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THE EFFECT OF DIRECTED MOTOR EDUCATION ON THE MOTOR PROFILE OF CHILDREN WITH MILD INTELLECTUAL DISABILITIES

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ABSTRACT

This study aims to identify the effect of directed motor education on improving the motor profile of children with mild intellectual disabilities through the application of a directed motor program based on the principles of adapted motor education. The experimental method was applied using a design with an experimental and a control group. The sample consisted of twenty-six (26) children aged between six and seven years, equally divided into two homogeneous groups. The experimental group participated in a directed motor education program that included twenty-four (24) instructional units, at a rate of two sessions per week, focusing on developing the components of the motor profile (balance, agility, and coordination). The results revealed statistically significant differences ($p \leq 0.05$) in favor of the experimental group in all studied motor variables, confirming the effectiveness of directed motor education in improving basic motor abilities among children with mild intellectual disabilities. The study recommends the generalization of such programs in specialized institutions, as they contribute to the development of motor performance and the psychological and social integration of this group.

Key words: Directed motor education, Motor profile, Mild intellectual disability

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INTRODUCTION

Motor education is a pedagogical process that integrates the physical, cognitive, and emotional dimensions of development. It views movement not merely as a biological necessity but as an educational tool that fosters awareness, learning, and adaptation (Maicas-Pérez et al., 2024). When adapted and directed, motor education becomes a developmental and therapeutic approach that assists children with disabilities in overcoming psychomotor delays and acquiring essential motor skills (Kavanagh et al., 2023).

Children with mild intellectual disabilities typically experience deficits in coordination, balance, and agility that hinder their participation in physical and social activities (Wuang et al., 2009). These limitations underscore the importance of creating structured motor programs tailored to their abilities. Directed motor education offers such structure, providing progressive, guided, and individualized movement experiences that promote psychomotor development (Karakaş et al., 2024; Ozkan & Kale, 2021).

International research has demonstrated the effectiveness of such programs. Maicas-Pérez et al. (2024) found that structured motor activities improve coordination and overall fitness in children with developmental disorders. Karakaş, Eroğlu Kolayiş & Bayazıt (2024) observed that adapted programs enhance static and dynamic balance. Ozkan & Kale (2021) reported improvements in both coordination and psychosocial well-being.

In the Arab and Algerian context, similar evidence exists. Belkheyr & Bensabeur (2022) demonstrated that adapted sports activities enhance self-esteem and social integration among people with disabilities. Ben Dali (2021) found significant improvement in coordination among children with mild intellectual disabilities following a motor education program. Benyekhlef (2022) confirmed that adapted motor activities enhance basic motor skills and psychosocial adjustment in Algerian special-education institutions.

These converging findings confirm the value of directed motor education as an educational and rehabilitative approach that strengthens the motor profile—the integrated set of motor capacities including balance, agility, and coordination. However, previous research rarely treated the motor profile as a holistic construct; most studies analyzed its components separately.

Problem Statement

Children with mild intellectual disabilities often show deficits in balance, agility, and coordination that negatively affect their ability to perform daily tasks and interact socially. Previous studies have treated these abilities separately rather than as an integrated motor profile.

Research Question:

What is the effect of directed motor education on improving the motor profile (balance, agility, and coordination) of children with mild intellectual disabilities?

Objectives

1. To identify the impact of directed motor education on improving the motor profile of children with mild intellectual disabilities.
2. To determine the extent of improvement in each motor component (balance, agility, and coordination).
3. To provide a pedagogical framework applicable in Algerian special-education centers

Hypotheses

1. There are statistically significant differences between pre- and post-test means of the experimental group in favor of the post-test at ($p \leq 0.05$).
2. There are no statistically significant differences between pre- and post-test means of the control group.
3. There are statistically significant post-test differences between the two groups in favor of the experimental group.

Definitions of Terms

Directed Motor Education

1. Conceptual Definition: An organized educational process that develops motor skills through guided, purposeful, and structured movement.
2. Operational Definition: The 12-week program designed by the researcher (24 sessions, two per week) focusing on balance, agility, and coordination.

Motor Profile

- Conceptual Definition: The overall expression of motor competence combining balance, agility, and coordination.
- Operational Definition: The composite score obtained from children's performance on standardized motor tests before and after the program.

Balance

- Conceptual Definition: The ability to maintain postural stability in static and dynamic positions.
- Operational Definition: Performance level achieved in static and dynamic balance tests used in the study.

Agility

- Conceptual Definition: The ability to perform rapid and controlled body movements with precision.
- Operational Definition: The time and control achieved in the shuttle-run agility test.

Coordination

- Conceptual Definition: The ability to harmonize and integrate movements of different body parts for efficient performance.
- Operational Definition: The result achieved in hand-eye and bilateral coordination tasks.

Mild Intellectual Disability

- Conceptual Definition: A developmental condition characterized by limitations in intellectual functioning (IQ 50–70) and adaptive behavior (AAIDD, 2021).
- Operational Definition: Children formally diagnosed with mild intellectual disability at the Psychopedagogical and Medical Center of Bir El Djir (Oran, Algeria).

RESEARCH METHOD

This study employed the experimental method, using a pre-test/post-test design with control and experimental groups. This design is appropriate to establish causal relationships between the independent variable (directed motor education) and the dependent variable (motor profile).

Study Population and Sample

The population consisted of children with mild intellectual disabilities enrolled in the Psychopedagogical and Medical Center for Children with Intellectual Disabilities in Bir El Djir, Oran (Algeria).

The sample included 26 children aged 6–8 years, divided into:

- Experimental Group (n = 13): Participated in the directed motor education program.
- Control Group (n = 13): Continued with regular physical education activities at the center.

Both groups were matched for age, sex, IQ level, and general health status.

Research Period

The experiment was conducted from January 5, 2025, to March 23, 2025, for 12 weeks, with two sessions per week, totaling 24 instructional sessions.

Research Instruments

1. Bruininks Oseretsky Test of Motor Proficiency (BOT-2) – measuring:
   - Balance (static and dynamic)
   - Agility (speed and movement control)
   - Coordination (hand–eye and bilateral coordination)

1. Observation grids for behavioral and motivational monitoring.
2. Anthropometric measures (height, weight, BMI).
3. SPSS v26 software for statistical analysis

Pilot Study

To ensure the reliability and suitability of the research tools, a pilot study was conducted on six children not included in the main sample.

Table 1. Reliability Coefficients (Cronbach's Alpha)

Variable	Number of Items	Cronbach's α	Interpretation
Balance	6	0.81	High reliability
Agility	5	0.79	Acceptable reliability
Coordination	6	0.83	High reliability
Total Scale	17	0.82	Reliable instrument

Interpretation:

The results show satisfactory internal consistency (α = 0.82), which indicates high reliability of the tests and their suitability for the main study.

Table 2. Content Validity (Expert Evaluation)

Domain	Number of Experts	Agreement (%)	Decision
Balance	7	92.8%	Accepted
Agility	7	90.4%	Accepted
Coordination	7	94.2%	Accepted
Overall	7	92.5%	High Validity

Interpretation:

The expert consensus exceeded 90%, which confirms the content validity of the selected tests as suitable for children with mild intellectual disabilities.

Description of the Directed Motor Education Program

The directed motor education program was designed according to the principles of adapted motor education and progressive learning. It aimed to improve the three components of the motor profile (balance, agility, coordination).

Table 3. Each session lasted 45–50 minutes, divided as follows:

Phase	Duration	Description
Warm-up	10 min	Light activities (walking, stretching, orientation).
Main Phase	30 min	Progressive motor tasks focused on balance, agility, and coordination.
Cool-down	10 min	Relaxation, breathing, verbal feedback.

Table 4. Program Structure

Weeks	Focus	Example Activities
1–4	Basic balance	Walking on lines, standing on one foot, balance beam.
5–8	Agility and direction changes	Shuttle runs, obstacle games, zigzag paths.
9–12	Coordination and integration	Ball games, rhythmic movement, throwing and catching.

Pedagogical principles applied:

- Gradual difficulty progression.
- Motivation through play and reward.
- Continuous feedback and adaptation.
- Inclusive learning according to children's capacities.

RESULTS AND DISCUSSION

Table 5. Equivalence of Groups (Pre-test Results)

Variable	Group	Mean	SD	t	Sig (0.05)
Balance	Experimental	8.42	1.27	0.36	0.72
Balance	Control	8.31	1.22	—	—
Agility	Experimental	12.18	1.54	0.42	0.67
Agility	Control	12.09	1.61	—	—
Coordination	Experimental	9.84	1.39	0.31	0.76
Coordination	Control	9.77	1.41	—	—

Interpretation:

There were no statistically significant differences ($p > 0.05$) between the two groups before the program, confirming initial homogeneity of the sample.

Table 6. Pre- and Post-Test Comparison of the Experimental Group

Variable	Pre-test Mean	Post-test Mean	t	Sig (0.05)
Balance	8.42	12.65	6.72	0.000
Agility	12.18	9.53	5.94	0.000
Coordination	9.84	13.11	7.15	0.000

Interpretation and Discussion:

Significant improvements ($p \leq 0.05$) were observed in all three variables after the intervention. The results confirm that the directed motor education program effectively enhanced the motor profile of children with mild intellectual disabilities. These results are consistent with Maicas-Pérez et al. (2024) and Karakaş et al. (2024), who reported similar improvements in balance and coordination due to structured, guided activities.

Discussion by Variable:

- **Balance**: Improvement resulted from regular repetition and balance-oriented exercises such as beam walking and static control.
- **Agility**: Enhanced through progressive obstacle and reaction drills that increased neuromuscular control.
- **Coordination**: Strengthened by rhythmic and ball-handling tasks that promoted bilateral and hand-eye coordination.

Table 7. Pre- and Post-Test Comparison of the Control Group

Variable	Pre-test Mean	Post-test Mean	t	Sig (0.05)
Balance	8.31	8.62	0.84	0.41
Agility	12.09	11.88	0.92	0.38
Coordination	9.77	9.98	0.67	0.51

Interpretation:

No significant differences were found ($p > 0.05$), confirming that traditional physical activities had minimal effect compared to the directed motor program.

Table 8. Post-Test Comparison Between Experimental and Control Groups

Variable	Experimental Mean	Control Mean	t	Sig (0.05)
Balance	12.65	8.74	7.58	0.000
Agility	9.53	11.92	6.21	0.000
Coordination	13.11	9.89	7.96	0.000

Interpretation and Discussion:

Statistically significant differences ($p \leq 0.05$) favoring the experimental group indicate the success of the directed motor education program. These findings are in line with Özkan & Kale (2021) and Belkheyr & Bensabeur (2022), confirming the pedagogical and psychosocial benefits of guided motor interventions.

Summary of Discussion:

The consistent improvement across all variables demonstrates that directed motor education is effective in enhancing both isolated and integrated motor abilities. The children showed increased motivation and confidence, suggesting a positive influence on their emotional and social adaptation, consistent with Ben Yekhlef (2022).

GENERAL RESULTS

The statistical analyses demonstrated that the directed motor education program had a positive and significant effect on improving the motor profile of children with mild intellectual disabilities. The most prominent findings were:

1. Improvement in balance, agility, and coordination among children in the experimental group, as shown by significant post-test differences ($p \leq 0.05$).
2. Absence of significant improvement in the control group, which confirms that traditional physical activities are less effective in developing psychomotor performance.
3. The program's structured and guided nature contributed to a progressive enhancement of neuromotor control, psychomotor organization, and motivation to engage in movement.

These results confirm that directed motor education, when based on scientific planning, progressive load, and adaptation to individual capacities, is an effective educational and therapeutic tool.

CONCLUSIONS

1. Directed motor education significantly improves the motor profile (balance, agility, coordination) of children with mild intellectual disabilities.
2. The systematic and guided nature of the sessions allows for better neuromuscular adjustment, control, and learning transfer.
3. The program fosters not only motor but also psychological and social adaptation, promoting self-confidence and participation.
4. The experimental evidence validates the theoretical principles of adapted motor education and highlights its relevance for special education settings in Algeria and beyond.

Practical Recommendations

1. Implementation in specialized centers: Incorporate directed motor education as a regular part of the curriculum for children with intellectual disabilities.
2. Teacher training: Prepare physical education teachers and therapists to design and apply guided motor programs suited to children's abilities.

3. Program adaptation: Adapt similar programs for other age groups and levels of intellectual disability.
4. Further research: Encourage experimental studies integrating physiological, cognitive, and emotional measures to better understand motor learning processes among this population.
5. Institutional support: Develop partnerships between universities, health centers, and educational institutions to promote applied research in adapted physical education.

Ethics and Consent

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki.

Informed consent was obtained from the children's parents and from the administration of the Psychopedagogical and Medical Center for Children with Intellectual Disabilities in Bir El Djir, Oran (Algeria).

All participants were informed about the objectives and procedures of the study, and their participation was entirely voluntary.

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Competing Interests

The author declares **no competing interests** related to the publication of this study. (*The author has no financial, academic, or institutional conflict of interest to disclose.*)

Authors' Contributions

The author conceived and designed the study, conducted the experimental work, collected and analyzed the data, and wrote the manuscript. All sections of the article were prepared and reviewed solely by the author, who approved the final version for submission.Ent dolupti bearum nobis sunt.

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