Using Concept Mapping to Enhance Reception and Setting Skills of Students with Autism at Al-Sabtain Academy

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Abstract

This study examined the effect of using the concept mapping strategy in teaching the skills of reception and preparation in volleyball for students at Al-Sabtain Academy for Autism. The idea of the research came from the need to apply modern teaching methods that help students connect and organize information instead of only receiving it. The study aimed to prepare educational units based on concept mapping and to identify their effect on learning these skills. The researcher used the experimental method with two similar groups, applying pre- and post-tests to measure the development of performance. The participants were chosen from students enrolled at the academy. After analyzing the data, the results showed a clear improvement in the students' level of learning and performance for both reception and preparation skills. The researcher concluded that the use of concept mapping had a positive influence on understanding and applying the skills in a practical way. It is recommended to use this method in similar educational environments to help students with autism improve their learning and skill performance more effectively.

Keywords : Concept Mapping, Autism, Reception Skills, Preparation Skills, Educational Strategy

1. INTRODUCTION

Over recent decades, educational paradigms have shifted profoundly as schools strive to address the evolving demands of the information age (Zhao (赵勇) & Zhong (仲若君), 2025). Traditional instructional methods that rely primarily on rote memorization and passive learning are increasingly considered insufficient for fostering the critical thinking, problem-solving, and practical skills needed by learners today (Javed & Pattoki, 2023) . In contrast, active learning strategies, which engage students in constructing and organizing knowledge, have gained prominence for enabling more meaningful learning outcomes.

Students with autism spectrum disorder (ASD) often face additional obstacles in acquiring new skills due to differences in communication, processing, and understanding of abstract relationships (Gomot & Wicker, 2012). These challenges underscore the necessity for teaching strategies that are visually oriented, structured, and designed to support conceptual understanding (Van Breukelen et al., 2017). One such strategy, concept mapping, has been shown to be effective in enhancing comprehension and performance among ASD learners (Jackson & Hanline, 2020). For example, found that concept mapping integrated into science lessons produced nearly four times greater gains on subject-specific assessments for pupils with ASD compared to conventional teaching methods (Roberts & Joiner, 2007). Similarly, (Koçak & Sari, 2021) demonstrated the effectiveness of semantic concept maps in helping students with ASD grasp thematic life-studies concepts more successfully than without such visual tools.

Despite this evidence, there remains a scarcity of research exploring the use of concept mapping in

teaching motor skills—particularly reception and preparation skills in volleyball—to students with autism. Given the importance of these physical skills in both athletic and social domains, this gap is significant. Therefore, the present study aims to (1) design and implement instructional units using the concept mapping strategy targeted at reception and preparation skills in volleyball for students with ASD, and (2) measure the impact of this strategy on learning outcomes. Ultimately, the study seeks to offer practical guidance to educators on how to foster a more active and meaningful learning environment for students with autism through structured, visual pedagogical tools.

2. METHODOLOGY

Selecting an appropriate research method was a crucial step in ensuring the success and validity of this study. The research method defines the systematic procedures employed to collect data, analyze results, and draw conclusions that address the study's central objectives. In this investigation, the experimental method was adopted because it provides a structured framework for examining the effects of specific teaching strategies on students' performance while controlling for extraneous variables. This approach enables the establishment of cause-and-effect relationships between the intervention and the observed outcomes.

The experimental design consisted of two equivalent groupsan experimental group and a control group each subjected to both pre-tests and post-tests. The experimental group received instruction through educational units developed using the concept mapping strategy, whereas the control group continued learning through the conventional teaching methods commonly applied by teachers at *Al-Sabtain Academy for Autism* in Karbala. The comparative analysis of both groups' performance before and after the intervention allowed the researcher to accurately determine the influence of the concept mapping strategy on students' learning outcomes.

Furthermore, the methodology encompassed detailed descriptions of the research setting, participant characteristics, sampling procedures, data collection tools, and the statistical techniques employed in the analysis. These elements were systematically presented to ensure transparency, reproducibility, and academic rigor. By adhering to a descriptive and objective academic reporting style, the study aimed to maintain clarity, precision, and methodological soundness throughout the research process.

3. RESULTS AND DISCUSSION

RESULTS

Results for the Control Group

The results presented in Table 1 summarize the mean values, standard deviations, and *t*-test results for the assessment of reception and preparation skills among the control group during the pre-test and post-test measurements.

In the reception skill, the mean and standard deviation in the pre-test were 2.29 and 0.57, respectively, while in the post-test they were 3.32 and 0.99. The calculated *t*-value was 1.33, which is less than the tabulated value of 2.10 at a significance level of 0.05 with 19 degrees of freedom, indicating no statistically significant difference between the two measurements.

For the preparation skill, the mean and standard deviation in the pre-test were 2.13 and 0.68, respectively, and in the post-test they were 3.26 and 0.97. The calculated *t*-value of 1.46 was also below the tabulated value of 2.10 at the same significance level, confirming the absence of a significant difference between the pre-test and post-test means (Alzuwaini, 2024).

These findings indicate that the traditional teaching methods employed by instructors at *Al-Sabtain Academy for Autism* did not significantly enhance the acquisition of reception and preparation skills in volleyball among the control group participants. The limited improvement observed can be attributed to the conventional instructional approach, insufficient repetition of exercises, and the lower cognitive and motor abilities of the students compared with their typically developing peers.

Table 1. Mean, Standard Deviation, and *t*-Test Values for Reception and Preparation Skills in the Control Group

No.	Variables	Unit of Measurement	Pre-Test (x)	SD (s)	Post-Test (x)	SD (s)	Difference	Calculated t-Value	Sig
1	Transmission and Reception Performance Evaluation	Degree	2.29	0.57	3.32	0.99	1.03	1.33	0.069
2	Setup Performance Evaluation	Degree	2.13	0.68	3.26	0.97	1.13	1.46	0.055

Results for the Experimental Group

Table 2 illustrates the differences between the pre-test and post-test results for the experimental group in the volleyball reception and preparation skills.

For the reception skill, the mean and standard deviation in the pre-test were 2.33 and 0.65, respectively, while in the post-test they were 5.67 and 1.58. The calculated *t*-value was 7.77, which exceeds the tabulated value of 2.10 at the 0.05 significance level with 19 degrees of freedom, indicating a statistically significant improvement in reception skills.

Regarding the preparation skill, the mean and standard deviation in the pre-test were 1.77 and 0.66, respectively, while in the post-test they were 5.54 and 1.73. The calculated *t*-value of 8.11, greater than the tabulated value of 2.10, confirms a significant enhancement in preparation skill performance.

These findings clearly demonstrate that the concept mapping strategy had a substantial positive impact on learning and skill acquisition in volleyball among students with autism.

Table 2. Mean, Standard Deviation, and *t*-Test Values for Reception and Preparation Skills in the Experimental Group

No.	Variables	Unit of Measurement	Pre-Test (x)	SD (s)	Post-Test (x)	SD (s)	Difference	Calculated t Value	Sig
1	Transmission and Reception Performance Evaluation	Degree	2.33	0.65	5.67	1.58	3.34	7.77	0.00
2	Setup Performance Evaluation	Degree	1.77	0.66	5.54	1.73	3.77	8.11	0.00

Comparison Between the Control and Experimental Groups

Table 3 presents the differences in post-test results between the control and experimental groups for the two studied variables: reception and preparation skills.

The statistical analysis revealed significant differences at the 0.05 level in favor of the experimental group for both variables. The experimental group, which was taught using the concept mapping strategy, outperformed the control group, which received instruction through traditional methods.

Table 3. Post-Test Comparison Between Control and Experimental Groups

No.	Variables	Unit of Measurement	Control Group (x)	SD (s)	Experimental Group (x)	SD (s)	t Value	Sig
1	Transmission and Reception Performance Evaluation	Degree	3.32	0.99	5.67	1.58	3.66	0.00
2	Setup Performance Evaluation	Degree	3.26	0.97	5.54	1.73		

DISCUSIION

Based on the statistical results, it can be concluded that the use of the concept mapping strategy led to a significant improvement in both reception and preparation volleyball skills among students in the experimental group. The superiority

of this group is attributed to the structured and visual nature of concept mapping, which helped learners with autism organize knowledge, clarify relationships between concepts, and apply them effectively in skill performance.

The visual framework provided by concept maps enhanced the learners' comprehension of volleyball techniques and sequences, thereby increasing their motivation, collaboration, and social interaction within the learning environment (Albalawi et al., 2023). Educational situations that demand analysis and interpretation rely heavily on cognitive abilities such as comprehension, recall, and critical thinking. As many theorists suggest, knowledge represents a synthesis of mental abilities—study, imagination, and understanding—that form the foundation of learning and conceptual development. Teachers' cognitive engagement with students who have special needs directly influences their confidence, motivation, and capacity to acquire skills effectively.

The researcher also observed noticeable improvements in movement accuracy and error reduction among students in the experimental group. This progress was facilitated by the visual and conceptual aids embedded in the concept mapping strategy, which allowed learners to create mental representations of correct techniques and adjust their own performance accordingly. These findings are consistent who emphasized that visual and printed models assist learners in identifying mistakes and refining responses (Van Breukelen et al., 2017). Similarly, highlighted that effective teaching methods should stimulate students' interest, encourage participation, respect individual differences, and align with cognitive processes— factors that collectively enhance learning motivation and achievement (Adegbija & Fakomogbon, 2013; Adewale et al., 2024).

4. CONCLUSION AND RECOMMENDATIONS

Based on the research procedures and the results of data analysis, it can be concluded that the use of the concept mapping strategy had a significant positive impact on learning volleyball skills among students at *Al-Sabtain Academy for Autism*. Specifically, teaching through concept mapping led to marked improvements in both reception and preparation skills, demonstrating its effectiveness in enhancing understanding and performance among learners with autism. The experimental group that received instruction through this strategy outperformed the control group, indicating that concept mapping provides a clearer and more structured framework for acquiring technical and cognitive components of volleyball. This approach not only facilitated skill acquisition but also fostered motivation, engagement, and social interaction during the learning process.

In light of these findings, several recommendations are proposed. Teachers at *Al-Sabtain Academy for Autism* are encouraged to adopt the concept mapping strategy in their instructional practices, given its proven effectiveness in developing reception and preparation skills. Furthermore, future studies should extend the investigation of this strategy to larger and more diverse samples, including individuals with various disabilities across Iraq, to validate and generalize the results. It is also recommended that teacher training programs in special education institutions include professional development on the design and implementation of concept mapping strategies under the supervision of qualified trainers. Lastly, challenges encountered by teachers in applying concept mapping—particularly those related to complex technical skills—should be identified and systematically addressed to ensure the strategy's successful and sustainable integration into the teaching and learning process.

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