ROSSIISKAYA ISTORIYA
ISSN : 0869-5687
No. 1(2026)
https://rossiiskaya.com

Supportive Educational Aids and Their Impact on the Development of Cognitive Skills among Learners with Multiple Disabilities

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Received : 10-12-2025 Accepted : 15-02-2026 Published :17-04-2026

Abstract :

The field of special education represents a notable development in the employment of supportive educational aids with the aim of improving learning opportunities for learners from various disability categories. Learners with multiple disabilities are among the groups that face the most complex challenges due to the interaction of impairments, which necessitates the adoption of adapted educational aids that meet their diverse needs. This study aims to investigate the impact of using supportive educational aids — digital, manual, and interactive — on the development of basic cognitive skills among learners with multiple disabilities, with emphasis on attention, perception, discrimination, memory, and problem solving. The study also addresses the teacher's role in selecting and adapting these aids, and the family's role in reinforcing their use during home-based learning. The study adopts a descriptive-analytical approach supported by field data to measure the effectiveness of these aids, with the goal of offering scientific recommendations that contribute to improving educational practices within inclusive institutions and specialized centers.

Keywords : Supportive educational aids, Cognitive skills development, Cognitive skills, Learners with multiple disabilities, Special education, Inclusive éducation, Multiple disabilities.

Introduction

Attention to learners with special needs is one of the fundamental indicators of the development of educational systems, as it reflects awareness of the importance of providing equitable educational opportunities that consider individual differences and developmental particularities of learners. Learners with multiple disabilities are among the groups most in need of deep and specialized educational interventions, due to the dual difficulties they face that affect their learning abilities and their interaction with the school and social environment. In light of these challenges, supportive educational aids have emerged as effective tools to enhance learning and improve cognitive performance, especially when used systematically in ways that align with the needs and specificities of this group. Given the intertwined cognitive and behavioral difficulties learners face, reliance on supportive educational aids becomes a necessity to ensure effective learning. However, the extent of the effectiveness of these aids,

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and how to employ them in ways that genuinely contribute to the development of cognitive skills, remains a subject of debate and requires in-depth study.

From here arises the following problem:

To what extent are supportive educational aids effective in developing cognitive skills among learners with multiple disabilities?

1/ Definition of Educational Aids:

- Ahmed Hassani defines them as "any means that intervenes to assist the teacher in achieving educational and pedagogical objectives during his direct interaction with his subject on the one hand, and with the learner on the other" (Hassani, 2000, p.152).
- Muhammad Mahmoud Al-Hila defines them as "devices, tools, and materials used by the teacher to improve the teaching and learning process, shorten its duration, clarify meanings and explain ideas, teach pupils skills, instill good habits in them, develop attitudes, and present values, without the teacher relying solely on words, symbols, and numbers, with the aim of leading his pupils to correct scientific facts and national education at no cost" (Al-Hila, 2001, p.25).
- Ahmed Jaber defines them as "the various tools and methods used in educational situations which rely entirely on the understanding of words, symbols, and numbers" (Jaber, 1998, p.27).

2- Types of Assistive Educational Aids in the Learning Process:

2.1- Auditory Educational Aids:

These include educational aids that depend on the sense of hearing in the teaching process and in acquiring experiences as a fundamental element, such as what is heard from the radio, tape recorder, and loudspeakers; four types are identified (Sabri, 1998, p.69).

a. Audio Recordings: The process of preserving sounds and storing them by various methods and using different devices in order to replay them when needed, such as recordings of bird and animal sounds, music, human voices, and any sound regardless of its source. Audio recordings that contain comprehensive explanations of scientific facts, and those in which the teacher explains the procedures the pupil must follow and the safety measures to be observed, have proven effective in the pupil's comprehension of relationships and have helped develop inventive abilities (Muhammad Al-Baz, n.d., p.105).

b. Educational Radio Programs: These are among the most suitable auditory educational aids for those with multiple disabilities due to the low cost of producing and receiving broadcast radio programs (Muhammad Al-Baz, n.d., p.105).

c. Talking Books:These consist of recording the text of a book onto audio tapes or discs and represent one of the educational materials that help learners with multiple disabilities acquire various knowledge; this method is useful for conveying knowledge to pupils (Muhammad Al-Baz, n.d., p.106).

2.2- Audiovisual Educational Aids:

These are highly beneficial means that address a large audience at low cost and in a short time; among them are:

a. Television: Television contributes to education on a wide scale, addresses all segments of society, and reaches the largest possible number of people. Algerians have used it as a tool for

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preparation and training; it has had broad effectiveness and impact in achieving results at minimal cost (Belet, 1974, p.14).
b. Educational Video: Provides the teacher with a large amount of information in a short time, increases scientific knowledge for pupils who suffer from weak reading skills, motivates learners, and clarifies difficult information (Ben Abdulrahman, 2004, p.38).
c. Theatre: A play is a representational story that presents a topic or situation through dialogue among the story's characters; its events unfold through the conflict between characters' positions and attitudes, the situation develops until it reaches a climax, and then resolves, leading to the desired solution (Taouinat, 2009, p.81).
d. Computer: The computer is defined as "a programmable electronic device characterized by the ability to store and process, and to communicate with humans and other devices and components using various media; it is an instructional method that relies on programmed instruction and machine use, and the computer is used for purposes of education, administration, and communications" (Drouza, 2007, p.197).
e. Internet: The Internet is one of the most important media means at present due to its global reach and ease of use. It is defined as "a network composed of computer networks that allows connection and information exchange between any computing device synchronously and without regard to geographic location" (Al-Awad, 2005, p.18).

2.3- Tactile Educational Aids:

a. Educational Models and Three-Dimensional Objects:
Defined as "a three-dimensional representation of the object itself with full details, or simplified according to the objective and need." They are educational aids that achieve simulation of scientific reality and its treatment; they refer to manufactured forms characterized by three dimensions to simulate reality or something, or to reproduce the original object, such as the globe or an airplane model (Ismaili, 2011, p.342).
b. Educational Boards: A flat surface usually made of wood, metal, cardboard, cork, compressed cardboard, or fabric, suitable for writing or drawing on, or for displaying useful educational aids for teaching and learning. If educational boards have proven effective in teaching regular pupil groups, adding a tactile alternative and using them in teaching special groups has shown great effectiveness, as educational boards allow direct interaction with lessons (Hamdan, 1987, p.137).
c. Tactile Pictures: A raised surface that illustrates the features of objects in nature with labels indicating the components of the tactile pictures; they serve as raised illustrative drawings. Tactile pictures embody objects and places by transferring them to paper and vary according to their use: scientific, historical, artistic, etc.
d. Specimens: A part of reality, considered one of the educational aids taken from the environment without any modification or change; they help students with special needs study subjects not available in the community or at the time of study, such as fruits, birds, reptiles, etc.
e. Calculating Device: The calculating device has been developed to assist those with special needs in performing arithmetic operations of addition, subtraction, multiplication, and division for whole numbers and fractions (Muhammad Al-Baz, n.d., p.108).

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f. Programmed Book: In it, the educational material or curriculum is organized in a studied manner, where its content is divided into small sections; each section represents a behavioral objective and requires a specific response. These sections are organized progressively so that the first section leads to the second, the second to the third, and so on until the educational task is completed and the overall learning objective is achieved (Drouza, 2007, p.195).
g. Programmed Educational Packages: The educational material is organized in a case or package that includes the educational objectives, the contents of the subject matter, the activities the student must perform, the exercises to be solved, the required curricula and references, the tools and aids to be used, the assessment tests, models of correct answers, and the method of evaluating the student in awarding the final grade or semester average (Drouza, 2007, p.196).

2.4- Learning through Virtual Reality

Virtual reality (VR) is a technology that allows users to immerse themselves in a three-dimensional environment designed by computer, through the use of specialized goggles or a head-mounted display. Virtual reality attempts to give users the impression that they are physically present in the virtual world even while they remain in the real world.

The National Center for E-Learning defines it as: "a virtual environment entirely similar to or different from reality, in which the learner immerses and interacts through digital wearables" (Mazhor and Alrifare, 2023, p.422).

In light of the foregoing, the teacher must recognize that the life experience of a child with special needs is limited, and the child may not know many things that typically developing children take for granted; their interaction with the world is therefore more restricted than that of a typical child. Consequently, experiences from which they are deprived should be provided through the role of educational technology and its tools.

Many studies have demonstrated the effectiveness of educational aids in addressing numerous behavioral and psychological problems of pupils with multiple disabilities; they have also contributed to reducing hyperactive behavior and improving some associated behaviors such as inattention, impulsivity, and hyperactivity.

I. Methods of Teaching Arabic Language

Arabic grammar has been taught since it became an independent subject separate from other branches of language, first by the deductive (rule-then-examples) method and then by the inductive method.

The deductive method is based on deductive inferential thinking, in which the transition occurs from the whole (the grammatical or morphological rule) to the part (the sentences).

The inductive method is based on inductive thinking, in which the transition occurs from the part to the rule.

Deduction and induction are interrelated processes that embody the meanings of correct thinking. Thinking is a single mental process, yet reasoning may begin from a holistic perspective when observing things, in which case thinking is deductive, or it may begin from a partial perspective for one reason or another, in which case thinking is inductive.

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1- The Deductive Method

The deductive method is the rule-then-examples approach; it is an old method still used by many teachers. It involves presenting the rule and requiring pupils to memorize it, then presenting examples to clarify the rule.

Another definition states: "Deduction is the transition of thought from judging the whole to judging the part, or parts within that whole" (Nahi, 2013, p.52).

2- The Inductive Method

The inductive method is derived from induction, which means discovering laws, concepts, theories, and general rules in life through observation and abstraction. The inductive method relies on logical gradation to reach conclusions by observation and by watching scientific experiments, then extracting the law or generalization and formulating it in clear, specific language (Al-Jubouri, 2014, p.191).

Induction is also defined as "the way to reach general judgments through observation and viewing," and induction became a teaching method through the German Friedrich Herbart (Fridiric Haryatt), who established its five logical steps: preparation, presentation, comparison, connection, deriving or inferring the rule, and application (Al-Dulaimi, 2009, p.38).

Educational Activities Suitable for Teaching Arabic to Learners with Multiple Disabilities According to the Theory of Multiple Intelligences

1. **Linguistic Intelligence:** Activities for this intelligence rely on the linguistic aspect, such as storytelling that weaves concepts, ideas, and educational objectives, and audio recording as an alternative means of expressing ideas and feelings and using language skills in communication and listening.
2. **Spatial Intelligence:** Activities for this intelligence use photographs and charts to clarify ideas. The child can also use imagination to transform the lesson topic into mental images of objects.
3. **Musical Intelligence:** Activities for this intelligence rely on musical rhythm, such as repeating the life cycle of a butterfly in a rhythmic form, spelling words to a beat, or expressing the essence of the lesson through songs accompanied by music or rhythm.
4. **Interpersonal Intelligence:** Activities for this intelligence depend on positive social interaction with others, such as peer participation in various social activities or presenting and discussing a topic (Muhammad Al-Baz, n.d., p.41).
5. **Bodily-Kinesthetic Intelligence:** Activities for this intelligence use different body parts, such as using fingers for counting, employing body movements, or expressing scientific concepts or specific lesson vocabulary through gestures.
6. **Intrapersonal Intelligence:** Activities for this intelligence rely on the individual's self-awareness, awareness of their feelings, thoughts, and beliefs, and proper life planning, such as having pupils express themselves within the classroom and helping them set short-term and long-term goals.
7. **Naturalistic Intelligence:** Activities for this intelligence focus on exploring items in the natural environment such as plants, animals, birds, and rocks. Examples include pupils planting ornamental plants with the teacher's help in small pots inside the classroom and

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encouraging them to classify garden plants according to type or flower color (Muhammad Al-Baz, n.d., p.42).

The following table illustrates the multiple intelligences suitable for teaching Arabic:

Type of Intelligence	Examples of Learning Activities	Examples of Learning Tools	Strategy Instructions
Linguistic	Lectures; discussions; word games; narration; journal writing.	Books ; tapes ; notebooks ; stamps.	Read about the following; write about; talk about; listen to...
Spatial-Visual	Visual representation; art activities; imaginative play; mind mapping; metaphor; visuals.	Drawings and maps and video; LEGO set; tech tools; optical illusions; camera and pictures.	Look at the following drawing; observe; draw a mind map.
Bodily-Kinesthetic	Drama; dance; using hands in teaching; tactile activities; relaxation models.	Construction tools; sports equipment and clay; tactile tools.	Build; dance; act out visibly; touch.
Musical	Chosen songs; melody rooms; listening to songs; composing songs	Tape recorder; musical instruments.	On the excerpt...; beat; listen to...
Interpersonal	Simulations; group interactions; social gatherings; a special friend or peer.	Games; role-play; parties.	Learn that; interact with consideration; collaborate in...
Intrapersonal	Individual instruction; selected study; choices in subject areas; self-esteem.	Self-assessment tools.	Relate that to your life; make a decision considering that...
Naturalistic	Field trips and site visits; direct experience; practical experiments.	Natural samples from the environment (plant; animal; soil).	Conduct an experiment; examine the plant; observe the surrounding environment; take a trip to the countryside; contemplate nature.

(Muhammad Al-Baz, n.d., p.43)

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II. Teaching Methods Observed in Psychological Centers in Algeria

After the field visit we conducted to the Center for Multiple Disabilities in Tlemcen Province, Algeria, we identified a set of teaching aids available for instruction; we observed progress in the use of these aids that benefit the learner with a disability and help them achieve integration and excellent academic attainment in the Arabic language subject.

Among the aids used in teaching Arabic to pupils with multiple disabilities are the following:

1-Teaching letters using Virtual Reality (VR): the "Learn and Speak " project

This project aims to teach the letters of the Arabic alphabet to children with multiple disabilities by employing virtual reality technology, where the learner wears VR goggles and interacts with the letters by pressing them within an immersive digital environment. Thanks to this technology, the child — despite concurrent motor disabilities and speech and intellectual difficulties — feels as if they are moving inside the virtual space and participates actively in an educational activity that takes the form of an enjoyable game. This approach facilitates the process of presenting letters in an attractive way that reduces feelings of boredom and fatigue, enhances the child's motivation to learn, and increases their concentration. According to the teacher's statement, this aid not only positively affects the educational aspect by enabling the child to recognize and repeat the letters, but its effects also extend to the psychological domain, as the child appeared happier and more enthusiastic while using it.

2- Use of the Computer:

The computer is used as a primary means for teaching children with multiple disabilities reading and writing skills at the primary level, in accordance with their mental age and cognitive readiness. We observed that pupils learn the Arabic letters through an educational game created by the teacher Aisha Beljilali entitled "Learn and Speak ", and this game is used in two ways: via virtual reality goggles and via the computer. The game is entertaining and not tedious; the teacher took care to immerse the child in an interactive educational experience that combines learning and play by employing natural scenes such as palm trees, trees, and water within an attractive digital environment. In this way, the child with motor disability feels as if they are wandering through those natural spaces, searching for the letters and discovering them

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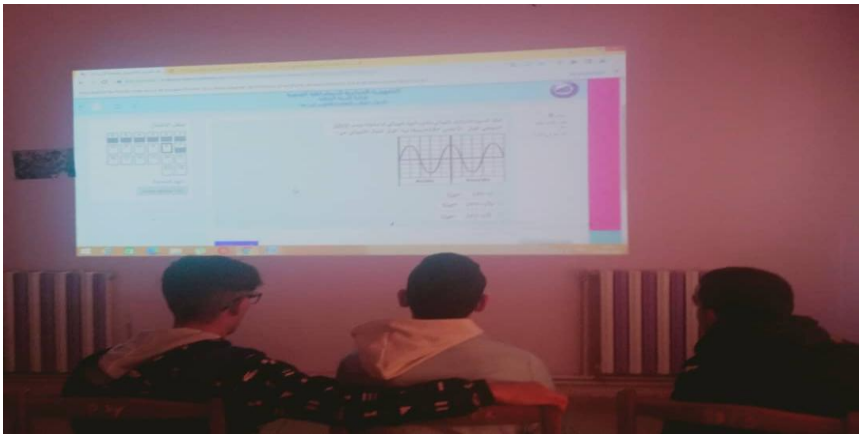
independently, which helps them perceive and consolidate the letters in their mind within an enjoyable and purposeful learning framework..

3- Data Show (Data Show):

The data projector (Data Show) is considered one of the audiovisual educational aids that the teacher employs effectively in teaching Arabic, as it displays various lessons on the screen based on what is stored on the computer, whether related to teaching writing, reading, or presenting texts and practical activities. This device allows the enlargement of displayed content, making it clearer and more attractive, which helps learners—especially those with disabilities—to follow the explanation more easily and to focus on the letters, words, and sentences presented before them. It also enables the teacher to use interactive presentations that include images, animations, and audio clips, thereby diversifying instructional stimuli, stimulating students' attention, and making the process of learning Arabic more engaging and effective.



4- Wall Pictures and Posters:

Wall pictures and posters are among the most important visual supports for teaching Arabic to children with multiple disabilities. Teachers take care to prepare letters, words, and three-dimensional wall displays and to employ them within the classroom in ways that suit the

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particularities of this group and their diverse needs. These aids do not merely present a letter or a word in an attractive visual form; they are designed in clear sizes and contrasting colors, with the possibility of reinforcing them with tactile elements or illustrative symbols, which helps children perceive letter shapes, distinguish them, and link them to appropriate images or concepts despite the dual sensory or cognitive difficulties they face. Posters also contribute to creating a rich and stimulating classroom environment that surrounds the child with linguistic stimuli continuously, thereby strengthening visual and tactile memory and facilitating the retrieval of letters and words during supported reading and writing activities. In addition, these aids offer the teacher varied opportunities to adapt activities, such as matching a letter to its image or matching a letter to a word reinforced by a picture, symbol, or sign, which supports the construction of initial language competencies in children with multiple disabilities within an active, interactive, and differentiation-sensitive learning framework.

5- Intelligence Games

Intelligence games, such as puzzles, are important educational tools for developing a child's abilities; through them the child assembles letters, words, or various models, which helps them perceive letter shapes and link them to their sounds and meanings in an enjoyable and simple way, thereby paving the way for learning to read and write. These games also develop eye-hand coordination by having the child grasp pieces, orient them, and place them in the correct position, which trains fine motor muscles and strengthens concentration and observation. In addition, such games enhance logical thinking and problem-solving skills, because the child experiments with multiple possibilities until reaching the appropriate solution, learning patience, persistence, and resilience. With each success in completing a picture or assembling a correct word, the child feels pride and self-confidence, which makes them more eager to engage in learning and to try new activities.

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It is evident from the direct inspection of the instructional aids used at the Center for Multiple Disabilities in Tlemcen that the employment of supportive educational aids, particularly technological ones, contributes significantly to improving the learning of the Arabic language among learners with multiple disabilities. Classroom experiments showed that integrating modern tools such as virtual reality, the computer, and optical media (Data Show), alongside traditional tangible aids such as pictures and educational games, yields positive outcomes at the cognitive, motor, and psychological levels for the child.

These aids also provided a stimulating learning environment based on interaction, stress reduction, increased concentration, and the presentation of linguistic content in a simplified and enjoyable manner. They clearly contributed to the development of visual and auditory perception skills, improved the ability to distinguish, read, and write letters, and enhanced the child's self-confidence and sense of achievement.

The value of these aids is particularly pronounced for children who suffer from compound disabilities (motor, speech, intellectual), where virtual play and multimedia become necessary pedagogical mediators that enable them to overcome difficulties and achieve educational and social integration within the classroom.

On this basis, it can be stated that the use of supportive educational aids represents an effective and innovative pedagogical approach that contributes to raising the quality of Arabic language instruction for learners in this category, and it underscores the necessity of further investment in educational technology and in training teachers to employ it optimally.

Conclusion

The theoretical study and field observation show that assistive educational aids constitute a central element in improving the quality of learning for learners with multiple disabilities, due to the adaptations they provide to school life, the expansion of interaction opportunities, and the development of cognitive, sensory, and motor skills. The results indicated that the employment of auditory, audiovisual, tactile aids, and virtual reality technology, in addition to the computer, pictures, and projector, effectively contributes to enhancing attention and concentration, facilitating the comprehension of linguistic concepts,

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and developing reading and writing skills, as well as improving learners' psychological state by making the learning process more enjoyable and motivating.

Field experiments in pedagogical psychological centers, notably in Tlemcen, also showed that pedagogical innovation—such as the Learn and Speak project—plays an important role in integrating the child into an interactive learning environment that provides experiences difficult to obtain in reality, especially for children who suffer from concurrent motor, speech, and intellectual disabilities. Together, these findings confirm that integrating modern educational aids, especially digital ones, is no longer a secondary option but a pedagogical necessity that enables these learners to achieve higher levels of learning and social engagement.

In light of what has been presented and analyzed, a set of practical and scientific recommendations can be proposed to enhance the effectiveness of assistive educational aids in teaching learners with multiple disabilities:

- The necessity of systematically integrating auditory, audiovisual, and tactile aids into teaching plans, while taking into account individual differences among learners.
- Adopting programmed instruction and educational packages as effective tools to simplify concepts and segment them in ways that respect children's cognitive capacities.
- Employing educational games and intelligence games such as puzzles to develop fine motor skills and address perceptual difficulties.
- Strengthening the use of pictures, wall posters, and three-dimensional models as media that support both visual and tactile learning.
- Providing continuous professional development for teachers on how to design, select, and employ appropriate educational aids for learners with multiple disabilities.
- Involving teachers in the development of locally produced interactive educational games that respect the cultural and linguistic context of the Algerian child.
- The necessity of supplying modern technical equipment within pedagogical psychological centers, such as computers, Data Show projectors, virtual reality goggles, and tactile tools.
- Encouraging partnerships among universities, research centers, and psychological centers to develop digital educational content specifically for the population of learners with multiple disabilities.

List of Sources and References:

Hassani, Ahmed. (2000). Studies in Applied Linguistics: The Field of Language Teaching. n.p. University Publications Office, Algeria.

Jaber, Abdel Hamid. (1978). Psychology of Learning and Theories of Instruction. n.p. Dar Al-Nahda Al-Arabiya, Egypt.

Al-Hilah, Mohammad Mahmoud. (2001). Fundamentals of Designing and Producing Educational means (Instructional Media) (2nd ed.). Dar Al-Maseera, Amman, Jordan.

Sabri, Maher Ismail. (1998). From Educational Aids to Educational Technology. n.p. Al-Riyadhi Library, Saudi Arabia.

© Rossiiskaya Akademiya Nauk, Izdatelstvo Nauka

Mohamed El-Baz, Marwa. (n.d.). Teaching Methods for Individuals with Special Needs. n.p. Faculty of Education, Department of Curriculum and Instruction, Port Said University, Egypt.

Abdel Hashemi, Abdel Rahman, & Al-Dulaimi, Taha Ali Hussein. (2008). Modern Strategies in the Art of Teaching (1st ed.). Dar Al-Shorouk, Amman, Jordan.

Taouinat, Ali. (2009). Communication and Interaction in the School Environment. n.p. Ministry of National Education, Algeria.

Jaber, Ahmed Walid. (1998). Teaching Methods and Their Educational Applications (1st ed.). Dar Al-Fikr, Amman, Jordan.

Darwazeh, Afnan Nazeer. (2007). Theory in Teaching and Its Practical Application (2nd ed.). Dar Al-Shorouk for Publishing and Distribution, Amman, Jordan.

Al-Awad, Walid bin Mohammed. (2005). The Role of Internet Use in Academic Achievement. n.p. Naif Arab University for Security Sciences, Saudi Arabia.

Ismaili, Yamna. (2011). “The Role of Educational means in Enriching the University Learning Situation.” Journal of Human and Social Sciences, Issue 6, Algeria.

Hamdan, Mohammed Ziyad. (1987). Educational Technology Tools. n.p. Dar Al-Tarbiyah Al-Haditha, Jordan.

Mohamed El-Baz, Marwa. (n.d.). Teaching Methods for Individuals with Special Needs. n.p. Faculty of Education, Department of Curriculum and Instruction, Port Said University, Egypt. (Repeated reference)

Mazhor, A. A., & Alrifare, M. M. (2023). A Systematic Review of the Use of Virtual Reality in Education (Translated by Hind Khalifa). International Conferences on Information Technology.

Nahi, Abdel Aoun Fadel. (2013). Methods of Teaching the Arabic Language and Its Instructional Techniques (1st ed.). Dar Safaa for Publishing and Distribution, Amman, Jordan.

Al-Jubouri, Imran Jassim. (2014). Curricula and Methods of Teaching the Arabic Language (2nd ed.). Dar Radwan for Publishing, Amman, Jordan.

Al-Dulaimi, Taha Ali Hussein. (2009). Teaching the Arabic Language between Traditional Methods and Innovative Strategies (1st ed.). Dar Alam Al-Kutub Al-Hadith, Irbid, Jordan.

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