Applied Mathematics & Information Sciences
An International Journal

http://dx.doi.org/10.18576/amis/190612

Evaluating the Effectiveness of ChatGPT-Driven Educational Support in Improving Motivation Among Students with Learning Disabilities

Reem Alkenani[1,*], *Maher Tayseer Sharadgah*[2], *Randa Mousa Abd Alrahman Al Momani*[3], *Burhan Mahmoud Hamadneh*[4], *Mohannad Igdaifan Alseraa*[5], *and Ahmed A. Elngar*[6]

[1]Faculty of Educational Sciences, Department of Special Education, Ajloun National University, Jordan
[2]Department of Special Education, Amman Arab University, Mobus District, Amman Street, Amman, Jordan
[3]Department of Special EducationPrincess Alia University College, Amman, Jordan
[4]Department of Special Education, Faculty of Educational Sciences, Ajloun National University, Jordan
[5]Ministry of Education, Jordan Counseling Psychology, Jordan
[6]Faculty of Computers and Artificial Intelligence, Beni-Suef University, Beni-Suef City, 62511, Egypt

Received: 2 May 2025, Revised: 22 Jul. 2025, Accepted: 11 Sep. 2025
Published online: 1 Nov. 2025

Abstract: The study aimed to evaluate the effectiveness of an educational support strategy utilizing artificial intelligence (Chat GPT) in enhancing motivation among students with learning disabilities. The researcher used the quasi-experimental approach. To achieve the study's objectives, the researcher developed a motivation scale for learning comprising 20 paragraphs. The study sample consisted of 40 male and female students with learning difficulties from Arar International Academy School, which is affiliated with the Bani Ubaid Directorate of Education in Irbid Governorate. Of these, 20 students were assigned to the experimental group and 20 students to the control group. The participants were randomly selected during the second semester of the 2023/2024 academic year. The results of the study showed that the arithmetic mean of the experimental group on the motivation scale was in favor of the experimental group, and this came in the value of the effect size for the Eta square, which amounted to (0.405), meaning that (40.5%) of the variance in the test is in favor of the effectiveness of the educational support strategy using artificial intelligence (Chat GPT). The study recommended that special education teachers utilize the educational support strategy employing artificial intelligence (AI), specifically ChatGPT, to enhance motivation among students with learning disabilities.

Keywords: Effectiveness, Educational Support Strategy, AI-(ChatGPT), Motivation, Students with Learning Disabilities

1 Introduction

The world has recently witnessed unprecedented developments across various domains, particularly in the field of education. As a result, many countries have sought to keep pace with these transformations by integrating emerging technologies into the educational process. A range of modern tools once considered the realm of science fiction has now become an integral part of contemporary classrooms. These technologies facilitate the shift from traditional instruction toward interactive, learner-centered environments that support cognitive, psychomotor, and affective development [1].

This global trend aligns well with Constructivist Integration Theory, which posits that learners construct knowledge actively through meaningful, technology-facilitated experiences. From this theoretical standpoint, digital tools such as multimedia platforms, AI-powered tutoring systems, and immersive virtual environments are not merely content delivery mechanisms but act as cognitive partners that promote scaffolding, exploratory learning, and reflective thinking [14],[10]. This framework provides a compelling foundation for the current research, which seeks to understand how technology transforms learning into an adaptive, personalized, and engaging experience. Teachers under this paradigm no longer function solely as information

* Corresponding author e-mail: Reem.kinani@anu.edu.jo

© 2025 NSP
Natural Sciences Publishing Cor.

transmitters but as instructional designers and facilitators who employ technology to enhance learning across multiple domains, mirroring the shifts outlined [16], [17]. Recent advancements in AI technologies have further redefined the landscape of education, particularly in providing individualized educational support. These innovations include tools for computer-assisted instruction, multimedia-enhanced learning, e-libraries, and distance education [16]. The philosophical shift from collective, rote-based learning to individualized, outcome-based assessment underscores the evolving role of educators. Teachers are now expected to strategically leverage technological affordances to foster meaningful engagement and improve learning outcomes [17].
Among the most significant recent breakthroughs is the emergence of Artificial Intelligence (AI) applications, including ChatGPT, which has gained increasing attention as a tool to enhance teaching and learning [9]. Note, the global orientation is now toward employing such tools to support educational institutions and ensure quality education[11]. Further assert that ChatGPT represents a powerful AI application, capable of enhancing student learning and promoting active classroom engagement.

A key strength of ChatGPT lies in its human-like language generation, enabling it to provide nuanced, contextualized responses and individualized feedback. Its interactive capabilities foster a mobile, intelligent learning environment that can adapt to diverse learning styles and preferences [8]. Moreover, its recent integration into classrooms demonstrates promising potential for improving instructional effectiveness and student motivation, particularly when traditional teaching methods fall short [3].

In the domain of special education, especially for students with learning disabilities, AI tools such as ChatGPT provide powerful means to deliver personalized and engaging learning experiences. These tools contribute to improved academic achievement by offering multimodal learning content (text, audio, and visuals), supporting comprehension and retention, and promoting enjoyment and motivation [23]. The alignment between educational support strategies and students' unique needs fosters intrinsic motivation—a critical determinant of learning engagement and academic success [22].

Motivation, in particular, plays a central role in student learning outcomes. It precedes academic achievement and shapes students' willingness to participate actively in the learning process. Creating supportive, interactive learning environments that utilize advanced tools like AI can help nurture such motivation. This requires teachers to move beyond passive lecture-based instruction and instead design AI-enhanced learning experiences that accommodate learners' interests and abilities, especially in inclusive settings [6].

The researcher is motivated by the intersection of three critical trends: the rise of AI in education, the increasing emphasis on student-centered learning, and the urgent need to support students with learning disabilities through personalized interventions. The potential of tools like ChatGPT to foster motivation and improve the educational experience for these students remains underexplored.

This study thus aims to evaluate the effectiveness of an AI-based educational support strategy specifically utilizing ChatGPT in enhancing the motivation of students with learning disabilities. By addressing this research gap, the study seeks to contribute both theoretically and practically. It will help inform instructional design, guide the integration of intelligent educational tools, and provide evidence-based recommendations for inclusive educational practices.

2 Problem Statement

Educational support in special education programs is considered one of the modern educational services provided to serve students with learning disabilities. It provides an inclusive educational environment and avoids the isolation that does not suit the needs and characteristics of these students. In light of the spread of modern technological applications, most notably artificial intelligence through the "Chat GPT" application, which provides a supportive and helpful electronic environment for students with learning disabilities and makes classroom learning more effective, attractive, and enjoyable by providing texts, images, and videos through modern technological devices. It also provides information from more than one source and reference, and shows different viewpoints. There are also several obstacles facing teachers of students with learning disabilities, including the large number of students in one class and the different needs of students with learning disabilities from one student to another according to their diagnosis and level of learning difficulty (reading, writing, arithmetic [4].argues that traditional education is limited in motivation and does not keep pace with the development of the generation that relies on tablets. Therefore, it was necessary to make the educational environment keep pace with the developments of age by employing educational environments based on electronic innovations, including artificial intelligence. Several previous studies, such as the studies by [18],[12], have confirmed the effectiveness of artificial intelligence applications in supporting the education of students with learning disabilities.

In short, the problem of the study, which stems from the limited integration of study strategies, learning disabilities, and artificial intelligence (Chat GPT) in the educational system, justifies the need for a comprehensive

© 2025 NSP
Natural Sciences Publishing Cor.

study that investigates these educational support strategies. This study can provide valuable insights for teachers, researchers, and policymakers who aim to create inclusive and effective learning environments to develop motivation for all students with learning disabilities. Furthermore, educational support through artificial intelligence has the potential to provide actionable recommendations and bridge the gap between theory and practice to improve education. In light of this, this study was conducted in an attempt to reveal the effectiveness of an artificial intelligence-based educational support strategy (ChatGPT) in developing motivation among students with learning disabilities.

This will be achieved by answering the following main study question: Is there a statistically significant difference at the significance level $(\alpha = 0.05)$ between the mean scores of students in the two study groups on the motivation scale attributed to the educational support strategy (using artificial intelligence, conventional)?

Mathematical Formulation of the Study Problem
To systematically investigate the impact of an AI-based educational support strategy (using ChatGPT) on the motivation of students with learning disabilities, the problem can be represented through a formal mathematical model.

Variables and Definitions: Let us define the variables as follows:

–M_i: Motivation score of student i
–G_i: Group indicator, where...

$$G_i = \begin{cases} 1 & \text{if student } i \text{ is in the experimental group (ChatGPT)} \\ 0 & \text{if student } i \text{ is in the control group (traditional support)} \end{cases}$$

–β_0: Mean motivation score for the control group (intercept)
–β_1: Mean motivation score for the control
–ε_i: Random error term

Model Equation:

$$M_i = \beta_0 + \beta_1 G_i + \varepsilon_i$$

Hypothesis Testing:
To determine the statistical significance of the effect, the following hypotheses are tested at a significance level $(\alpha = 0.05)$:
Null Hypothesis

$$H_0 : \beta_1 = 0$$

(No significant difference in motivation between the two groups)
Alternative Hypothesis

$$H_1 : \beta_1 > 0$$

(The AI-based support strategy significantly improves motivation)
If the estimated β_1 is positive and the associated p-value is less than 0.05, the null hypothesis is rejected in favor of the alternative, indicating a statistically significant effect of the ChatGPT-based educational support.
Effect Size Consideration:
The practical impact of the intervention can be assessed using Eta squared η^2, calculated as follows:

$$\eta^2 = \frac{\text{SS}_{\text{between}}}{\text{SS}_{\text{total}}}$$

In this study, an effect size of

$$\eta^2 = 0.405$$

indicates that approximately 40.5% of the variance in motivation scores can be attributed to the educational support strategy using ChatGPT, reflecting a strong and meaningful effect as shown in Figure 1.

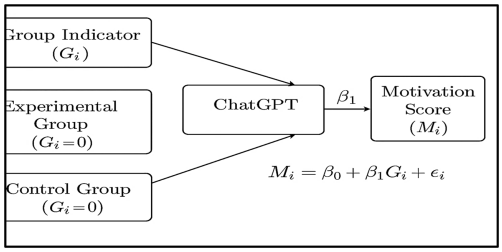


Fig. 1: Visual Representation of the Mathematical model

Objectives of the Study

The current study aims to achieve the following:
To reveal the effectiveness of an educational support strategy using artificial intelligence (Chat GPT) in developing motivation among students with learning disabilities and to determine the existence of a statistically significant difference at the significance level $(\alpha = 0.05)$ between the mean scores of students in the two study groups on the motivation scale attributed to the educational support strategy (using artificial intelligence, conventional.

Theoretical and Applied Practical Importance of the Study
The importance of this study lies in the following:
Generalizing the results of this study to specialists, researchers, curriculum developers, supervisors of the educational process, special education teachers, especially teachers of students with learning disabilities, and students in educational institutions, and directing the attention of those in charge of the educational process to

© 2025 NSP
Natural Sciences Publishing Cor.

the importance of employing artificial intelligence in teaching students with learning disabilities. Employing artificial intelligence (AI) tools like ChatGPT in teaching students with learning disabilities makes them active participants in classroom learning situations, thereby establishing their position in the educational process and increasing their motivation towards learning. Providing new tools for research studies conducted by researchers, such as achievement tests and interviews, by employing artificial intelligence (ChatGPT) as an educational support strategy in teaching students with learning disabilities, which can be used by researchers in the field of learning disabilities and on other samples. Educational supervisors may benefit from this study by designing workshops that focus on employing artificial intelligence (ChatGPT) as an educational support strategy in teaching students with learning disabilities. This technology may present educational materials in an interesting, attractive, and enjoyable manner.

Limitations of the Study

The results of this study are limited by a set of boundaries, which are:

Human Limitations: This study was applied to a sample of students with learning disabilities (sixth grade) at Arar International Academy School, affiliated with the Directorate of Education of Bani Obaid Brigade in Irbid Governorate. **Spatial Limitations:** This study was applied at Arar International Academy School, affiliated with the Directorate of Education of Bani Obaid Brigade in Irbid Governorate. **Temporal Limitations:** This study was applied during the second semester of the academic year (2023/2024 AD). **Thematic (Procedural) Limitations:** The study was limited to identifying the effectiveness of an educational support strategy using artificial intelligence (Chat GPT) in developing motivation among students with learning disabilities.

3 Operational and Terminological Definitions of Study Terms

The study necessitated defining the following terms:

Artificial Intelligence: A set of new methods and approaches in programming computer systems that can be used to develop systems that simulate some elements of human intelligence and allow them to perform inferential operations on facts and laws represented in computer memory [7].

Operationally Defined by the Researcher: An educational support strategy provided to students with learning disabilities that complements the teacher's work in teaching students.

Chat GPT (Chat Generative Pre-Training): A type of artificial intelligence application that uses deep learning techniques to generate text that resembles human text generation by training generative conversational robots on a large dataset of text, thus providing an understanding of natural language inputs [3].

Operationally Defined by the Researcher: One of the artificial intelligence applications used in the educational field that provides students with a vast amount of textual information and multimedia through the use of an electronic robot or model.

Motivation: The internal or external state of the learner that drives their behaviour, performance, persistence, and direction towards a specific goal or objective [22].

Operationally Defined: The state that directs the behaviour of students with learning disabilities towards learning and is measured by the score obtained by students with learning disabilities on the motivation scale developed by the researcher to achieve the objectives of this study.

Students with Learning Disabilities: Students who exhibit a disorder in one or more of the basic psychological processes involved in understanding and comprehending written or spoken language, which appears in disorders of hearing, thinking, speaking, reading, spelling, and arithmetic [23].

Operationally Defined: Students enrolled in public and private schools affiliated with the Ministry of Education and diagnosed as having learning disabilities based on the tests and scales used by the Jordanian Ministry of Education.

4 Related Work

The researcher reviewed a collection of previous studies related to the topic of the study, which have been arranged chronologically from the most recent to the oldest as follows:

[23]conducted a study aimed at identifying the impact of artificial intelligence on the educational practices of teachers of students with special needs at Yalwa Private School in Bauchi State, Nigeria. The study used a case study approach to explore the impact of the practical applications of artificial intelligence technologies in enhancing the educational practices of teachers in a special needs school. To achieve the study's objective, the following important educational practices were measured: lesson planning, grading and assessment, individualized student support, and classroom management. Purposive

© 2025 NSP
Natural Sciences Publishing Cor.

and census sampling techniques were used to include all (31) teachers and the school principal as respondents in the study. Findings were drawn from data collected through interviews, observations, and surveys with teachers and administrative staff. Subjective and quantitative methods were used to analyze the data obtained. Finally, the study concluded that the more artificial intelligence technologies were integrated into educational processes, the more educational practices improved, and the learning of students with learning disabilities was enhanced.

[5] Conducted a study aimed at developing scientific concepts among middle school students with learning disabilities through the use of simulation via artificial intelligence. The research group consisted of (32) middle school students with learning disabilities. The research instruments, represented by a test of scientific concepts for middle school students with learning disabilities, were prepared. The test was administered pre-intervention, followed by teaching the research group through a program using simulation via artificial intelligence, and then the test was administered post-intervention to the research group. The research results showed a statistically significant difference between the mean scores of the research group in the pre- and post-applications of the scientific concepts test in favour of the post-application.

[2] Conducted a study aimed at presenting the perspectives of higher education students regarding the use of artificial intelligence in language teaching interventions, with a focus on secondary education students with specific learning disabilities. Although AI applications in literature are related to education, the research community's interest was renewed in 2022 with the release of ChatGPT. This large language model can generate text and quickly attract millions of users. This has raised expectations about potential benefits but has also raised concerns about potential risks that may arise in the context of special education and training. Given the above, the methodology used a mixed-methods analysis of an online questionnaire administered to 120 students from "Language" departments in Greece (Kalamata). The results showed expectations for improving skills, but there were also concerns about providing ready-made answers. Additionally, students expect resistance from parents and peers but support from students themselves. The research highlighted the expected barriers and factors that students perceive they will face, emphasizing the need for staff training.

[13] Conducted a study aimed at developing teaching materials using ChatGPT and revealing the effectiveness of the developed reading skill teaching materials. This research used a research and development approach with the ADDIE model, which includes **five steps**: analysis, design, development, implementation, and evaluation. In this research, the researcher used a mixed-methods approach combining qualitative and quantitative approaches. In data collection, the researcher used observation, interviews, questionnaires, and tests. In data analysis, the researcher used the independent sample t-test formula to determine the effectiveness of the teaching material development. The study results showed that teaching materials were developed using artificial intelligence (Chat GPT) based on the ADDIE style, and the teaching materials were developed through instructions using a Chat GPT guide that includes defining learning objectives, identifying target students, selecting teaching materials, including vocabulary and reading texts, providing punctuation and translation, and evaluating materials. The effectiveness of developing teaching materials using artificial intelligence (ChatGPT) and developing teaching materials using Chat GPT in teaching reading skills is effective.

[18] Conducted a study aimed at identifying the effectiveness of employing augmented reality technology in improving attention among students with learning disabilities in the Northern Jordan Valley Brigade for the second semester of the academic year 2021/2022. The study population consisted of (325) male and female students, and the study sample consisted of (48) male and female students with learning disabilities distributed into two groups: a control group (24) and an experimental group (24) male and female students. They were selected using a purposive sampling method in Al-Hassan Basic Mixed School, North Shuna Basic Mixed School, Al-Aramsha Secondary Mixed School, and Al-Fudayeen Secondary Mixed School in the Northern Jordan Valley Brigade. The study results showed that the arithmetic means of the responses of the study sample on the instrument as a whole were significant for the experimental group who were exposed to augmented reality technology compared to the individuals of the conventional method, with a statistically significant arithmetic mean at a high degree. The results showed a significant effect of the teaching method in favour of the experimental group.

[25] Conducted a study aimed at investigating the impact of combining ChatGPT-generated dialogues in language learning materials on language learners' motivation. The participant group in this study consisted of (60) second-year university students. The students' motivation strategies were measured using the "Motivation Strategies for Learning Questionnaire." The study employed a quasi-experimental design. The results of the current study revealed statistically significant strong differences between the majors in the sub-categories of the motivation test (self-regulation, intrinsic values, and test anxiety). In other words, the use of ChatGPT technology as a learning material increased students' motivation.

© 2025 NSP
Natural Sciences Publishing Cor.

[20] Conducted a study aimed at developing achievement motivation and academic achievement among primary school students with learning disabilities using augmented reality technology, and identifying a statistically significant relationship between augmented reality technology and the development of achievement motivation among primary school students with learning disabilities, and identifying a statistically significant relationship between augmented reality technology and academic achievement among primary school students with learning disabilities. The basic sample for this study consisted of (30) male and female students with learning disabilities from the sixth grade of primary school. The following study instruments were applied to them: Raven's Colored Progressive Matrices test, behavioural characteristics rating scales for students with learning disabilities, the achievement motivation scale (prepared by the researcher), an achievement test in social studies for the sixth grade of primary school (prepared by the researcher), and augmented reality technology (prepared by the researcher), using a quasi-experimental design with two groups. The results showed the effectiveness of augmented reality technology in developing achievement motivation and academic achievement among primary school students with learning disabilities.

[21] Conducted a study aimed at identifying the impact of a program based on augmented reality in developing cognitive processes, academic motivation, and learning perceptions among primary school students with learning disabilities. The researchers provided a theoretical framework for the research variables and relied on it in preparing the proposed program based on augmented reality, as well as the cognitive processes test and the academic motivation and learning perceptions scales using the augmented book. The researchers adopted descriptive and experimental approaches with a quasi-experimental design. The program was applied to a sample of (17) male and female sixth-grade primary school students with learning disabilities at Al-Raml Al-Miri Primary School in the East Educational Administration - Alexandria Governorate. The program instruction lasted for (36) sessions. The research results revealed statistically significant differences between the mean scores of the pre- and post-tests in favour of the post-test, indicating the impact of the program based on augmented reality in developing cognitive processes, academic motivation, and learning perceptions.

[15] Conducted a study aimed at investigating the use of artificial intelligence to support students with intellectual disabilities from an educational and health perspective. The integration of AI into the education of a child with intellectual/developmental disabilities would mitigate educational, adaptive, and social skill gaps that occur as a direct result of ongoing health problems. The study utilized a descriptive-analytical approach, where literature related to the use of AI in education for students with intellectual/developmental disabilities was systematically collected from online international databases based on specific inclusion and exclusion criteria. The collected articles were analyzed inferentially, looking for the various gaps in the field. Based on the literature, the results showed several gaps in supporting students with intellectual/developmental disabilities through the use of AI. Since the majority of students with intellectual/developmental disabilities often experience significant, chronic, and co-occurring health conditions, the potential use of health information in AI is even more critical. Therefore, there is a clear need to develop a system that facilitates communication and access to health information for students with intellectual/developmental disabilities, which provides information to caregivers and educational providers, reduces errors, and ultimately improves the education and quality of life of these individuals.

[24] Conducted a study aimed at identifying the effect of using augmented reality technology on the academic achievement of sixth-grade students with learning disabilities in computer science. The research instruments consisted of an experimental treatment, which was an augmented reality-based application. The research measurement tools were defined as an achievement test to measure cognitive aspects of computer science. The study was applied to a sample of (150) male and female sixth-grade students with learning disabilities, randomly divided into two groups: an experimental group of (75) male and female sixth-grade students and a control group of (75) male and female sixth-grade students. After applying the measurement tools, the research found a statistically significant difference between the mean scores of the experimental group in the pre- and post-applications of the achievement test in favour of the post-application. There was also a statistically significant difference between the mean scores of the experimental and control groups in the post-application of the achievement test in favour of the experimental group. Furthermore, there was an effect of using augmented reality technology on the development of academic achievement in computer science among middle school students with learning disabilities.

The summarization of the related work is shown in Table 1 and Figure 2

Commentary on Previous Studies and Their Relation to the Current Study:

The current study aligns with the previous studies in its examination of artificial intelligence (ChatGPT) as an educational support strategy. What distinguishes the current study from the previous ones is that it specifically investigates the effectiveness of an educational support strategy using artificial intelligence (Chat GPT) in developing motivation among students with learning disabilities in private schools affiliated with the Directorate of Special Education in the Bani Obaid

© 2025 NSP
Natural Sciences Publishing Cor.

Table 1: Summary of Studies in Education

Study	Year	Technology	Target Group	Purpose / Focus	Methodology	Main Findings
Garba & Abdullahi	2024	AI	Teachers of students with special needs	Impact of AI on educational practices	Case study, interviews, surveys, observations	AI improves planning, assessment, and support for special needs education
Al-Mutairi et al.	2024	AI-based Simulation	Middle school students with learning disabilities	Enhancing scientific understanding	Pre-post test design	Significant improvement in scientific comprehension
Alexopoulos	2024	ChatGPT / AI Tools	Higher ed. students (Language majors)	Attitudes toward AI in special education	Mixed-methods, online survey ($n = 120$)	Supportive attitude, concerns about cheating, need for staff training
Hidayatillah	2024	ChatGPT	General students	Effectiveness of AI-generated teaching materials	R&D with ADDIE model, mixed methods	ChatGPT-designed materials enhance reading skills
Salem et al.	2023	Augmented Reality	Students with learning disabilities (Jordan)	Improve attention via AR	Quasi-experimental (n=48)	Significant attention improvement in experimental group
Yildiz	2023	ChatGPT Dialogues	University students	Impact on language learning motivation	Quasi-experimental, Motivation Strategies Questionnaire	AI improved self-regulation and motivation
Sawiris et al.	2023	Augmented Reality	Primary students with learning disabilities	Boost motivation and academic performance	Quasi-experimental ($n = 30$)	AR significantly improved motivation and achievement
Shawqi & Amin	2022	Augmented Reality	Primary students with learning disabilities	Develop cognition and motivation	Quasi-experimental ($n = 17$), 36 sessions	Significant gains in cognition and motivation
Kharbat et al.	2021	Artificial Intelligence	Students with intellectual disabilities	Role of AI in Education and Health Integration	Descriptive-Analytical, Literature Review	Identified gaps in health-related AI Integration
Wahbeh	2019	Augmented Reality	6th-grade students with learning disabilities	Impact of AR on academic achievement in CS	Quasi-experimental ($n = 150$)	AR improved academic outcomes compared to traditional methods

Brigade in Irbid Governorate.

5 Methodology and Procedures

The following section describes the study population and sample, the research instrument, the methods used to verify its validity and reliability, the study variables, and the statistical treatments employed to arrive at the findings.

Study Design

The study utilized a quasi-experimental design employing a pre-test/post-test control group design, which is considered the most appropriate methodology for such studies.

© 2025 NSP
Natural Sciences Publishing Cor.

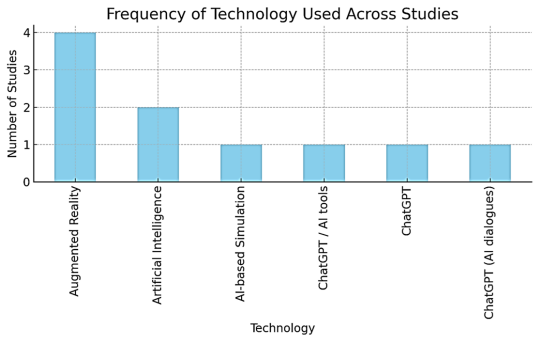


Fig. 2: Frequency of Technology

Study Participants

The study population consisted of all students with learning difficulties in the basic education stage at private schools under the jurisdiction of the Private Education Directorate in the Bani Ubaid District, Irbid Governorate, for the 2023/2024 academic year. The study sample comprised 40 sixth-grade students with learning difficulties from Arar International Academy School, selected purposefully due to the availability of a resource room and a sufficient number of students with learning difficulties at the school, as shown in Table 2.

Table 2: Distribution of the Study Sample According to Its Variables

Group	Number	Percentage
Experimental	20	50.0%
Control	20	50.0%
Total	40	100%

Table 2 presents the distribution of the study sample according to the group variable. The sample consists of 40 participants, evenly divided into two groups: 20 students (50%) in the experimental group and 20 students (50%) in the control group. This equal allocation ensures a balanced comparison between groups, which enhances the internal validity of the study's findings.

6 Research Instruments

Study Instrument:

The researcher developed the Motivation Scale for Students with Learning Disabilities after reviewing a collection of previous studies, such as those by [19] [12]. The scale consisted of (20) items using a five-point Likert scale.

Construct Validity:

To verify the construct validity of the scale, the researcher administered it to a sample of (30) male and female students from outside the study sample. This was done to determine the internal consistency of the instrument and the contribution of its constituent items by calculating the correlation coefficient between each item and the total score of the scale.

Table 3: Item-Total Correlation Coefficients for the Motivation Scale

Item No.	Correlation Coefficient	Item No.	Correlation Coefficient
1	0.69	11	0.71
2	0.66	12	0.69
3	0.73	13	0.80
4	0.75	14	0.74
5	0.77	15	0.72
6	0.80	16	0.72
7	0.83	17	0.82
8	0.75	18	0.74
9	0.71	19	0.80
10	0.67	20	0.81

Table 3 displays the item-total correlation coefficients for the Motivation Scale items. The coefficients range from 0.66 to 0.83, indicating strong positive correlations between each item and the overall scale score. These values suggest that all items consistently measure the underlying construct of motivation, demonstrating good internal consistency and reliability of the scale. The relatively high correlations, particularly for items such as 7(0.83) and 17(0.82), confirm the scale's robustness in capturing motivational aspects relevant to the study population.

7 Reliability of the Study Instrument

To ensure the reliability of the study instrument, it was verified using the test-retest method. The scale was administered and then re-administered after two weeks to a group of (30) male and female students from outside the study sample. Pearson's correlation coefficient was then calculated between their scores at the two time points, which amounted to (0.87).

The reliability coefficient was also calculated using the internal consistency method based on Cronbach's alpha equation, which amounted to (0.84). These values were considered appropriate for this study.

Educational Material

The researcher prepared the educational material and teacher's guide to evaluate the effectiveness of the

© 2025 NSP
Natural Sciences Publishing Cor.

instructional support strategy using Artificial Intelligence (ChatGPT) in enhancing motivation among students with learning disabilities. This was accomplished through reviewing a range of previous studies in both Arabic and international databases related to the effectiveness of AI-based instructional support (ChatGPT) in fostering motivation in students with learning difficulties, including the studies [21], [24].

The objective of preparing the guide was to illustrate how the instructional support strategy using Artificial Intelligence (ChatGPT) can be implemented by the special education teacher in teaching the unit Geometry and Measurement to the experimental group. This unit, selected from the sixth-grade mathematics textbook, was designed according to the AI-based support strategy to enhance motivation in students with learning difficulties in mathematics.

The guide included several sections: an introduction to the guide, an explanation of the instructional support strategy using AI (ChatGPT), application of the strategy in the Geometry and Measurement unit from the sixth-grade mathematics textbook, teaching procedures based on the strategy, the guide's objectives, instructions for its use, the educational unit and the time required for instruction, and detailed lesson plans for the topics covered in the Geometry and Measurement unit. The unit was implemented over ten instructional sessions, each lasting 50 minutes, covering five lessons: quadrilaterals, area of a parallelogram, area of a triangle, area of a trapezoid, and volume and surface area of a rectangular prism. The program was carried out over five weeks.

To ensure the content validity of the teacher's guide on the effectiveness of the AI-based instructional support strategy (ChatGPT) in developing motivation among students with learning difficulties, the initial version was reviewed by a panel of experts from the faculty members specializing in special education and learning difficulties. Their feedback was incorporated to improve the guide's clarity and to ensure its appropriateness for achieving its intended objectives, its suitability for the target age group, and the relevance of its content, instructional activities, learning resources, teaching methods, and assessment strategies. Based on the experts' recommendations, additional sections were included, such as teaching procedures according to the AI-based instructional support strategy (ChatGPT) and the guide's objectives. Moreover, modifications were made to the content of the educational material in the Geometry and Measurement lessons, including the addition of the tools used in instruction.

Study Variables:

The study included the following variables:

The effectiveness of an educational support strategy using artificial intelligence (Chat GPT) in developing motivation among students with learning disabilities.

Independent Variable: Educational Support Strategy (Artificial Intelligence (Chat GPT), Conventional).

Dependent Variable: Development of Motivation.

Statistical Analysis: Pearson's correlation coefficient and Cronbach's alpha equation were used to verify the scale's validity and reliability.

After neutralizing the effect of the pre-test scores, means, standard deviations, and one-way analysis of covariance (ANCOVA) were used for the post-test scores on the motivation scale.

8 Study Results and Discussion

The following presents the results of the study after collecting data using the study instrument, the Motivation Scale, to determine the "effectiveness of an educational support strategy using artificial intelligence (Chat GPT) in developing motivation among students with learning disabilities." The results are presented as follows: Results Related to the Main Study Question: "Is there a statistically significant difference at the significance level $(\alpha = 0.05)$ between the mean scores of students in the two study groups on the motivation scale attributed to the educational support strategy (using artificial intelligence, conventional)?

To answer this question, the means, standard deviations, and adjusted means on the motivation scale attributed to the educational support strategy (using artificial intelligence, conventional) were calculated. Table 4 and Figure 3 show these results.

Table 4: Means, Standard Deviations, and Adjusted Mean for the Motivation Scale in the Pre-and Post-Test for the Educational Support Strategy (Using Artificial Intelligence vs. Traditional Method

Teach. Strat.	N	Pre-Test Mean	Pre-Test SD	Post-Test Mean	Post-Test SD	Adjus. Mean	Error
GPT	20	3.08	0.294	3.98	0.367	**3.975**	0.086
Trad.	20	3.06	0.318	3.36	0.420	3.362	0.086

Table 4 presents the means, standard deviations, and adjusted means for the motivation scale in both the pre- and post-test for the two teaching strategies: ChatGPT-based support and the traditional method. The

© 2025 NSP
Natural Sciences Publishing Cor.

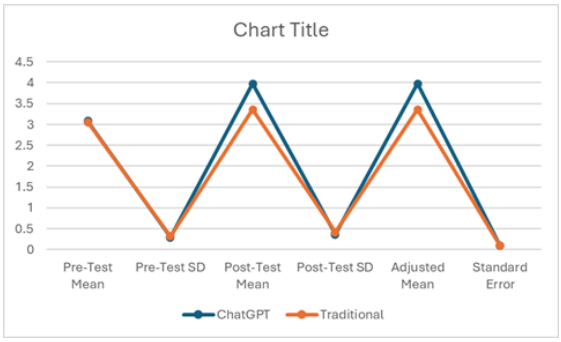


Fig. 3: Teaching Strategies: Pre-Test, Post-Test, Adjusted Means

results show that both groups had similar pre-test motivation scores (ChatGPT: $M = 3.08$; Traditional: $M = 3.06$). However, in the post-test, the ChatGPT group showed a notable improvement ($M = 3.98$) compared to the traditional group ($M = 3.36$). After adjusting for pre-test differences, the adjusted mean for the ChatGPT group was significantly higher (3.975) than that of the traditional group (3.362), with equal standard error (0.086).

This indicates that the educational support strategy using ChatGPT was more effective in enhancing students' motivation compared to the traditional approach. The presentation of these results is shown in Table 5:

Table 5: Results of One-Way ANCOVA for the Post-Test of the Educational Support Strategy (Using Artificial Intelligence vs. Traditional), Controlling for the Pre-Test

Var.	Sum of S.	df	Mean S.	F Value	Sign. Level	Eta S. (η^2)
Pre-Test	0.387	1	0.387	2.595	0.116	0.066
Group	3.750	1	3.750	25.164	**0.000**	**0.405**
Error	5.514	37	0.149	-	-	-
Adjusted Total	9.713	39	-	-	-	-

Table 5 presents the results of a one-way ANCOVA conducted to examine the effect of the educational support strategy (ChatGPT-based vs. traditional) on students' motivation, while controlling for pre-test scores. The results show a statistically significant difference between the two groups in the post-test motivation scores, $F(1,37) = 25.164$, $p < 0.001$, with an Eta Squared $(\eta^2) = 0.405$, indicating a large effect size. This means that approximately 40.5% of the variance in post-test motivation scores can be attributed to the type of instructional strategy used. No significant effect was found for the pre-test scores themselves $(p = 0.116)$, confirming that the observed differences in post-test outcomes were primarily due to the intervention. These findings clearly favor the group taught using artificial intelligence (ChatGPT), highlighting its effectiveness in enhancing student motivation compared to the traditional method.

As evident from Table 5, the effect size of the teaching method was large; the eta-squared (η^2) value explained (40.5%) of the explained (predicted) variance in the dependent variable, which is the motivation scale as shown in Figure 4.

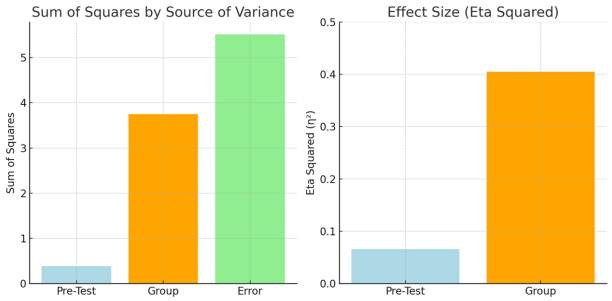


Fig. 4: Sum of Squares across sources of variance and Effect Size (Eta Squared) for "Pre-Test" and "Group

The researcher attributes this result to the fact that the educational support strategy using artificial intelligence (Chat GPT) works to provide an intelligent learning environment that makes students with learning disabilities the focus of the educational process, positively affects their learning, and attracts their motivation. It also provides an environment rich in pleasure, excitement, and focused attention for students with learning disabilities. Furthermore, it is one of the applications that offers students suggestions for problems that do not have a well-known solution method and helps in forming a suitable solution style while maintaining the flexibility of these solutions if the desired result is not reached.

This may also be attributed to the fact that the solutions provided by (ChatGPT) consider the intelligent behaviour of learning from previous experiences, situations, and practices, taking into account past errors and trying to avoid them. It also provides an environment capable of teaching students with learning disabilities thinking skills, generalizing information, inferring similarities and disregarding dissimilar or extraneous information, deducing and deriving solutions, and extracting answers in a way that considers the individual differences between students with learning disabilities

© 2025 NSP
Natural Sciences Publishing Cor.

and their special needs.

This result aligns with the findings of study [13], which demonstrated the effectiveness of developing educational materials using artificial intelligence, particularly ChatGPT, in teaching reading skills. Similarly, [25] found that incorporating ChatGPT technology as a learning material significantly increased students' motivation. Furthermore, [20] confirmed the positive impact of augmented reality technology on enhancing achievement motivation and academic performance among primary school students with learning disabilities.

The researcher attributes this outcome to the nature of the educational support strategy utilizing artificial intelligence (ChatGPT), which may have effectively fostered motivation among students with learning disabilities toward the classroom environment and the learning process. This is particularly relevant because such technology leverages electronic devices and innovative tools that align well with students' preferences and developmental trajectories in education. AI-based educational support represents a novel and modern approach that appeals to students with diverse needs, offering them an engaging learning experience through advanced technology. Since this technology is relatively recent, it requires clear and structured implementation steps within the educational field.

The educational environment, being enhanced and fertile, seeks to integrate and employ this technology by transforming traditional paper-based textbooks into interactive platforms accessible via smart devices. This transformation facilitates easier explanations by teachers and enables students with learning disabilities to achieve a deeper comprehension of lessons. Consequently, it empowers them to participate actively in innovative educational activities, thereby increasing their engagement and motivation to learn. [18] also emphasized the effectiveness of employing augmented reality and technology-rich, AI-based environments in improving attention among students with learning disabilities, further supporting the positive role of such technologies in inclusive education.

This result is consistent with the findings of study [13], which showed the effectiveness of developing educational materials using artificial intelligence (Chat GPT) and that developing educational materials using Chat GPT in teaching reading skills is effective. It also aligns with the findings of study [25], which indicated that the use of ChatGPT technology as a learning material increased students' motivation, and the study by [20], which confirmed the effectiveness of augmented reality technology in developing achievement motivation and academic achievement among primary school students with learning disabilities.

9 Recommendations

In light of the study's findings, it is recommended to adopt the educational support strategy based on artificial intelligence, particularly the use of ChatGPT, as a modern educational tool for teaching students with learning disabilities, with an emphasis on achieving effective learning outcomes. Furthermore, educators and stakeholders involved in teaching students with learning disabilities in Jordan are encouraged to utilize the study's results and integrate this AI-based support strategy into their instructional practices to enhance the quality and effectiveness of learning. Moreover, the study highlights the necessity of providing specialized training programs for teachers to familiarize them with the use of artificial intelligence tools such as ChatGPT through workshops and courses. Additionally, it is essential to equip classrooms with internet-enabled devices that enable teachers to effectively implement these AI technologies. Such measures are critical to strengthening teachers' technical competencies and ensuring the smooth and successful integration of AI tools within educational settings.

It is also recommended that special attention be paid to the security and ethical considerations associated with the use of AI technologies in the educational process, particularly in protecting student data privacy and the confidentiality of personal information. Educational institutions should adopt clear policies that ensure the responsible use of these technologies, while providing safeguards to protect digital information from any breach or leakage. Furthermore, ethical principles must be adhered to in the design and implementation of AI tools, ensuring the absence of bias or discrimination among students and maintaining the principle of fairness in the provision of educational support. This also requires providing awareness and training programs for teachers and supervisors on the ethical and legal aspects associated with the use of AI in education, to ensure a safe and inclusive learning environment that respects the rights of all learners.

10 Conclusion

This study demonstrated the significant effectiveness of an educational support strategy based on artificial intelligence (ChatGPT) in enhancing motivation among students with learning disabilities. The results indicated a clear improvement in motivation levels within the experimental group, with a substantial effect size ($\eta^2 = 0.405$), confirming that 40.5% of the observed variance in motivation was attributable to the AI-based intervention. These findings highlight the potential of integrating AI tools like ChatGPT into special education settings to support and engage students more effectively. Accordingly, the study underscores the importance of

© 2025 NSP
Natural Sciences Publishing Cor.

adopting innovative, technology-driven strategies in educational practices and recommends that special education teachers consider incorporating AI-based support methods to foster motivation and improve learning outcomes among students with learning difficulties.

*Acknowledge The authors are grateful to the anonymous referee for a careful checking of the details, and for helpful comments that improved this paper.

References

[1] N. Abd Majid, N. Yunus, M. M. Hashim, and M. A. Embi, "Empowering digital education: A systematic review of adaptive learning and technological practices,"SAGE Open, vol. 15, no. 1, pp. 1–14, (2025).

[2] P. Alexopoulos, "Higher education students' views on the use of artificial intelligence for teaching students with specific learning disabilities, "European Journal of Open Education and E-Learning Studies*, vol. 9, no. 1, (2024).

[3] M. Al-Hadi, "Revolutionizing education: Unleashing the power of ChatGPT/AI to empower educators,"Journal of the Egyptian Society for Information Systems and Computer Technology, vol. 36, no. 36, pp. 77–84, (2024).

[4] H. B. H. Al-Ibrahim, "Use of assistive technologies for pupils with learning difficulties in resource rooms," Journal of Scientific Research in Education*, vol. 18, no. 1, pp. 535–586, (2017).

[5] F. F. S. Al-Mutairi, A. Jalil, S. F. M. Abdul, and S. Abdul Mohsen, "Using simulation through artificial intelligence to develop scientific concepts among middle school students with learning difficulties,"Studies in Psychological and Educational Counseling*, vol. 7, no. 1, pp. 147–166, (2024).

[6] A. Al-Qarni and S. Imran,"The effect of using micro-learning based on artificial intelligence on the development of programming skills and motivation to learn among first-year secondary school students," Scientific Journal of the Faculty of Education - Assiut University*, vol. 33, no. 2, pp. 465–492, (2020).

[7] A. Bressane, D. Zwirn, A. Essiptchouk, A. Saraiva, A. C. V. de Campos Carvalho, F. L. Formiga, J. K. S. Formiga, and R. G. Negri, "Understanding the role of study strategies and learning disabilities on student academic performance to enhance educational approaches: A proposal using artificial intelligence,"Computers and Education: Artificial Intelligence*, vol. 6, p. 100196, (2024).

[8] B. Carr, "Revolutionizing education: Unleashing the power of ChatGPT/AI to empower educators,"Technology and the Curriculum: Summer 2023, (2023).

[9] D. Choi, S. Lee, S. I. Kim, K. Lee, H. J. Yoo, S. Lee, and H. Hong, "Unlock life with a chat (GPT): Integrating conversational AI with large language models into everyday lives of autistic individuals,"in Proceedings of the CHI Conference on Human Factors in Computing Systems, pp. 1–17, (2024).

[10] A. S. Gibbons, "Model-centered instruction,"Journal of Structural Learning and Intelligent Systems*, vol. 14, pp. 511–540, (2001).

[11] B. Graefen and N. Fazal, "From chatbots to virtual tutors: An overview of ChatGPT's role in the future of education," Archives of Pharmacy Practice*, vol. 15, no. 2, pp. 43–52, (2024).

[12] F. Hariri, "The impact of the use of chatbots 'GPT Chat' on academic achievement, motivation, and classroom interaction in learning mathematics among tenth grade female students in Irbid Governorate," M.S. thesis, Al al-Bayt Univ., Mafraq, Jordan, (2024).

[13] B. W. D. Hidayatillah, "Developing educational materials for female students using artificial intelligence: ChatGPT in teaching reading skills at the International Islamic Mahara Institute Malang," Ph.D. dissertation, Univ. Islam Negeri Maulana Malik Ibrahim, Malang, Indonesia, (2024).

[14] A. D. Işik, "Use of technology in constructivist approach," Educational Research and Reviews*, vol. 13, no. 21, pp. 704–711, (2018).

[15] F. F. Kharbat, A. Alshawabkeh, and M. L. Woolsey, "Identifying gaps in using artificial intelligence to support students with intellectual disabilities from education and health perspectives," Aslib Journal of Information Management, vol. 73, no. 1, pp. 101–128, (2021).

[16] V. Liu, E. Latif, and X. Zhai, "Advancing education through tutoring systems: A systematic literature review,"arXiv preprint, arXiv:2501.12345,(2025).

[17] S. Rakap, "Chatting with GPT: Enhancing individualized education program goal development for novice special education teachers," Journal of Special Education Technology*, vol. 39, no. 3, pp. 339–348, (2024).

[18] E. O. A. R. Salem, E. M. Al-Qusayrin, and R. A. Al-Kanani, "The effectiveness of using augmented reality technology in improving attention among students with learning difficulties,"Journal of the College of Education, vol. 20, no. 118, pp. 288–319, (2023).

[19] E. Sawalma, "The effectiveness of an application based on artificial intelligence in developing logical thinking skills and motivation towards learning computer material among eighth grade students," M.S. thesis, Middle East Univ., Amman, Jordan, (2022).

[20] M. J. Sawiris, A. Zaree, and A. Muhammad, "The effectiveness of employing augmented reality technology in developing motivation for academic achievement and achievement among primary school students with learning difficulties," Journal of the College of Education (Assiut), vol. 39, no. 10, pp. 327–346, (2023).

[21] R. Shawqi and A. Amin, "Developing an augmented reality-based program to enhance cognitive processes, mental motivation, and learning perceptions among primary school students with learning difficulties,"Fayoum University Journal of Educational and Psychological Sciences, vol. 16, no. 2, pp. 570–678, (2022).

[22] F. H. Siregar, B. Hasmayni, and A. H. Lubis,"The analysis of ChatGPT usage impact on learning motivation among scout students,"International Journal of Research and Review, vol. 10, no. 7, pp. 632–638, (2023).

[23] R. Tamdjidi, "ChatGPT as an assistive technology to enhance reading comprehension for individuals with ADHD," B.S. thesis, Degree Project in Media Technology, KTH Royal Institute of Technology, Sweden, (2023). Available: https://urn.kb.se/resolveurn=urn:nbn:se:kth:diva-330731

© 2025 NSP
Natural Sciences Publishing Cor.

[24] H. F. S. Wahba, "The impact of the use of augmented reality technology on academic achievement in computers among students with learning difficulties in the sixth intermediate grade in the State of Kuwait, "Journal of the Faculty of Education in Mansoura*, vol. 108, no. 6, pp. 1759–1793, (2019).

[25] T. A. Yıldız, "The impact of ChatGPT on language learners' motivation," Journal of Teacher Education and Lifelong Learning*, vol. 5, no. 2, pp. 582–597, (2023).

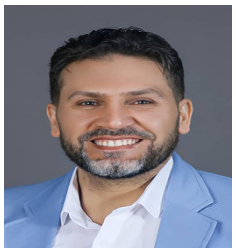
Reem Abdallah Al-Kenani is an Associate Professor in Special Education and Psychological Counseling. She currently serves as Dean of Student Affairs at Ajloun National University. With a Ph.D. from Amman Arab University, she has held academic and administrative roles in universities across Jordan, Saudi Arabia, and the UAE. Dr. Al-Kanani has participated in international conferences, supervised numerous master's theses, and published research in Scopus-indexed journals. She has authored a specialized book and received the prestigious Obadah Prize for Scientific Research in 2024. She is also an active member of Rehabilitation International. https://orcid.org/0009-0000-3863-6192

Maher Tayseer Sharadgah is an Associate Professor of Special Education. He worked at the College of Education, Umm Al-Qura University (Saudi Arabia) from 2013 to 2023. Currently, he is a Lecturer in the Department of Special Education, Amman Arab University, located in Amman, Jordan (Amman Street, Mobus District). His research interests focus on special education, particularly in the areas of hearing impairment and autism. He can be contacted at: m.sharadqa@aau.edu.jo ORCID: 0000-0001-6130-9683

Randa Mousa Al-Momani is an Associate Professor of Special Education at Princess Alia University College, Al-Balqa Applied University in Jordan. She holds a Ph.D. and M.A. in Special Education from Amman Arab University, in addition to a Higher Diploma in Learning Disabilities and a B.A. in Classroom Teaching. Her research focuses on learning disabilities, visual and hearing impairments, and autism. ORCID: 0000-0002-9724-3847

Burhan Mahmoud Hamadneh is a professor in the Department of Special Education at Ajloun National University and Director of the Center for Consultation and Community Service. He has led awareness lectures on combating extremist ideologies and electronic recruitment, and has supervised master's theses in the field of learning disabilities education.

Mohannad Igdaifan Alseraa is a specialist in psychological counseling working at the Ministry of Education in Jordan. He is actively engaged in the field of school counseling and has contributed to numerous activities and published research in psychological counseling. His academic and professional interests focus on counseling for people with disabilities and their families, and he plays a key role in promoting and enhancing counseling services within the Ministry of Education.



Ahmed A. Elngar is an Associate Professor and Head of the Computer Science Department at the Faculty of Computers and Artificial Intelligence, Beni-Suef University, Egypt. Dr. Elngar is also an Associate Professor of Computer Science at the College of Computer Information Technology, American University in the Emirates, United Arab Emirates. Also, Dr. AE is an Adjunct Professor at the School of Technology, Woxsen University, India. Dr. AE is the Founder and Head of the Scientific Innovation Research Group (SIRG). Dr. AE is a Director of the Technological and Informatics Studies Center (TISC), Faculty of Computers and Artificial Intelligence, Beni-Suef University. Dr. AE has more than 150 scientific research papers published in prestigious international journals and over 35 books covering such diverse topics as data mining, intelligent systems, social networks, and smart environments. Dr. Ellngar research areas include the Internet of Things (IoT), Network Security, Intrusion Detection, Machine Learning, Data Mining, and Artificial Intelligence. Big Data, Authentication, Cryptology, Healthcare Systems, Automation Systems. ORCID ID: 0000-0001-6124-7152

© 2025 NSP
Natural Sciences Publishing Cor.