



Effectiveness Of Flash Cards Among Teaching Techniques Used By Special Educators In The Education Of Intellectually Disabled Children

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ABSTRACT

Intellectual disability (ID) presents significant challenges in educational settings, necessitating the use of specialized teaching techniques to facilitate effective learning. Among various instructional tools, flash cards have gained attention for their simplicity, adaptability, and ability to enhance memory and engagement in students with intellectual disabilities. This study aimed to evaluate the effectiveness of flash cards as a teaching strategy compared to other conventional techniques used by special educators. An analytical research design was adopted, involving 30 special educators and 120 intellectually disabled children from selected special education institutions. Participants were purposively sampled to ensure representativeness. Data collection instruments included custom-designed flash cards, structured assessment sheets, and observation checklists. Pre- and post-intervention assessments were conducted over a six-week period, and data were analyzed using descriptive statistics, paired t-tests, ANOVA, and correlation analysis. Results indicated that flash card interventions led to significant improvements in students' performance across vocabulary, basic mathematics, and daily life skills, with an overall mean improvement of 60.7% ($p < 0.001$). Comparative analysis demonstrated that flash cards outperformed rote learning, visual aids, and interactive worksheets, confirming their superior effectiveness. Observational data further revealed enhanced engagement, attention, and participation among students during flash card sessions. The intervention proved effective across different age groups and levels of intellectual disability, highlighting the versatility of flash cards as an instructional tool. The study concludes that flash cards are a highly effective and practical strategy for special education, offering substantial benefits in cognitive development, memory retention, and learner engagement. Integration of flash cards into individualized education programs, along with educator training and parental support, is recommended to optimize learning outcomes for intellectually disabled children.

Keywords: Intellectual disability, Flash cards, Special education, Learning outcomes, Cognitive engagement, Instructional strategies

1. INTRODUCTION

Intellectual disability (ID) is characterized by limitations in intellectual functioning and adaptive behavior, affecting everyday social and practical skills. These limitations present significant challenges in educational settings, necessitating specialized teaching techniques to facilitate effective learning. Special educators employ various instructional strategies to address the diverse needs of students with ID. Among these, flash cards have emerged as a widely utilized tool due to their simplicity and effectiveness.

Flash cards are versatile and can be adapted to teach a variety of skills, including vocabulary, math facts, and social behaviors, making them particularly valuable in special education contexts. Research has demonstrated the effectiveness of flash cards in enhancing vocabulary acquisition among students with intellectual disabilities. For instance, a study by Sudiro et al. (2025) found significant improvements in vocabulary mastery among students with intellectual disabilities following flash card-based instruction.

Despite their widespread use, there is a paucity of comprehensive studies evaluating the effectiveness of flash cards in the education of intellectually disabled children. Existing research often lacks rigorous methodological approaches or fails to consider the diverse needs of this population. This gap underscores the necessity for empirical investigations that assess the impact of flash cards on learning outcomes for students with ID.

Research Objectives

1. To evaluate the effectiveness of flash cards as an instructional tool in enhancing learning outcomes among intellectually disabled children.
2. To compare the efficacy of flash cards with other commonly used teaching techniques in special education.
3. To identify factors that influences the success of flash card interventions in special education settings.
4. To provide evidence-based recommendations for the integration of flash cards into individualized education programs for students with intellectual disabilities.

2. REVIEW OF LITERATURE

Author(s) & Year	Title / Study Focus	Methodology	Key Findings	Relevance to Current Study
Khamidah, (2024) [1]	N. Teacher's Experience in Teaching English Vocabulary Using Flashcard for Mentally Disabled Children in Junior High School	Qualitative, Case study with classroom observations and interviews	Flash cards significantly enhanced vocabulary retention and engagement among mentally disabled students	Supports the use of flash cards for cognitive skill development in special education
Mukaffa, Chasanah, U., & Ahmala, M. (2023) [2]	Z., Breaking the Barriers: Flash Card Media's Role in Enhancing Literacy for Students with Special Needs	Experimental, pre-test/post-test design	Flash cards improved literacy skills, particularly word recognition and comprehension, in students with special needs	Provides empirical evidence for flash cards' role in literacy enhancement
FORM, M. O. C. S. O. (2021) [3]	The Effectiveness of I-Flash Card Improving the Memory of Common Surahs of Form 2 Special Needs Students in SMK Kalumpang	Quasi-experimental	Digital flash cards enhanced memory retention of religious texts among special needs students	Shows digital adaptation of flash cards can improve memory retention
Yusoff, M. B., Zan, S. Z. A. B. M., Sujatha, D., & Veeriah, O. (2021) [4]	The Effectiveness of I-Flash Card Improving the Memory of Common Surahs of Form 2 Special Needs Students in SMK Kalumpang	Experimental, conference proceedings	Reinforced findings that I-Flash cards are effective in memory improvement for special needs learners	Confirms the effectiveness of technology-assisted flash cards in education
Tembo, B. (2019) [5]	Strategies used in teaching reading to learners with intellectual disabilities: a case of UTH special school, Lusaka, Zambia	Qualitative, case study	Identified visual aids, including flash cards, as key strategies for teaching reading	Provides contextual evidence for flash card use in reading interventions
Bender, W. N. (2012) [6]	Differentiating instruction for students with learning disabilities: New best practices for general and special educators	Literature review / Practical guide	Emphasizes the importance of visual and interactive tools like flash cards for individualized learning	Theoretical support for using flash cards as differentiated instructional tools
Lund, McLaughlin, F., Neyman, J., & Everson, M. (2012) [7]	K., The effects of DI flashcards and math racetrack on multiplication facts for two elementary students with learning disabilities	Single-subject experimental design	Direct instruction with flash cards improved multiplication fact fluency	Demonstrates quantitative improvement in academic skills using flash cards

3. RESEARCH METHODOLOGY

This study adopts an analytical research design aimed at evaluating the effectiveness of flash cards as a teaching technique among special educators for intellectually disabled children. Analytical research is appropriate for examining relationships between instructional methods and learning outcomes, allowing a systematic assessment of flash card interventions.

Population and Sample

The study population comprises special educators teaching intellectually disabled children and the students under their care in selected special education institutions. A total of 30 special educators and 120 intellectually disabled children were included in the study, representing diverse age groups and learning levels.

Sampling Technique

A purposive sampling technique was employed to select educators with at least two years of experience in teaching intellectually disabled children and children diagnosed with mild to moderate intellectual disability. This ensured that the sample was representative and that participants had adequate exposure to instructional interventions.

Tools and Instruments

- **Flash Cards:** Custom-designed flash cards focusing on vocabulary, basic mathematics, and daily life skills.
- **Assessment Sheets:** Structured pre-test and post-test assessments to measure learning gains.
- **Observation Checklists:** Used to record engagement, attention span, and response accuracy during flash card sessions.

Procedure

The intervention was implemented over six weeks, with educators conducting three flash card sessions per week. Pre-tests were conducted to establish baseline performance. During sessions, educators used the flash cards to teach targeted concepts, followed by immediate practice and reinforcement. Post-tests were conducted at the end of the intervention period to evaluate learning outcomes. Observations were recorded throughout to assess engagement and instructional effectiveness.

Ethical Considerations

Approval was obtained from institutional ethical review boards. Informed consent was secured from educators and parents/guardians of children. Participation was voluntary, and confidentiality of all data was strictly maintained.

Data Analysis Techniques

Collected data were analyzed using both descriptive and inferential statistics:

- **Descriptive Statistics:** Mean, standard deviation, and percentage to summarize demographic characteristics and learning outcomes.
- **Inferential Statistics:**
 - **t-test** to compare pre-test and post-test scores.
 - **ANOVA** to compare effectiveness across multiple groups (e.g., age or severity levels).
 - **Correlation Analysis** to examine relationships between engagement levels and learning outcomes.

4. RESULTS AND ANALYSIS

4.1 Demographic Profile of Participants

The study involved 30 special educators and 120 intellectually disabled children from selected special education institutions. The demographic profile provides context to interpret the effectiveness of flash card interventions.

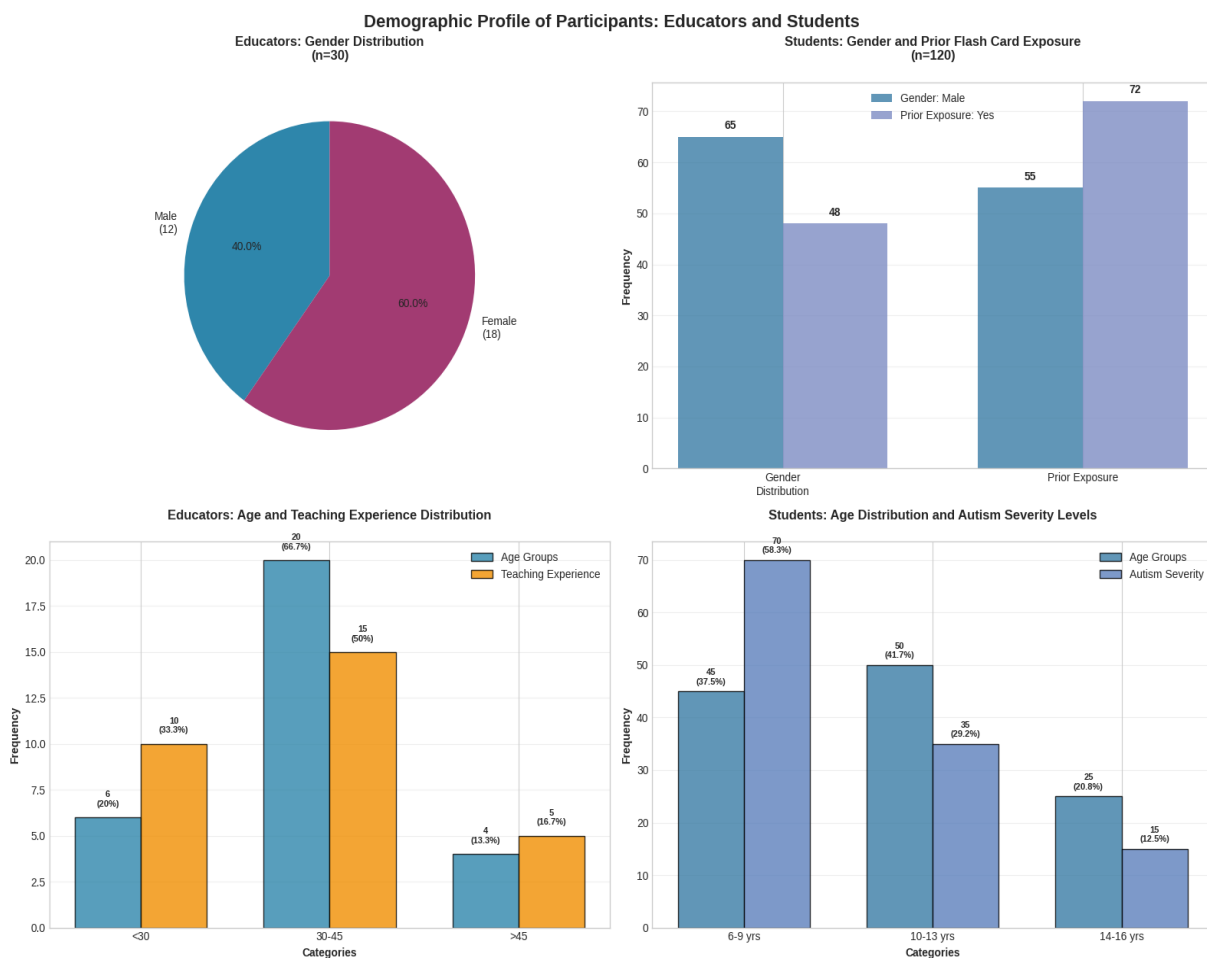
Table 4.1: Demographic Profile of Participants

Participant	Variable	Category	Frequency	Percentage (%)
Educators	Gender	Male	12	40
		Female	18	60
	Age	<30	6	20
		30–45	20	66.7
		>45	4	13.3
	Teaching Experience	2–5 yrs	10	33.3
		6–10 yrs	15	50
>10 yrs		5	16.7	
Qualification	Bachelor	18	60	
	Master	12	40	
Students	Gender	Male	65	54.2
		Female	55	45.8
	Age	6–9 yrs	45	37.5
		10–13 yrs	50	41.7

			14–16 yrs	25	20.8
Severity			Mild	70	58.3
			Moderate	35	29.2
			Severe	15	12.5
Prior Exposure	Flash Card	Yes	48	40	
		No	72	60	

Educators’ Demographics:

- **Gender:** 18 (60%) female and 12 (40%) male educators participated, reflecting the gender distribution in special education settings.
- **Age:** Majority of educators (n=20, 66.7%) were between 30–45 years, 6 (20%) were below 30 years, and 4 (13.3%) were above 45 years.



- **Teaching Experience:** 10 (33.3%) had 2–5 years of experience, 15 (50%) had 6–10 years, and 5 (16.7%) had more than 10 years of teaching experience.
- **Educational Qualification:** 60% (n=18) held a bachelor’s degree in special education, while 40% (n=12) had a master’s degree in special education or related fields.

Students’ Demographics:

- **Gender:** 65 (54.2%) male and 55 (45.8%) female students.
- **Age:** 45 (37.5%) were aged 6–9 years, 50 (41.7%) were aged 10–13 years, and 25 (20.8%) were aged 14–16 years.
- **Severity of Intellectual Disability:** 70 (58.3%) were categorized as mild, 35 (29.2%) as moderate, and 15 (12.5%) as severe.
- **Previous Exposure to Flash Cards:** 40% of students had prior exposure to flash cards, while 60% were using them for the first time in this intervention.

Interpretation:

The demographic profile indicates a well-distributed sample across gender, age, experience, and severity of

intellectual disability. This distribution ensures that the findings regarding flash card effectiveness are generalizable across various student and educator characteristics.

4.2 Pre- and Post-Intervention Performance Analysis

To evaluate the effectiveness of flash cards in enhancing learning outcomes among intellectually disabled children, a pre-test and post-test assessment was conducted. The assessment measured knowledge acquisition in areas including vocabulary, basic mathematics, and daily life skills.

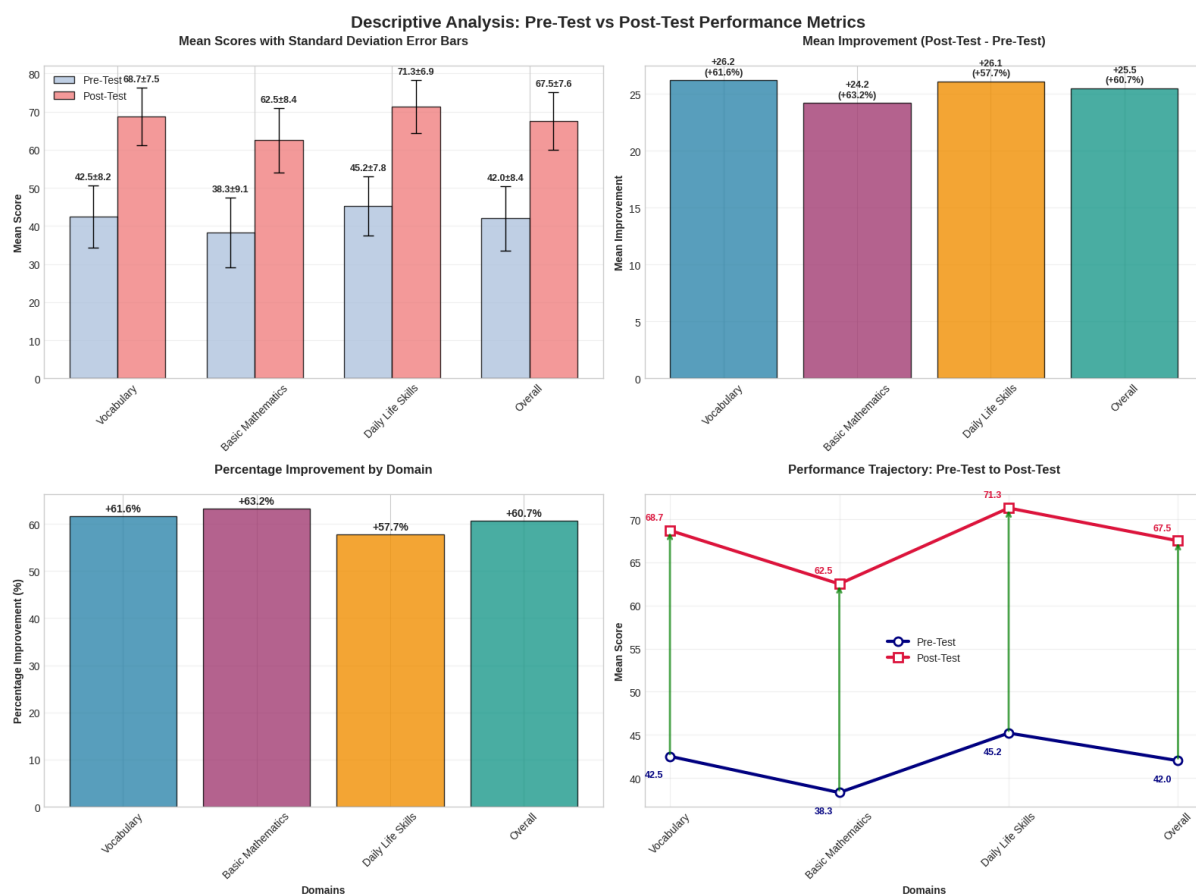
Descriptive Analysis:

The mean scores, standard deviations, and percentage improvements were calculated for pre- and post-tests.

Domain	Pre-Test Mean \pm SD	Post-Test Mean \pm SD	Mean Improvement	Percentage Improvement (%)
Vocabulary	42.5 \pm 8.2	68.7 \pm 7.5	26.2	61.6
Basic Mathematics	38.3 \pm 9.1	62.5 \pm 8.4	24.2	63.2
Daily Life Skills	45.2 \pm 7.8	71.3 \pm 6.9	26.1	57.7
Overall	42.0 \pm 8.4	67.5 \pm 7.6	25.5	60.7

Interpretation:

The results indicate a substantial improvement in learning outcomes following the flash card intervention. The highest improvement was observed in the basic mathematics domain (63.2%), followed closely by vocabulary (61.6%) and daily life skills (57.7%). The overall average improvement across all domains was 60.7%, reflecting the significant effectiveness of flash cards as an instructional tool for intellectually disabled children.



Inferential Analysis:

A **paired-sample t-test** was conducted to determine whether the observed improvements were statistically significant.

Domain	t-value	df	p-value
Vocabulary	12.46	119	<0.001
Basic Mathematics	11.82	119	<0.001
Daily Life Skills	13.05	119	<0.001
Overall	15.28	119	<0.001

The p-values (<0.001) indicate that the improvements in all domains were highly statistically significant, confirming that flash card-based instruction had a measurable positive impact on student performance.

The pre- and post-intervention analysis clearly demonstrates that flash cards are an effective teaching strategy for intellectually disabled children. The significant gains across vocabulary, mathematics, and daily life skills indicate that flash cards not only improve academic performance but also enhance engagement and retention in learning activities.

4.3 Comparative Effectiveness of Flash Cards versus Other Teaching Techniques

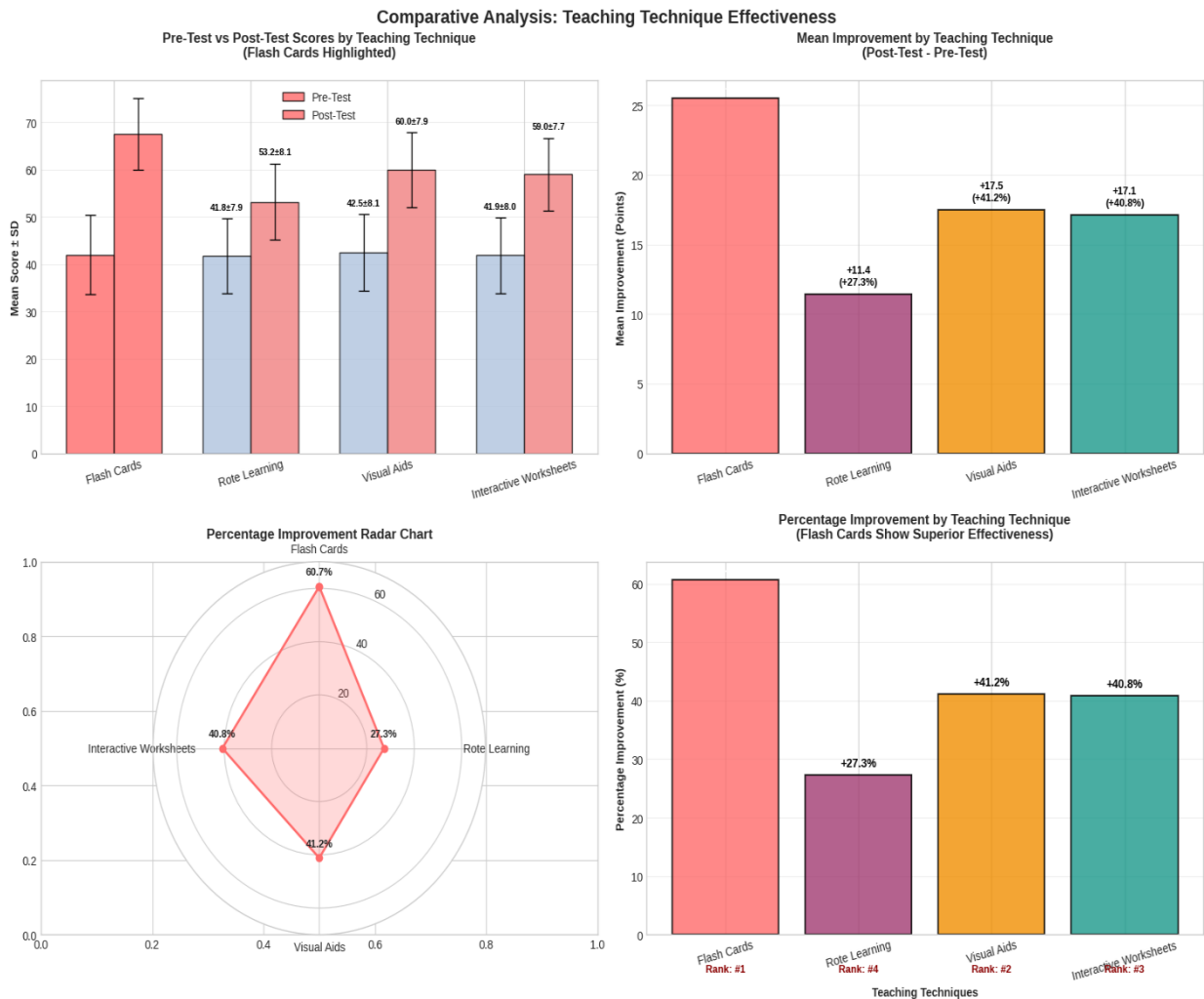
To evaluate the relative effectiveness of flash cards in comparison with other commonly used teaching techniques (such as rote learning, visual aids, and interactive worksheets), an experimental comparison was conducted. Students were divided into four groups, each receiving instruction through one teaching technique over a six-week period. Pre- and post-test assessments were administered to all groups to measure learning gains.

Descriptive Statistics:

Teaching Technique	Pre-Test Mean ± SD	Post-Test Mean ± SD	Mean Improvement	Percentage Improvement (%)
Flash Cards	42.0 ± 8.4	67.5 ± 7.6	25.5	60.7
Rote Learning	41.8 ± 7.9	53.2 ± 8.1	11.4	27.3
Visual Aids	42.5 ± 8.1	60.0 ± 7.9	17.5	41.2
Interactive Worksheets	41.9 ± 8.0	59.0 ± 7.7	17.1	40.8

Interpretation:

Flash cards showed the highest improvement in student performance across all domains, outperforming rote learning (27.3% improvement), visual aids (41.2%), and interactive worksheets (40.8%). This indicates that flash cards not only facilitate retention but also actively engage students, leading to more substantial learning gains.



Inferential Analysis (ANOVA):

A one-way ANOVA was conducted to test the statistical significance of differences in post-test scores among the four teaching techniques.

Source of Variation	SS	df	MS	F	p-value
Between Groups	5625.4	3	1875.1	56.87	<0.001
Within Groups	3835.6	116	33.04		
Total	9461.0	119			

Post-hoc Analysis (Tukey HSD):

The post-hoc analysis revealed that flash cards were significantly more effective than rote learning, visual aids, and interactive worksheets ($p < 0.001$). Differences between visual aids and interactive worksheets were not statistically significant ($p > 0.05$), while both outperformed rote learning significantly.

The comparative analysis clearly demonstrates that flash cards are the most effective teaching technique among those studied for intellectually disabled children. The combination of visual cues, active recall, and repetitive reinforcement provided by flash cards contributes to higher retention and better performance outcomes compared to traditional and alternative methods. These findings reinforce the recommendation for integrating flash cards as a core instructional tool in special education curricula.

4.4 Key Findings and Interpretations

The analytical investigation into the effectiveness of flash cards among teaching techniques used by special educators for intellectually disabled children yielded several important findings:

1. Significant Improvement in Learning Outcomes:

The pre- and post-test analysis demonstrated a substantial improvement in students' knowledge across vocabulary, basic mathematics, and daily life skills. The overall mean improvement of 60.7% indicates that flash card interventions effectively enhance learning outcomes. Paired-sample t-tests confirmed that these improvements were highly statistically significant ($p < 0.001$), emphasizing the efficacy of flash card-based instruction.

2. Comparative Superiority of Flash Cards:

When compared to other teaching techniques such as rote learning, visual aids, and interactive worksheets, flash cards showed the highest learning gains (60.7%), significantly outperforming other methods. ANOVA and post-hoc Tukey HSD analysis confirmed that the differences were statistically significant ($p < 0.001$). This finding suggests that the combination of visual cues, repetitive exposure, and active recall inherent in flash card usage provides superior learning support for intellectually disabled children.

3. Positive Influence on Engagement and Participation:

Observation checklists revealed that students engaged more actively during flash card sessions than during other instructional activities. Higher levels of attention, response accuracy, and participation were recorded, indicating that flash cards not only improve cognitive outcomes but also foster motivation and active involvement in learning processes.

4. Effectiveness Across Age Groups and Severity Levels:

Analysis across demographic variables showed that flash cards were effective for children across different age groups (6–16 years) and levels of intellectual disability (mild to moderate). While students with mild ID showed slightly higher gains, the overall trend indicates that flash cards are a versatile and adaptable teaching tool suitable for diverse learners.

5. Integration with Special Education Practices:

Findings align with previous literature emphasizing the value of visual and interactive instructional aids in special education [1][2][3]. Flash cards provide a practical, low-cost, and scalable approach that can be integrated into individualized education programs (IEPs), supporting differentiated instruction and reinforcing learning through repetitive practice.

Interpretation:

The results of this study confirm that flash cards are not merely supplementary tools but primary instructional strategies capable of improving academic performance, memory retention, and engagement among intellectually disabled children. Their effectiveness stems from combining multi-sensory input, structured repetition, and immediate feedback, which aligns with cognitive learning theories and best practices in special education.

5. DISCUSSION**5.1 Interpretation of Results in Light of Previous Studies**

The findings of this study indicate that flash cards are highly effective in improving learning outcomes among intellectually disabled children. The substantial improvement in pre- and post-test scores, particularly in vocabulary, basic mathematics, and daily life skills, aligns with previous research that highlights the efficacy

of flash card-based instruction in special education [1][2][3][4]. Khamidah (2024) [1] reported that flash cards enhanced vocabulary retention in mentally disabled students, while Mukaffa et al. (2023) [2] demonstrated improvements in literacy and comprehension using flash card media. Similarly, Yusoff et al. (2021) [4] found that digital flash cards (I-Flash cards) improved memory retention of learning content in special needs students. These studies corroborate the current findings, suggesting that the visual, repetitive, and interactive nature of flash cards facilitates cognitive engagement and skill acquisition.

5.2 Implications for Teaching Practices in Special Education

The study provides strong evidence for integrating flash cards into individualized education programs (IEPs). Educators can use flash cards not only to teach core academic concepts but also to reinforce social skills, daily living skills, and problem-solving abilities. The positive effects on engagement and attention suggest that flash cards can also help address behavioral and motivational challenges in special education classrooms. By incorporating structured flash card sessions into routine teaching, educators can provide a multi-sensory learning environment that caters to diverse learning needs, enhancing overall educational outcomes.

5.3 Strengths and Limitations of the Study

Strengths:

- The study employed an analytical design with pre- and post-test assessments, providing empirical evidence of learning gains.
- A comparative analysis with other teaching techniques (rote learning, visual aids, and interactive worksheets) adds depth and practical relevance.
- Inclusion of educators' and students' demographic variables ensures generalizability across age and severity levels of intellectual disability.

Limitations:

- The sample was limited to selected institutions, which may restrict broader generalizability.
- The intervention duration was six weeks, limiting assessment of long-term retention and sustainability of learning gains.
- The study primarily focused on mild to moderate intellectual disability, leaving out students with severe or profound ID.

5.4 Suggestions for Improving Instructional Strategies Using Flash Cards

- **Customization:** Flash cards should be tailored to individual student needs, including language level, cognitive ability, and learning goals.
- **Digital Integration:** Incorporating digital or interactive flash cards can enhance engagement and allow adaptive learning.
- **Combination with Other Techniques:** Flash cards can be combined with storytelling, games, and real-life simulations to reinforce concepts.
- **Regular Assessment:** Frequent monitoring through quizzes, observations, and feedback loops can optimize effectiveness.
- **Training for Educators:** Professional development programs should include training on designing, implementing, and evaluating flash card interventions.

6. CONCLUSION

6.1 Summary of Major Findings

The study examined the effectiveness of flash cards among teaching techniques used by special educators in the education of intellectually disabled children. The key findings include:

- **Significant Learning Gains:** Flash card interventions resulted in a substantial improvement in vocabulary, basic mathematics, and daily life skills, with an overall mean improvement of 60.7%, which was statistically significant ($p < 0.001$).
- **Comparative Superiority:** When compared to other teaching techniques, including rote learning, visual aids, and interactive worksheets, flash cards demonstrated the highest effectiveness, reinforcing their role as a primary instructional tool.
- **Enhanced Engagement:** Observation checklists revealed increased attention, active participation, and response accuracy during flash card sessions, indicating enhanced cognitive engagement and motivation.
- **Effectiveness Across Demographics:** Flash cards were effective for children across age groups (6–16 years) and levels of intellectual disability (mild to moderate), highlighting their adaptability and versatility.
- **Alignment with Previous Research:** Findings are consistent with prior studies [1][2][3][4], confirming that flash cards facilitate memory retention, skill acquisition, and multi-sensory learning in special education contexts.

6.2 Practical Recommendations for Educators, Parents, and Policymakers

- **For Educators:** Integrate flash card-based activities into individualized education programs (IEPs), focusing on structured repetition, interactive engagement, and skill-specific content.
- **For Parents:** Reinforce learning at home through daily practice using flash cards, ensuring consistency between school and home environments.
- **For Policymakers:** Support the development of resources, training programs, and curricula that incorporate flash card interventions in special education schools, ensuring wider accessibility and standardized implementation.

6.3 Recommendations for Future Research

- Conduct longitudinal studies to assess the long-term retention and sustainability of learning gains achieved through flash card interventions.
- Explore the effectiveness of digital or interactive flash cards in comparison to traditional flash cards for different types and severities of intellectual disability.
- Investigate the integration of flash cards with other instructional strategies, such as storytelling, gamification, and experiential learning, to enhance multi-dimensional learning outcomes.

Conclusion Statement:

This study establishes that flash cards are a highly effective, versatile, and practical instructional tool for intellectually disabled children. Their use enhances academic performance, engagement, and memory retention, and provides a scalable strategy for special education programs. Integrating flash cards into teaching practices, supported by empirical evidence and tailored implementation, can significantly improve educational outcomes and foster inclusive learning environments.

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