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Effect of Magic School AI Tool on Elementary Students' Academic Achievement

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Abstract

This research was designed to compare the academic achievement of elementary students by using Magic School AI (Artificial intelligence tool) and traditional teaching methods. The main objective of the study was to assess the effectiveness of Magic School in enhancing the academic achievement of elementary-level students. The research was quantitative in nature and it used a quasi-experimental design. The tool of the research was a self-developed achievement test from seventh grade General Science textbook. Tool was developed using Magic School AI. Simple random sampling technique was used to select two sample classes from among the population. These two classes and their students served as sample of the study. Selected classes were assigned to as control and experimental groups. The treatment span was six weeks. Collected data was analyzed using statistical techniques (i.e., Mean, SD, and t-test). On the basis of the findings of the study it was concluded that students' academic achievement was almost the same before the treatment. After the treatment, the academic achievement of students in the experimental group was higher than that of the control group. Thus, equal-ability students when taught through the Magic School AI tool, performed better after the treatment. Hence, the integration of Magic School AI in the teaching method proved a better alternative than the traditional method for teaching science at the elementary level.

Keywords: Artificial intelligence; Magic school AI; Academic achievement; Engagement; Problem solving skills; Motivation.

Introduction

A new educational environment is emerging as a result of artificial intelligence. It is transforming the static classroom into an interactive, individualized learning space. We are seeing a paradigm change in both student and teacher learning as a result of AI's use. It has completely changed how teachers teach. In the future, thanks to this technology revolution, education will be accessible, engaging, and individualized for each student, allowing us to unleash the full potential of every learner.

Sustainable Development Goal 4 is to guarantee inclusive and equitable quality education and to incite opportunities for lifelong learning for all. AI is intended to support personalized and improved learning outcomes. Equal learning facilities for everyone throughout life are emphasized. AI technologies are employed to guarantee inclusive and democratic access to education. It also gives everyone access to suitable learning opportunities, including marginalized groups i.e. refugees, individuals with disabilities, out-of-school children, and residents of remote and less privileged areas (Tapalova & Zhiyenbayeva, 2022; Pedro, Subosa, Rivas, & Valverde, 2019).The tele-robot enables students with special needs to participate in schooling from home or a medical facility, ensuring continuous learning. This technology promotes inclusive and widespread educational access. AI contributes to the advancement of collaborative learning. (The capacity to is a revolutionary aspect of computer-assisted collaborative learning.) It can bring together students even if they aren't in the same room. Students have the freedom to choose their own study locations. Collaborative learning with computers relies heavily on online asynchronous discussion forums. The discussion groups are monitored by AI systems that use machine learning and text processing techniques. Insights on student conversations and suggestions for guiding their engagement and learning are provided to teachers in this way. Artificial intelligence (AI) uses a variety of methods to greatly aid in the customization of learning (Smith & Johnson, 2020).Teachers will be able to spend more time with pupils who are struggling since AI can improve their working conditions. Making assignments and responding to commonly requested enquiries are examples of the mundane and administrative duties that can quickly take a teacher's time. Teachers can devote more time to guiding students and communicating with them on an individual basis when they work in tandem with a virtual teaching assistant in a dual-teacher model. This assistant takes care of mundane but necessary responsibilities. In the realm of Computer Assisted Learning (CAL), where teachers and AI assistants work together, new ways of assisting students' learning processes through digital and AI technologies are starting to show promise (Steffi Grado, 2024).

The technology of AI creates personalized education programs which discover students' abilities together with their most appealing lesson topics and educational materials. Intelligent Tutoring Systems stand out as vital elements in new technological methods which seek to boost educational delivery in developing countries according to recent research investigations. AI assessment practices help teachers save time grading tests which creates opportunity to focus their energy on essential duties. AI reacts beyond multiple-choice tests to assess both multiple-choice questions and written essays. The educational sector stands as one of the critical fields where Artificial Intelligence (AI) operates noticeably throughout multiple domains. Educational environments become ready in the future to receive AI technologies which will reshape teaching approaches and adapt learning approaches and boost educational outcomes. Academic institutions utilize artificial intelligence for two categories of applications including smart tutoring solutions and personalized adaptive learning solutions and automated exam scoring techniques and digital educational guides.

The developed educational tools use individual student needs as a basis for personalized content delivery which in turn improves student understanding and engagement. Educational institutions seek diverse student needs solutions through AI tools which provide modern approaches to established education problems. Educators can use analyzed data effectively to create individualized support programs which establish an inclusive learning environment (Pedro et al, 2019).

Teachers now have the opportunity to improve their educational practice through the introduction of artificial intelligence (AI) tools according to Mishra & Varshney (2024). The quantity of research articles focusing on AI application in higher education has risen through analyses conducted between 2007 and 2018. AI-driven algorithms like Intelligent Tutoring Systems function effectively to mimic human tutor learning sessions and give students prompt support according to Zawacki-Richter et al. (2019).

Modern academic research focuses on examining how artificial intelligence (AI) affects the educational performance of students in elementary schools. The results of a thorough analysis revealed that AI delivers small positive effects on students' mathematical performance according to Hwang et al. (2020) but this effect varies based on the taught subjects and grade level of each student. The educational program which combines software education and AI image recognition technology outperformed standard teaching methods while increasing computational thinking ability alongside STEAM literacy according to Lee & Kwon (2024). The developers created LAISES as a learning integration platform that combines AI technology with personal learning styles to promote digital education opportunities for students in primary school. Such research findings confirm that AI-based educational methods create beneficial impacts on academic success and learning experiences of elementary students across multiple subjects (Fahsyah, Nurzaman, Tedja, Kusuma, Kurniawan, Bhutkar, & Johan, 2021).

Educational applications of AI drive sustainable development by creating new opportunities as well as implementing complex problems. AI opportunities have started to emerge in developed nations while multiple applications become tested through both public and private initiative programs. The study includes illustrations from developing nations to demonstrate both the prospects and dangers that come with using AI-based instructional software for personalized education. China is a model because of its innovative public-private partnerships, state-of-the-art technology, and one-of-a-kind scope, dimension, and degree of comprehensive perspective. The South American nation of Uruguay leads the field as one of the smallest developed Latin American countries. Various nation-based and private educational programs existing in developing nations demonstrate how advanced AI education stands at present. While not complete lists these cases exist to illustrate existing AI educational practices in developing countries (Pedro et al, 2019). China emerges as a significant player in AI development because of its expanding size together with its recent technological advancements and economic growth as the nation aims to dominate world AI leadership by 2030. The national AI education strategy stands as part of this vision which the government developed (Jing, 2018).

Funds from private foundations will support the state-led initiative. A private digital education startup called Hujiang is developing voice and image recognition software that can read students' emotions and provide them online artificial intelligence feedback. An adaptable software called Liulishuo can teach 600,000 pupils English for the price of one teacher. In order to help students prepare for the Gaokao university admission test, Master Learner is creating a "Super teacher" that can answer 500 million questions at once. Every local government agency in China is required by the Ministry of Education to devote a minimum of eight percent of its budget to educational technology in 2016. With nearly all schools having internet access, this nation is setting the stage for the biggest digital education experiment in the world. The use of artificial intelligence in the assessment of essays is a significant development in China (Zhou & Lee, 2021).Lots of people in Latin America have been trying to get computers into classrooms as much as possible recently. When it comes to digital education, Uruguay's Plan Ceibal is head and shoulders above the competition. "Mathematics Adaptive Platform" (PAM), an online adaptive learning system that is customized to the national curriculum, is one of its main endeavors. Based on an analysis of each student's experiences, PAM provides personalized feedback that is tailored to their ability level. Implemented in 2013 as part of the one Laptop Per Child effort, PAM has been shown to have a favourable influence on learning. The Per Child program offers students a wide range of activities, totaling over 100,000, to provide personalized assistance based on their individual knowledge levels. PAM assists students through a collection of more than 25 thousand step-by-step exercises and 2800 feedback patterns that explain the solutions to each exercise. The official website of Plan Ceibal specifies PAM platform features for learning which include immediate responses, student autonomy, easy correction, personalized learning, classroom gamification, encouragement of group work and adaptation to class and individual rhythms as well as diverse activities. Latinoamerica currently implements various public initiatives which aim to integrate artificial intelligence (Pedro et al, 2019) within educational systems.

Mec Flix serves Brazilian students for ENEM national exam preparation through platform services operated by Brazil's federal government. The system allows students to access AI-based features for log-in authentication before they can build custom video lesson playlists which are generated from personalized recommendations. AI components within philanthropic projects directed at education emerge throughout developing countries. IBM uses technology to battle poverty by implementing the 'Simpler Voice: overcoming Illiteracy' project. This program employs artificial intelligence technology to assist illiterate and low-literacy adult students through visual interpretation of texts and basic word communication that enhances their ability to handle reading materials. The initiatives work to provide assistance that enables people to overcome obstacles in their daily schedule. Learning Equality operates as a non-profit organization derived from Khan Academy which uses platform content for developing nations (Pedro et al., 2019).

With the goal of providing low-income communities with access to quality education, Learn Equality developed Kolibri, an open-source educational platform. A number of global charitable initiatives use contests as a tool to encourage creativity. As an example, in 2019, the XPrize Foundation awarded $15 million in the Global Learning XPRIZE to a team of developers from all around the world. The goal of the prize is to develop open-source, scalable software that can help children in underdeveloped countries learn fundamental reading, writing, and math on their own within a 15-month timeframe. An AI-based learning system that uses data-driven algorithms, voice recognition, and robot tutors to personalize education on a massive scale was developed by researchers from Carnegie Mellon University. One significant solution to this problem is the Robo Tutor XPrize Foundation (2019). Several of these "first-generation AI initiatives in education in developing countries" are either led by commercial companies with an eye towards profit or are joint ventures between private companies and public agencies. Geekie is an adaptive learning platform that the Brazilian Ministry of Education endorses. Over 5,000 schools in Brazil use it to provide students with personalized learning experiences (WISE, 2011; Rigby, 2016). The software uses machine learning to personalize its content based on each student's engagement with it. On top of that, it gets better at spotting pupils' learning difficulties, which teachers may fix by implementing the right interventions.

Teachers, students, and content creators in Africa and other emerging countries can take use of Daptio's online software service, which provides a personalized learning solution through deep analytics. The company was founded in 2013 and is headquartered in Cape Town, South Africa. Daptio is an AI-powered platform that helps educators, mentors, and students gauge one other's skill levels and tailor their content delivery appropriately. Introduced in 2016, M-Shule is a mobile platform in Kenya that uses artificial intelligence to tailor lessons to each student's strengths and weaknesses while adhering to national curriculum standards. Lessons are delivered via text message. In order to give parents and schools useful information, M-Shule also tracks and analyses how well students are doing in class. School Desk in Uganda, Siyavula in South Africa and Nigeria, and Virtual Learning Africa are just a few of the developing country educational technology efforts that include some form of artificial intelligence (AI) in their lessons (Pedro et al, 2019).

TopDog (South Africa), Private companies in Africa that create educational content for students of all levels, along with Zaya Learning Labs' AI-enhanced EMIS from India, could significantly improve their ability to automatically analyze data and produce data dashboards for schools and national levels. Looking ahead, EMIS also has the potential to develop predictive decision-making algorithms. Both developed and developing nations are keen on upgrading their existing EMIS to more dynamic and integrated learning management systems that can facilitate real-time decision-making across the board in the education sector (Pedro et al., 2019), even though research in this area is still in its infancy.

With over 1.2 million students enrolled, the United Arab Emirates (UAE) Ministry of Education has deployed a state-of-the-art data analytics platform to 70 universities and 1,200 elementary schools. The system combines different data elements consisting of curriculum standards alongside teacher development processes and educational material resources together with funding methods and system procedures alongside performance rating systems along with feedback received from teaching staff and students and their guardians and assessment results from PISA and TIMSS. The UAE has developed a specialized data analytics division at its Ministry of Education to research strategic educational outcomes with machine learning algorithms inside the nation. Contrasting levels of wealth do not stop other nations from exploring AI-boosted Education Management Information Systems (EMIS) with Mlango in Kenya representing one such initiative that pairs public organizations with private sector entities (Pedro et al, 2019).

Quid's digital attendance system enables schools to monitor student presence through daily tracking and produces prompt reports and important knowledge about student information patterns and attendance status. The system utilizes advanced analytics to track student attendance from both class settings and the school education environment for teacher and field team identification of students with poor attendance. The interactive learning platform of Quid provides students and teachers with a variety of learning resources that combine virtual math tutoring with curriculum-specific revision guides.

Both Bhutan and Kyrgyzstan plan to build modern education information management systems through 2024 that will track individual student progress for personal learning assistance while achieving better school administration. The integration of AI-enhanced learning analytics into their systems will become possible because of their current development progress. UNICEF Innovation conducts research into DL algorithm functionality through a school mapping project which collaborates with academic organizations and private businesses. The research proves that Deep Learning algorithms successfully detect schools in satellite images thus revealing schools that were previously unmapped. The potential of artificial intelligence continues to rise in its ability to advance investigations toward sustainable development goals. The Inter-American Development Bank used its competition "New debates Data for development" to fund the research titled "Big Data for public policy in education: the Chilean case". Chilean researchers applied government open data to study the relationship between student dropout rates and social characteristics and geographical regions and education variables. An algorithm was developed through the researchers' analysis of 127 student characteristics together with their geographical locations to create detailed predictions about schools, access, academic performance and dropouts. The UNESCO Education Sector leads AI initiatives to achieve SDG 4 through programs dedicated to TVET education alongside Ericsson and other organizations to improve AI abilities of young people. The initiative aims to develop an AI training course database alongside establishing multiple centers and hosting hackathons which target large-scale training delivery for youth. People can learn AI-related material through MOOCs and Khan Academy in addition to obtaining training through programming and data science and machine learning courses provided by universities. The development of AI-related skills training receives support from two primary grassroots initiatives known as Code.org and EU Code Week (Pedro et al, 2019).

Statement of the problem:

The increasing presence of technology in schools does not eliminate failure of students to reach expected academic outcomes at the elementary level. The distinct educational requirements of students fail to receive sufficient attention when traditional teaching methods operate independently. In response, AI tools like "Magic School" have emerged as innovative solutions aimed at enhancing student engagement and learning effectiveness. However, there is limited research on the actual impact of such AI tools on academic achievement at the elementary level. This study addresses the need to evaluate the effectiveness of "Magic School" in improving the academic performance of elementary students, helping educators understand its potential role in fostering better educational outcomes.

Objectives of the study:

The objectives of this study were as;

1. To determine the baseline of academic achievement of elementary level students.
2. To assess the effectiveness of Magic School in enhancing the Academic achievement of elementary level students.

Research Questions

1. What is the academic achievement of 7th grade students in the subject of science before the intervention?
2. What is the difference in academic achievement between the students of control and experimental groups after the intervention?

Limitation:

Following are the limitations of the study;

i. Limited access to all schools and communities to Magic School AI tool.
ii. Teachers may not well trained to teach through Magic School AI tool.
iii. Restricted access to technology and unreliable internet connectivity in Tehsil Jhang may hinder the effective implementation of Magic School AI tools in classrooms.
iv. Cultural attitudes towards education and technology may vary across different regions, influencing the acceptance and adoption of Magic School AI tool in classrooms

Literature Review

The use of AI in the classroom has been the subject of multiple investigations. Results show that pupils' academic performance improves when teachers use AI tools in the classroom. In a study, Ouyang, Wu, Zheng, Zhang, and Jiao (2023), found that students who used the intelligent tutoring system showed significant improvements in their mathematical abilities compared to those who received traditional instruction. Compute models strengthen student academic success through their ability to deliver individualized teaching materials and specific performance assessments. Students who used AI writing tools performed better in writing tasks because they enhanced their writing skills with organized content and improved grammar and vocabulary according to study findings. Research indicates AI tools boost educational results for student learning in mathematics and writing subjects when introduced to educational practice (Ouyang et al., 2023).

Researchers must review academic achievement studies that analyze the impact of AI teaching tools on student results. Smith and Chen performed an extensive examination of educational results obtained by students between traditional teaching methods and AI-integrated teaching methods. Students demonstrated enhanced academic results when taught with AI-enhanced teaching approaches according to the research findings produced by their study. The results established a clear positive link between AI integration and educational outcomes. This research investigation provides essential academic findings related to AI device impacts on student achievement results thus supporting this study's research goals (Thomas et al., 2024).

The literature review represents studies with recommendations about effective AI tools implementation in educational settings. Lee and Park delivered operational implementation guidelines for educators and policymakers to supervise AI technology adoption in education by demonstrating how pedagogical cohesion and faculty backing serve as vital components for success. Their practical advice provides important direction for the AI-operated teaching practice implications which support the stated project objectives. Existing literature synthesis with critical analysis will provide theoretical basis and practical understanding about AI tool integration in education which will support understanding of study goals and research questions (Celik et al., 2022). Educational institutions of all nations possess the ability to build successful learning opportunities during the high-tech twenty-first century period. Research on the effects of IT has been extensive, and the results show that educational institutions can benefit greatly from incorporating IT into their curricula (Celik et al., 2022). New technological integration necessitates the development of digital literacy in both students and teachers, according to the researchers (Pihir et al., 2018). Although "digital transformation," "artificial intelligence," and "state of the art" are relatively recent terms, the phenomenon has been around for a while.

The procedures that back up educational information systems have been the subject of much debate in the last few decades. There are a number of well-known issues with digitization, and many different approaches to fixing them have been considered and implemented (Borg & Smith, 2018). The field of artificial intelligence (AI) is booming, and with it, the number of educational applications. For instance, according to Zhang and Aslan (2022), the education industry in developed countries is expected to experience a nearly 48% growth in the artificial intelligence market from 2018 to 2022.

In order to examine how students' usage of digital technology improves their academic performance, Al-Abdullatif & Gameil (2021) set out to construct a model. The main objective of this study, which used the technology acceptance model (TAM) as its basis, was to uncover the digital technology environment in terms of its usefulness, ease of use, and attitude towards integrating digital technology. The study also aimed to determine how these factors impact students' learning engagement and academic achievement in project-based learning (PBL). To address this, the study's authors provided a model that may be useful in doing the investigation. Students' academic performance increases when digital technology is used in the classroom, according to Al-Abdullatif and Gameil (2021). This is because students are more involved in their own learning and there are factors related to technology-assisted learning (TAM).

Task engagement and performance improved when AI-supported systems took into account pupils' emotional states with their cognitive traits (Hwang et al., 2020). According to the study's findings, AI can cater to students' emotional and affective requirements, which may improve their academic performance. This discovery lends credence to the notion that AIEd technology designs ought to be more inclusive to cater to the diverse preferences and demands of students. Recent reviews of literature on AIEd have often pointed out that educational perspectives are lacking in AIEd research, development, and implementations (Chen et al., 2020).

Future research directions can be suggested by various technologies and strategies employed in smart classrooms. Although our method to presenting smart class concepts is similar to this survey, we concentrate on how smart courses leverage emerging technology in conjunction with artificial intelligence (Saini et al., 2019).

In various forms, including computer programmes, web-based chatbots, online platforms, and humanoid robots, ΓI has found extensive usage in education. In addition to a broad overview of technology, this survey covers a variety of educational technologies and discusses in depth the pros and cons of using AI in the classroom (Chen et al., 2020).

The potential applications of artificial intelligence in education are many, ranging from AI-driven assessments to automated routine tasks for educators and individualized lessons for pupils (Popenici & Kerr, 2017). The creation of personalized tutoring systems that take into account each student's knowledge base, areas of strength and weakness, and other factors is one use of AI in education (Hwang et al., 2020).

Communicating back and forth between instructors and their students is crucial to online education. Improved student happiness and learning outcomes are associated with teacher-student interactions characterized by presence, support, and communication (Im & Kang, 2017). Im and Kang (2019) found that the learner-instructor connection influences students' confidence, self-esteem, and willingness to study. Because of AI systems, "a profound effect in the classroom, altering the dynamic between instructor and student" will happen. There has to be more research into the how's and whys of how various AI systems interact with online instructors and students. On the other hand, Guilherme (2019) notes that nothing is known about how AI systems affect online course interactions between instructors and students. In the realm of education, AI has great promise, especially for increasing student access to high-quality education, enhancing the quality of their learning experiences, and determining the most efficient methods to accomplish certain learning objectives. The employment of artificial intelligence robots to replace human instructors or at least some positions within the teaching profession has been publicly supported by several academicians. Additionally, Yang et al. (2019) emphasized the need of integrating AI across disciplines.

Research Design

This study employed quasi-experimental design and non-equivalent control group was used.

Population

The population of this study consisted of seventh-grade male students studying in elementary and secondary schools in Tehsil Jhang in the academic year 2024–2025.

Sample

For the sample of the study, two classes of seventh-grade were selected from the population. These two classes and their students served as the sample of the study.

Research Tool

A self-developed achievement test was used as the tool of this research study. The tool was generated through Magic school AI by giving all the instruction. The questions included in the tool were developed on the multiple-choice (MCQ's) question pattern.

Process of Developing Research Tool

The seventh-grade general science the units of textbook "Structure of an Atom", "Chemical bond" and "Solution" led to the developing of an achievement test. This test was to be used as pre-test and post-test. The tool consisted 60 questions from three units of general science textbook, 20 questions from each unit.

Procedure of the Study

Each class took a pretest, and then they were randomly allocated to either the experimental or control group based on their results. Each group consisted of 25 students; 25 were randomly assigned to the control and experimental groups, respectively. The researcher herself used the Magic School AI programme to teach the students in the experimental group. Regular classroom instruction was provided to the control group by an educator who shared the researcher's educational background. In terms of infrastructure, school atmosphere, student socioeconomic level, family background, teacher credentials, promotion policies, and resource availability, the chosen schools were also representative of the public sector as a whole.

The seventh grade general science students in the control and experimental groups first took pre-tests covering topics such as "Structure of an Atom," "Chemical Bond," and "Solution" in units 1 through 3. The researcher then used the Magic School AI Tool to educate the experimental group, while the control group received instruction based on more conventional approaches. This programme lasted for a total of six weeks. Afterwards, both the control and experimental groups were given post-tests for the first unit of seventh grade general science, "Structure of an Atom," as well as the second and third units, "Chemical Bond" and "Solution," respectively. The researcher formed small groups of four or five students based on the available resources and the degree to which they could implement the project.

Results

Table 1: *Comparison of the control and experimental groups before the treatment on items of "Structure of an Atom"*

	Total Scores	Group	N	Mean	SD	*t*	df	*p*
Structure of an Atom	20	Control	25	5.84	.943	1.091	48	.281
		Experimental	25	5.56	.870			

Items from the "Structure of an Atom" unit were used to compare the experimental and control groups prior to treatment (see Table 1). Since Levene's Test for Equality of Variances yielded a significance level of.831, which was more than.05., the assumption of equal variance was derived from this. What about the experimental group (n=25, Mean=5.56, SD=.870; t=1.091, p=.281) and the control group (N=25, Mean=5.84, SD=.943)? That is to say, given the p value is more than.05., there was no discernible difference in the academic performance of the children in the two groups prior to therapy.

Table 2 Comparison of the control and experimental groups before the treatment on items of "Chemical Bond"

Items	Total Scores	Group	N	Mean	SD	*t*	df	*P*
Chemical Bond	20	Control	25	5.28	.737	-1.749	48	.087
		Experimental	25	5.80	1.291			

Items from the "Chemical Bond" unit were compared between the control and experimental groups prior to treatment in Table 2. It was presumed that the variances were equal because Levene's Test for Equality of variances yielded a significance value of.017, which was greater than.05. Considering the experimental group (N=25, Mean=5.80, SD=1.291; t=-1.749, p=.087; and the control group (N=25, Mean=5.28, SD=.737)]. In other words, there was no statistically significant difference in the kids' academic achievement between the groups before the treatment, since the p value is bigger than.05.

Table 3: Comparison of the control and experimental groups before the treatment on items of "Solution"

Unit	Total Scores	Group	N	Mean	SD	t	df	*P*
Solution	20	Control	25	5.84	1.313	-.341	48	.735
		Experimental	25	5.96	1.172			

Table 3 compares the experimental group to the control group before treatment based on items from the "Solution" unit. We may infer that the variances were equal since Levene's Test for Equality of Variances has a significance level of.559, which is more than.05. Regarding the experimental group (N=25, Mean=5.96, SD=1.172; t=-.341, p=.735) and the control group (N=25, Mean=5.84, SD=1.313), respectively. That is to say, given the p value is more than.05., there was no discernible difference in the academic performance of the children in the two groups prior to therapy.

Table 4: Comparison of the control and experimental groups before the treatment on items of three units "Structure of an Atom", "Chemical Bond", and "Solution"

Unit	Total Scores	Group	N	Mean	SD	*t*	df	*p*
"Structure of an Atom", "Chemical Bond", and "Solution".	60	Control	25	16.88	1.740	-.639	48	.526
		Experimental	25	17.20	1.803			

The control and experimental groups were compared before treatment in Table 4, which includes items from the "Structure of an Atom," "Chemical Bond," and "Solution" sections. Assumption of equal variance was supported by the significant values obtained from Leven's Test for Equality of variance, which were.929, which were greater than.05. Results for the control group (N=25, Mean=16.88, SD=1.740) and the experimental group (N=25, Mean=17.20, SD=1.803) are presented. Here we have 48 degrees of freedom, a t-value of -0.639, and a p-value of.529. There was no statistically significant difference between the two groups in terms of the students' pre-treatment academic achievement (p >.05).

Table 5 Comparison of the control and experimental groups after the treatment on items of unit "Structure of an Atom"

Unit	Total Scores	Group	n	Mean	SD	t	df	*P*	η2
Structure of an Atom	20	Control	25	11.48	2.104	-14.649	48	.000	0.811
		Experimental	25	18.28	.980				

Table 5 compares the control and experimental groups' treatment outcomes on the elements of the "Structure of an Atom" unit. We may infer that we did not assume equal variances as Levene's Test for Equality of Variances had a significance level of.001, which is lower than.05. The outcomes demonstrate that there was a significant difference between the control group (N=25, Mean=11.48, SD=2.104) and the experimental group (N=25, Mean=18.28, SD=.980), with a p-value of.000 and a t-value of -14.649 at p<.05. There was a significant difference (p <.05) between the two groups in regards to the academic accomplishment of students on the "Structure of an atom" question after therapy. Statistical analysis revealed that the two groups were significantly different after treatment. A high Eta2 value of 0.811 indicates a robust impact. It was a very noteworthy discovery that the experimental group fared better academically than the control group.

Table 6 Comparison of the control and experimental groups after the treatment on items of unit "Chemical Bond"

Unit	Total Scores	Group	n	Mean	SD	*t*	df	*P*	η2
Chemical Bond	20	Control	25	11.44	2.162	-12.150	48	.000	0.755
		Experimental	25	17.44	1.193				

After the "Structure of an Atom" questions were administered, Table 6 shows the comparison between the control and experimental groups. We may infer that we did not assume equal variances as Levene's Test for Equality of Variances had a significance level of.001, which is lower than.05.

The statistical analysis showed a p-value of.000 and a t-value of -12.150 at p<.05, with 25 individuals in the control group and 17 in the experimental group. Less than 0.05 was the p-value. After therapy, there was a statistically significant difference between the groups. A statistically significant difference (p <.05) was seen between the two groups following treatment. With an Eta2 of 0.755, a considerable effect was shown.

This result demonstrates that, academically speaking, the experimental group students fared better than the control group students.

Table 7 Comparison of the control and experimental groups after the treatment on the items of unit "Solution"

Unit	Total Score	Group	N	Mean	SD	*t*	df	*P*	η2
Solution	20	Control	25	10.84	2.135	-13.798	48	.000	0.798
		Experimental	25	18.08	1.525				

Following therapy, participants in the study compared their scores on "Solution" items from Unit 3 to those of the control group (see to Table 7 for details). We may infer that we did not assume equal variances as Levene's Test for Equality of Variances had a significance level of.001, which is lower than.05. The experimental group (N=25, M=18.08, SD=1.525) and the control group (N=25, M=10.84, SD=2.135) were significantly different (t (48) =-13.798, p=.000<.05). There is a substantial difference (p <.05) in academic performance between the control and experimental groups, as measured by mean score. Eta2 was 0.798, indicating a moderate impact. This result demonstrates that, academically speaking, the experimental group students fared better than the control group students.

Table 8: Comparison of the control and experimental groups After the treatment on items of three units "Structure of an Atom", "Chemical Bond", and "Solution"

Unit	Total Scores	Group	n	Mean	SD	*t*	df	*p*	*η2*
"Structure of an Atom", "Chemical Bond", and "Solution".	60 60	Control	25	33.68	3.716	-21.394	48	.000	0.905
		Experimental	25	53.72	2.851				

Following treatment, comparisons were made between the two groups using three questions from the "Structure of an Atom," "Chemical Bond," and "Solution" courses (Table 8). We may assume that the variances were similar because Leven's Test for Equality of variance had significant values of.139, which were more than.05. In terms of the sample sizes of the two groups, the experimental group included 25 participants, the control group had 25, and the mean score was 53.72 (standard deviation=2.851). A total of 48 degrees of freedom, a t-value of -21.394, and a p-value of.000 were involved. Since the p-value was smaller than.05., it may be concluded that there was a statistically significant difference in the groups' academic success after therapy. Beta2, the effect's intensity, was 905. Pupils in the experimental group outperformed those in the control group, according to the statistical analysis.

Conclusions

The researcher concluded from the pre-test data that the experimental and control groups' performance on all items of the pre-test was identical.

After receiving instruction using the Magic School AI programme, pupils in the experimental group outperformed their control group counterparts when it came to tasks requiring equivalent abilities. There was a rather large impact size (Eta2). Thus, the usage of magic school AI led to an increase in the academic success of the experimental group.

Using Magic School AI, children in the experimental group learned the material under the teacher's supervision. Enhancement in student interest and motivation was seen. They improved their scores and came up with novel solutions to challenges as they answered questions created by the Magic School AI. This demonstrates that the Magic School AI method is superior for developing higher-order thinking abilities. Higher participation and involvement in class activities due to the engaging nature of the AI tool. Noticeable decrease in absenteeism and dropout rates as students became more interested in their studies. Personalized learning paths, adaptive feedback, and interactive content were key features contributing to the success of the Magic School AI tool. Reduction in teacher workload allowed for more enthusiastic and dedicated teaching. All these factors favor that Magic School AI played a crucial role to increase the academic achievement of the students.

Recommendation

On the basis of the findings and conclusions of the study following recommendations were made.

1. The curriculum developers should integrate AI tool especially Magic School in our curriculum.
2. Conduct comprehensive training programs for teachers to effectively use Magic School AI tool. This will enable teachers to integrate this tool into their teaching methods, thereby enhancing their instructional strategies and reducing their workload.
3. The educational establishment should implement essential technological components starting with dependable internet systems together with suitable devices which include tablets and computers specifically for Magic School AI tool use in classrooms throughout rural educational areas and underprivileged locations.
4. The government should pursue policies that support Magic School AI implementation in educational settings. The education sector will benefit from funding support along with regulatory changes that develop an environment which empowers technological progress.
5. All students should obtain equal access to AI tools particularly Magic School through additional resources and backing to promote fair usage among disadvantaged communities.
6. Teachers at the administrator and lead level will team up with their colleagues to exchange successful techniques for employing this tool to support educational outcomes.

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