaviorist strategies are widely reported as promising results, especially for students with learning disabilities (Hickey, 2014).

From a theoretical perspective, behaviorism is among the classical theories of learning and documented as the oldest (Nalliah & Idris, 2014). It is also known as a dominating psychological model, as indicated by the metaphor "learning as the acquisition of stimulus-response pairs" (Doolittle, 2014; Harold and Corcoran, 2013). behaviorists emphasize imparting reality knowledge to the learner (Hickey, 2014). behaviorism prevails when results are linked with the response or stimulus followed by maintenance of reinforcement (Ertmer & Newby, 2013). The dominating principles of behaviorism that are implemented in education and inclusive classrooms are; individuals learn behaviors directed by the settings in which behavior occurs, teaching cannot be done without learning, learning leads to changes in behaviors, behavior leads to actions, and the focus should be on the observable (Harold & Corcoran, 2013).

From a practical perspective, inclusive classroom practices based on behaviorism incorporate the implementation of the behaviorism approach to the inclusive classroom settings with a significant focus on students' behavior and practices in manipulating the stimulus materials (Al-Shammari, 2019). behaviorism-based inclusive classroom practices are direct and explicit and are systematic, including a step-by-step instructional process being instructed by teachers and followed by their students (Zhang et al., 2016). Moreover, direct or explicit instruction-based practices focus on breaking down the tasks into more minor elements and are widely applied by teachers in inclusive classrooms for students with special education needs (Steele, 2005).

Behaviorists permit the learners to determine the instructions' starting point during their instructional process and focus on more effective reinforcers. For example, in behaviorist inclusive class settings, the teachers' role is; 1) determination of the cues that may draw out students' required response, 2) arrangement of practices where target stimuli and prompts are paired to elicit the expected response in a natural setting, 3) arrangement of suitable environmental conditions to have a correct response from students in the presence of target stimuli and receiving reinforcement of such responses (Harold & Corcoran, 2013).

Essential characteristics and assumptions of the behaviorism strategies are widely embedded in current instructional practices in the classroom, including; functional behavioral analysis, direct instruction, evaluation, assessment, and feedback (Ertmer & Newby, 2013). For example, Direct Instructions are commonly practised in a teacher-leading environment where the teacher is the facilitator of students to learn from the targeted lessons (Hattie, 2008). In such settings, the teacher elaborates on the lesson. The teacher teaches a structured lesson, students' understanding is monitored, and feedback is taken from students to know the level of their understanding. In a similar context, the functional behavioral analysis classifies and targets particular behaviors, emphasizes changing disruptive behaviors, and encourages positive behavioral changes (Al-Shammari, 2019). Such analysis for students in inclusive classroom settings incorporates a chart indicating mainly targeted behaviors monitored for antecedents, time of day, frequency, and consequences. Evaluation, formative assessment, and feedback evaluate the progression of learning and investigate the gaps where enrichment or remediation is necessary. Examples include the usage of Exit slips like "things I found interesting", "things I learned", and "questions I still have" (Nalliah & Idris, 2014).

Therefore, it is considered that strategies based on behavioristic theory are related to several best practices necessary for inclusive classroom settings (Salend, 2011). Under such settings, a teacher-centered environment is established in which the teachers deliver and design the lessons according to the student's objectives. In addition, such classroom settings are focused on conditioned responses, evaluation, assessment, and feedback that facilitate the assessment of transfer and gain of knowledge between students and teachers (Ertmer & Newby, 2013).

Methodology

As the purpose of the current study is to have a comparative analysis of the impact of strategies based on "Constructivism" and "behaviorism" theories, the experimental research design was adopted in which pre-and post-test analyses are conducted (Taber, 2019). In this method, the pretest is undertaken before the implementation of the experimental treatment, while the post-test is completed after the treatment period. For this purpose, the target population is the Grade three students who are diagnosed with learning disabilities and studying in inclusive classrooms but have poor performance records, i.e. low grades and poor class participation and other related characteristics. So, 80 students were selected from different sections of the same class. Additionally, the selected sample was split into two groups so that similar students may experience two distinct teaching approaches. The difference could subsequently be discovered through their post-treatment test and the outcome. The students were divided into two groups (40 students each) based on outcomes of pretest results, i.e. two groups were equated based on their test outcomes so that each group contained an equal number of high achievers, low achievers, and average students. Still, they were selected randomly into groups so that each group would have similar participants (USDE, 2020).

The researchers utilized the diagnostic scale of essential skills in mathematics to assess the basic skills demonstrated in mathematics. This diagnostic and achievement assessment was designed and developed to determine the basic mathematical skills of students by Al-Waqfi, Alkilani and Hamzah (2012), which was accredited by the Jordanian ministry of education for diagnosing basic mathematical skills for students in elementary and primary school ages (1st to 9th grade). The study used the scale for the third elementary grade. The scale consists of four exercises or questions for each skill. The examiner assesses students based on their scores to demonstrate their mathematical skill level. Examiners allow only to read the question to students throughout the examination process. Test time was evaluated and determined to be 50 minutes,

where the examiner can extend examination time by 5 minutes if needed, according to his evaluation.

It is worth mentioning that the scale has versions A and B for all mathematical skills. Both versions are equivalent and appropriate to be used for pre-post experimental design. Form (A) was used as a pretest, and form (B) as a post-test. The instrument was validated using a test-retest approach over a sample of (477) students of different educational ages. The correlation coefficient between test and retest scores was significant at 0.01 level and above 0.70 (Al-Waqfi et al., 2012). Regarding content validity, the scale was introduced to a large panel of educators in the Jordanian ministry of education and approved to be used as a primary diagnostic and achievement scale in mathematics in Jordanian primary schools, especially for students with learning disabilities.

Factors like treatment length in time, time of the day, etc., were established similarly for both groups. At the same time, different teaching strategies were implemented in both groups, i.e. Group A was taught through the task analysis method based on behaviorism theory that focuses on learners' behaviors. Group B was introduced through the concept maps method based on constructivism theory that focuses on real-life practical experiences. The study's teaching strategies were aligned with the mathematics curriculum for the third elementary grade. The study used the mathematics book (second-semester version) assigned and authorized for third elementary grade by the Jordanian ministry of education. The participants were taught two units only from the curriculum (10th and 11th unit), which were the "time" unit and the "geometry and measurement" unit. The study was conducted for fifty-seven days with a 45-minute daily teaching session.

Moreover, a teacher from the same school was selected who agreed to participate in the study and get the required training to implement both teaching strategies in two different groups. The purpose of choosing a single teacher for both groups is to deliver the same content to both groups but in two other methods. First, the obtained marks of students indicate the pretest performance of the groups (Appendix I). The obtained students' marks indicate the post-test performance of the groups (Appendix II). The difference in their grades shows the difference in impact on both groups. The collected information is statistically analyzed using paired t-tests to identify the differences in both groups.

Results

Initially, the mean, differences of means, and standard deviation of both groups are estimated. Then the independent sample t-test is implemented to assess the significance of the difference between the means of groups. The significance level is 0.05 for pre-and post-tests. Finally, the mean values of the pre-and post-test outcomes are estimated to explore the gain of each group and the comparison of both groups. The analysis is performed using the statistical software SPSS, which extracts the findings of this research. The results are reported in Table 1.

Table 1. Significance of Difference between Mean Scores of Group A and Group B on the pretest

Group	N	Mean	Std. Error of Mean	t-value	
				Calculated T	Sig. (2 Talled)
Group A	40	52.4	0.567	0.325	0.747
Group B	40	52.13	0.668		
G A Pre - G B Pre	D.F	Difference Mean	Std. Error of Mean		
	39	0.27	0.847		

Table 1 indicates the mean scores of Group A (52.4) and Group B (52.13), which are not statistically significant at 0.05 significant levels. Hence, the results indicate no difference in both groups in the pretest results.

Then the post-test is conducted for the scores of the students from their tests achieved after a fifty-seven-day teaching session through a particular teaching strategy for each group. First, the paired t-test is performed for each group individually, i.e. estimating the difference in means of pretest and post-test results of the students of the same groups. Then based on the post-test results of both groups, the paired t-test for the difference in means of both groups is conducted so that their performance can be compared and the impact of each strategy can be highlighted. The results are reported in the following tables. Table 2 reports the results of the paired t-test for the difference in means of the pre-and post-test results of Group A.

Table 2. Significance of Difference between Mean Scores of Group A on pretest and Post-Test Scores

Group	N	Mean	Std. Error of Mean	t-value	
				Calculated T	Sig. (2 Talled)
Group A; pretest	40	52.4	0.567	12.466	0.000
Group A; Post-test Behaviourism Theory	40	61.18	0.395		
G A Pre - G A Post	D.F	Difference Mean	Std. Error of Mean		
	39	8.775	0.704		

Table 2 indicates the mean scores of Group A; pretest (52.4) and post-test (61.18); being taught through teaching strategies following Behaviorist theory, which are statistically significant at 0.05 significant level. Hence, the results indicate that the mean score of Group A significantly differs after being taught through the Behaviorist theory. The results suggest that such a strategy substantially impacts students' learning abilities in inclusive classrooms. Further, Table 3 reports the results of the paired t-test for the difference in means of the pre-and post-test results of Group B.

Table 3. Significance of Difference between Mean Scores of Group B on pretest and Post-test Scores

Group	N	Mean	Std. Error of Mean	t-value	
				Calculated T	Sig. (2 Talled)
Group B; pretest	40	52.13	0.668	20.031	0.000
Group B; Post-test Constructivism Theory	40	72.65	0.691		
G B Pre - G B Post	D.F	Difference Mean	Std. Error of Mean		
	39	20.525	1.025		

Table 3 indicates the mean scores of Group B; pretest (61.18) and post-test; being taught through teaching strategies following Constructivism Theory (72.65), which are found to be statistically significant at 0.05 significant level as the calculated t-value is greater than the table value of t at 0.05 significance level. Hence, the results indicate that the mean score of Group B significantly differs after being taught through the Constructivism Theory. The results suggest that such a strategy is found to have a significant impact on students' learning abilities in inclusive classrooms, which is also indicated by the increase in their mean score, which is greater than the

mean score before the teaching intervention.

Then the same test is conducted to estimate the differences in means of the two groups after the intervention, i.e. Group A being taught by the teaching strategies used under Behaviourism theory and Group B being instructed by the teaching strategies used under Constructivism theory. The results of the post-test are reported in Table 4.

Table 4. Significance of Difference between Mean Scores of Group A and Group B on Post-test

Group	N	Mean	Std. Error of Mean	t-value	
				Calculated T	Sig. (2 Tailed)
Group A; Behaviourism theory	40	61.18	0.395	13.741	0.000
Group B; Constructivism Theory	40	72.65	0.691		
Group A & B	D.F	Difference Mean	Std. Error of Mean		
	39	11.475	0.835		

Table 4 indicates that the means of both groups are different, i.e. Group A has 61.18, and Group B has 72.65. It is also suggested that the difference is also significant at 0.05 level. The results also indicate that the mean score of Group B is greater than that of Group A, who taught using strategies of Behaviourism theories. Hence, the results suggest that the different teaching interventions have various effects on the learning abilities of students having learning disabilities in the inclusive classroom. It can be noted that the mean difference between the pretest and post-test for group A (using a behaviorism-based strategy) is (8.775).

In contrast, the mean difference between the pretest and post-test for group B (using a constructivism-based approach) is (72.65). The mean difference between the two groups is (11.475) in favor of group B (constructivism-based strategy). From the mentioned results, it can be concluded that the two teaching strategies effectively teach students with learning disabilities in an inclusive classroom. However, the effectiveness of the constructivism-based strategy is greater than the behaviorism-based strategy.

Discussion

The findings indicate that although literature reports different beneficial aspects of Behavioristic strategy in inclusive classroom settings (Botha & Kourkoutas, 2016; Doolittle, 2014; Ertmer & Newby, 2013; Harold & Corcoran, 2013; Hickey, 2014; Salend, 2011; Steele, 2005; Zhang et al., 2016) practically, this strategy has not sufficient and desired outcomes, especially for students having disabilities and requiring special education needs, are being taught in inclusive classroom settings. However, constructive strategy is found to have comparatively more positive results in the form of enhancement in students' learning capabilities which is indicated by the improvement in their scores on the test as the mean value of their scores increases from 52.76 to 72.65 which shows a significant difference in their pre-and post-test results. In fact, Constructivism Theory focuses on studying in inclusive classroom settings in which they are provided with a cooperative learning environment and peer tutoring. These results are in line with those of Akpan and Beard (2016), Botha and Kourkoutas (2016), Hickey (2014), Sakarneh and Al-Swelmyeen (2020), Sakarneh and Al-Swelmyeen (2021), Shammari (2019), Shi (2013), Liu and Ju (2010), Lenjani (2016) who argue that constructivist strategies have a positive impact on students' learning in an inclusive classroom. Although behavioral approach focuses on the behavioral management of students with special learning needs, which is, in fact, a critical aspect of these students, the constructivist strategy copes with this by enhancing their interaction with their peers, teachers, and others in their settings which makes them comfortable in that setting and helps them cope with their behavioral issues as well. Hence, the constructive strategy is found to have

more effective results. As this study is focused on comparing both these strategies, the findings indicate that the constructivist strategy is a comparatively better and more effective teaching strategy for students having learning disabilities and requiring special education needs. Hence the results of this study suggest that teachers should provide instructions. Still, they should allow for peer tutoring to develop a constructive and cooperative learning environment in which the instructor is the facilitator for knowledge development among students. This strategy is found to have even better results due to the provision of practical, real-world experiences to students. Hence, this research suggests that teachers in inclusive classrooms should apply the constructivist teaching strategy to help them enhance their students' learning with special learning needs.

However, the results of this study are limited to the conditions and settings in which the study was conducted and cannot be generalized unless the same conditions and settings are employed, especially the method, sample, study tool, and data collection and analysis.

Conclusion

This research aimed to highlight the different aspects of behaviorist and constructivist strategies as practical teaching approaches for students having learning disabilities and requiring special education needs. The pre-and post-test scores of two groups of students, each being studied through different teaching strategies under Behaviorist theory (Group A) and Constructivist theory (Group B), are analyzed, and the information extracted from that analysis indicates that comparing the two strategies the constructivist strategy is found to have better and effective results. Constructivist strategy is introduced to have a positive impact on the learning attitude of students having learning disabilities and found to be comparatively a better approach in inclusive classroom settings, which is indicated by the improvement in the test scores of students being taught by this teaching strategy. The test scores of students in this group have increased difference significantly. On the other hand, the different approach based on the Behaviorist theory has created a difference in the mean scores of the other group. Still, the difference is not as much as the Constructivism theory. Hence, the study's findings indicate that the teaching strategies focusing on students' practical, real-life exposure create a major difference in the learning abilities of students with learning disabilities. In light of the findings of this study, the researchers suggest that institutions providing education to such students should enhance their real-life exposure to different things, which will lead to improved learning abilities. Furthermore, the researchers suggest future research directions focus on teaching and learning theories in inclusive settings, especially constructivism-based strategies.

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Appendix I

Pretest Scores of Each Group

Group A				Group B			
Students	Obtained Marks Out of 100	Students	Obtained Marks Out of 100	Students	Obtained Marks Out of 100	Students	Obtained Marks Out of 100
1	52	21	55	1	47	21	59
2	52	22	46	2	51	22	49
3	52	23	48	3	58	23	51
4	55	24	47	4	55	24	53
5	50	25	51	5	47	25	47
6	52	26	47	6	48	26	53
7	58	27	55	7	47	27	51
8	46	28	52	8	50	28	46
9	57	29	57	9	48	29	57
10	57	30	56	10	53	30	48
11	53	31	50	11	59	31	56
12	51	32	48	12	55	32	56
13	49	33	58	13	59	33	56
14	52	34	58	14	52	34	55
15	56	35	57	15	47	35	52
16	52	36	53	16	58	36	47
17	53	37	55	17	56	37	58
18	49	38	54	18	47	38	49
19	47	39	52	19	50	39	47
20	49	40	55	20	55	40	53

Appendix II

Post-test Scores of Each Group

Group A				Group B			
Students	Obtained Marks Out of 100	Students	Obtained Marks Out of 100	Students	Obtained Marks Out of 100	Students	Obtained Marks Out of 100
1	61	21	65	1	77	21	67
2	61	22	65	2	72	22	73
3	58	23	63	3	80	23	66
4	65	24	57	4	72	24	69
5	59	25	62	5	76	25	71
6	64	26	58	6	68	26	74
7	63	27	61	7	70	27	78
8	60	28	62	8	72	28	68
9	56	29	63	9	80	29	80
10	62	30	60	10	68	30	74
11	60	31	61	11	69	31	68
12	62	32	58	12	66	32	67
13	65	33	59	13	70	33	76
14	65	34	58	14	75	34	68
15	62	35	60	15	73	35	69
16	62	36	59	16	75	36	71
17	63	37	62	17	74	37	79
18	64	38	63	18	76	38	77
19	60	39	62	19	80	39	78
20	61	40	56	20	68	40	72