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Modern mathematics teaching methods and their role in developing academic achievement literature review

Asmaa Salih Jasim*
Technical Institute of Al-Musayyib, Al-Furat Al-Awsat Technical University, Iraq.

*) Corresponding Author (e-mail: asmaa.jasim.ims@atu.edu.iq)

Abstract
The purpose of this study is to identify the most prominent contemporary approaches to mathematics teaching and examine their contribution to students' academic achievement. The study uses a descriptive-analytical approach (reviewing and analyzing a body of relevant educational literature and previous theoretical and empirical studies on contemporary mathematics teaching approaches such as flipped learning, inquiry based learning, project based learning, technology enhanced learning and artificial intelligence). Studies reviewed were compared to determine their main findings about how these approaches contribute to mathematics learning and academic achievement. Contemporary mathematics teaching approaches can positively contribute to students' academic achievement through active participation in class, classroom interaction, mathematical thinking, problem solving skills and practical application of mathematical knowledge. Digital technologies and artificial intelligence also offer opportunities for more interactive and personalized learning experiences but effectiveness may vary depending on instructional design, educational context, student characteristics and appropriate integration of technology into learning process. Contemporary mathematics teaching approaches support the transition from teacher-centered instruction to more learner-centered practices. Therefore, it recommends professional development for teachers, incorporation of appropriate digital technologies and AI into mathematics instruction, learning environments that promote inquiry, problem solving, interaction and active student participation.

Keywords: Modern Teaching Approaches, Mathematics Teaching, Inquiry-Based Learning, Flipped Learning, Artificial Intelligence

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1. Introduction

Mathematics teaching has been increasingly studied in educational research because students' academic achievement depends not only on what content is taught but also on how learning is promoted (teacher-centered methods often focus on explanation, memorization and repetition of exercises). These teacher-centred approaches may not be able to meet the diverse abilities and learning needs of all students. Educational research therefore places more emphasis on modern teaching approaches that promote active participation, critical thinking, problem solving, self-regulated learning and collaboration among students (Pellegrini et al., 2021; Johnson et al., 2000; Dignath & Büttner, 2008; Donker et al., 2014; Cheng et al., 2019). In this way, mathematics instruction becomes a process where students construct mathematical understanding actively and apply their knowledge to different problems.

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Although modern teaching approaches have the potential to be beneficial, they are not equally effective in all educational contexts. Their outcomes may depend on instructional design (e.g., curriculum characteristics), teachers' competencies, students' abilities and educational and cultural environments in which they are implemented; therefore, an effectiveness of a particular teaching approach cannot be assumed to be universal. Furthermore, diversity of students' learning needs shows that using one instructional approach will not yield optimal results for all learners. Mathematics teaching requires approaches responsive to mathematical content, individual student characteristics and conditions of learning environment (Giambona & Porcu 2015)

These contextual differences become more relevant in Arab educational contexts where context-specific empirical evidence is still an important factor when selecting and implementing instructional approaches (previous research has stressed the need to strengthen educational research in the Arab region and take into account institutional and contextual factors that shape teaching and learning practices (Almutairi et al., 2020; Hallinger & Hammad, 2019; Kayan-Fadlelmula et al., 2022). In this broader context Iraqi educational environment is also a relevant setting for studying applicability of contemporary mathematics teaching approaches as transition to interactive and learner centered instruction requires more attention to approaches that meet students' needs for learning and improve mathematics education effectiveness.

A review of the literature reveals several important points. First, previous studies have looked at different modern mathematics teaching approaches (flipped learning, inquiry-based learning, project-based learning and technology enhanced learning) but their findings are scattered across instructional approaches and educational settings. Second, although these studies show evidence that some individual approaches might contribute to mathematics learning and academic achievement, they cannot be compared because of differences in research settings (e.g., Iraqi), student characteristics (e.g., Iraqi) and instructional designs (e.g., Iraqi). Third, relevance of these findings for Iraqi education should be further investigated (e.g., integration of major contemporary approaches and reported educational outcomes). Thus, a research gap remains: Comparative and context sensitive analysis is needed to bring together the findings from previous studies so as to understand how the contribution of modern mathematics teaching approaches to students' academic achievement and whether they are relevant to Iraqi education can be better understood.

In response to this gap the present study reviews and analyzes the literature on contemporary mathematics teaching approaches and how they contribute to students' academic achievement. That is, it identifies major approaches discussed in previous research; compares findings about their effectiveness in mathematics learning; and examines educational implications of these findings for Iraqi context (bringing together evidence from different educational studies). Thus, by bringing evidence from different educational studies the research aims at a wider understanding of what modern

teaching approaches can do to improve mathematics instruction and support students' academic achievement.

2. Method

In this study we use a descriptive-analytical literature review to investigate contemporary approaches to mathematics teaching and their contribution to students' academic achievement. The literature reviewed is drawn from selected body of educational literature (theoretical publications as well as previous empirical studies on modern mathematics teaching practices). Sources were chosen based on relevance to the research questions (instructional approaches and their effects on mathematics learning and academic achievement.

The five major approaches reviewed in the literature are flipped learning, inquiry-based learning, project-based learning, technology enhanced learning and artificial intelligence in mathematics education. The selected studies were analysed for their main objectives, instructional approaches used, research findings reported and effects on students' learning outcomes. Comparative analysis was then done to find common findings, differences across studies and factors that may influence effectiveness of these approaches; findings were then synthesized to discuss educational implications of contemporary teaching approaches in mathematics with particular reference to relevance to Iraqi context.

3. Results and Discussion

The concept of mathematics teaching methods

Mathematics was the driving force for nearly all technological and scientific development in the nineteenth and twentieth century. It is of great importance for professional and social daily life activities (Maasz & Schloeglmann, 2006). It has a key role in the success of students and in the development of a developed nation. Mathematics education has always been a part of general education and science education. It is believed that a teaching method is very important in any development. These differences of beliefs and values with regard to mathematics education systems result in different mathematics education systems. Teachers are supposed to lead students' thinking and learning and so need to motivate them to do so. To become aware of the teaching practice activities done by teachers, we need to know about learning and teaching methods. Different teaching methods, such as traditional, problem-solving, and discovery learning, have been used in all educational systems all over the world (Lessani & Bakar,2017).

Learning is one of the central elements of modern psychology. Different learning theories and teaching methods have been put in use in all education systems around the world. These three teaching methods (traditional, problem-solving, and discovery learning) all rely on different learning theories (behaviorism, cognitivism, and constructivism). Learning theories play a key role in mathematics teaching and teaching methods, and each of these theories has implications in mathematics education. To teach mathematics effectively, teachers are required to understand the various teaching methods so that they can use this knowledge to inform their

mathematics teaching processes. The teachers agreed that the teaching and learning of mathematics is an ongoing process and students must develop an understanding of the mathematics concepts and procedures at every level of the school. Teachers need to provide students with the confidence to find their mathematical problems and think critically to solve them as well as their life problems.

Deringöl (2020) argues that mathematics teaching methods are a set of approaches and techniques used by teachers to organize the learning process in mathematics. These include direct instruction, cooperative learning, question-and-answer sessions and problem-solving. (Liljedahl et al. 2016) argue that mathematics teaching is closely connected with problem solving, in which the problem is the starting point for building mathematical knowledge and thinking skills rather than the application of rules after learning them. Karlberg et al. (2021) suggest that mathematics teaching methods can be based on cooperative learning by facilitating interaction, dialogue and the exchange of ideas among students while addressing mathematical problems.

Expanding on these cognitive and social dimensions, Santos-Trigo (2024) argues that effective mathematics teaching methods should assist mathematical thinking, reasoning, modeling and communication beyond simply passing on information and procedures to develop the thinking processes of the learner. As Al-Mukhini (2026) explains, inquiry-based teaching makes the learner an active participant in research, exploration, formulating and exploring ideas, and justifying results, with the teacher acting as a guide and supporter. According to the above, modern mathematics teaching methods constitute a set of practices that make a student successful in building mathematical knowledge through understanding, thinking, problem-solving, inquiry, and collaboration as well as the subject matter of mathematics, learner characteristics and learning environment.

Evolution of mathematics teaching methods

The methods of teaching mathematics have evolved gradually with the shift in perception of mathematical knowledge and of the role of the learner in the education process. In the early stages, the focus was on the transfer of mathematical knowledge and learning procedures and rules. Today, the emphasis is on understanding, knowledge building, and the development of students' mathematical thinking. Educational theories and teaching models developed in the nineteenth and twentieth centuries changed the mathematics teaching methods and shifted them towards a more holistic approach that focuses on the learner as well as the learner's active involvement (Cotic et al., 2024). With the advent of mathematics education, problem solving became a vital approach to improving the teaching process. A mathematical problem did not become a means to learn knowledge from scratch but to develop thinking, reasoning, conjecturing, and mathematical communication. This approach has seen an increase in interest in the past decades, and this has been in a way driven by the learners to learn about the problem, to come up with different solutions as well and to justify their findings (Santos-Trigo, 2024)

Mathematics teaching methods then changed with the introduction of digital technology into the education process. Its use began from simple applications that were primarily practice and training-based to digital tools that provide dynamic representations, simulations, and opportunities for exploration, enabling students to interact more thoroughly with mathematical concepts and relationships (Clark-Wilson et al., 2020). This change in the nature of mathematics teaching made technology part of the learning environment instead of just an extra tool that was used by the teacher. In recent years, mathematics teaching methods have increasingly focused on the use of interactive digital environments, and technology has become much more related to inquiry, interaction, mathematical representations, and problem solving. This trend has been toward the transition away from technological adoption as a tool for aiding the traditional teaching methods in order to reorganize and create new ways of learning mathematics (Engelbrecht & Borba, 2024)

In contemporary education, such a development has come to include digital learning, artificial intelligence, and virtual reality, and there is a growing interest in making learning more interactive, flexible, and responsive to learners. Digital technologies have increasingly influenced mathematics teaching, learning, and assessment practices, which is indicative of the ever-evolving nature of education and the role of teachers and learners (Weigand et al., 2024). The development of mathematics teaching methods can be understood as a gradual progression from the transmission of mathematical rules and procedures to understanding, mathematical thinking, and problem solving, as well as interactive and inquiry-based learning, into the integration of digital technologies and intelligent learning environments. It is a paradigm shift in mathematics teaching that moves away from what the teacher teaches to what the learner constructs in terms of mathematical knowledge and competencies (Cotic et al., 2024; Santos-Trigo, 2024).

Major Modern Approaches to Teaching Mathematics

Today's mathematics education has moved more towards a learner-driven approach with emphasis on active participation, mathematical thinking, problem solving, inquiry, collaboration and technology use. Rather than simply transmitting mathematical rules and procedures, modern approaches focus on helping students build mathematical knowledge and apply it in different contexts. This development has led to the emergence of various modern approaches (Doğan & Kütükçü, 2024).

Problem-Based Learning

Problem-Based Learning (PBL) is one of the more modern approaches to mathematics teaching. It is based on presenting students with mathematical problems or situations that require them to use their previous knowledge and develop appropriate strategies to reach solutions. Students are not required to apply a predetermined rule but they analyze the problem, find information relevant to the problem, suggest possible solutions, compare different strategies, and justify their conclusions. So PBL can contribute to the development of mathematical reasoning, problem-solving skills, and the ability to represent mathematical situations in different ways (Santos-Trigo, 2024).

Inquiry-Based Learning

Inquiry-Based Learning (IBL) aims at students taking part in the exploration and discovery of mathematical ideas rather than receiving concepts directly from the teacher. Students might start with a mathematical question, problem, or situation that motivates them to make hypotheses, test ideas, discuss the results, and then justify their conclusions. In mathematics education, this approach is to teach students to understand the patterns and relationships in mathematics and provide a deeper understanding of mathematical concepts. It can serve in conjunction with other approaches like flipped learning in order to enhance the opportunities for inquiry and mathematical discussion during classroom time (Berg & Holst, 2024).

Cooperative Learning

Cooperative Learning is about groups of students coming together to solve math problems or solve mathematical problems. Students discuss ideas, rationalize their solution, and offer help to each other in the process of learning. It is not only the answer that is correct but also mathematical communication, interaction, and sharing of perspectives. As a result, this cooperative learning can bring deeper mathematical knowledge, and the students have more active involvement in building knowledge (Fadzil & Osman, 2025).

Project-Based Learning

Project-Based Learning (PjBL) is a method of putting mathematics in useful projects and real-life situations. Students work on a project that is to show mathematics concepts and skills in order to produce a product or result. It can be used to take mathematics from a very abstract subject to a more meaningful and applied learning experience. It also enables students to learn planning, data gathering, data analysis, calculation, interpretation, and working together. Project-based learning can enhance the students' engagement, problem-solving, and application of mathematics in the real world (Sánchez-Martín et al., 2021).

Flipped Learning

Flipped Learning restructures the traditional learning process with students able to access basic instructional materials before class through videos, digital resources, or other learning materials, while classroom time is devoted to discussion, practice, inquiry, and problem solving. In mathematics education, this approach can promote the students to engage in mathematical learning and discuss solving problems in the classroom rather than just listening to explanations in the course. Recent applications in mathematics have demonstrated that the combination of flipped learning with inquiry-based learning methods can be used (Berg & Holst, 2024) to create more interactive mathematics learning environments.

Technology-Enhanced Learning

Technology-Enhanced Learning is one of the most significant developments in modern mathematics teaching. Digital technology is no longer limited to just providing information or making mathematical calculations; rather it is an interactive platform for dynamic visualization, mathematical representation, exploration, experimentation,

communication, and assessment. Digital tools can also support flipped learning, distance learning, and problem solving, as well as immediate feedback. As a result, technology is a major part of the current mathematics teaching, learning, and assessment environment that is changing the way we teach and how students learn today (Weigand et al., 2024).

Artificial Intelligence and Adaptive Learning

Artificial Intelligence (AI) and adaptive learning are the most recent developments in mathematics education. AI-based systems can analyze students' performance and provide learning activities, feedback, or support that are appropriate for the individual learner and their level of learning. Recent research shows that AI in mathematics education is not just about the teacher; AI in mathematics is also about intelligent tutoring systems, automated assessment, personalized learning, and assistance with math problem solving. However, the teacher still has a role to play to create learning experiences for students, determine learning outcomes and to help them use AI technologies in the right way (Yoon & Kwon, 2024).

In this light, current mathematics teaching is transforming and moving towards active learning, mathematical thinking, problem solving, inquiry, collaboration, practical application and the use of digital technologies and artificial intelligence. These approaches are not competing or separate; they can be incorporated in a single teaching design. For example, problem-based learning should be combined with flipped learning and digital technologies to create an interactive, flexible and learner-centered mathematics learning environment (Santos-Trigo, 2024; Weigand et al., 2024).

Studies that have examined these methods and their impact on academic achievement

Recent studies have considered the effects of modern approaches to mathematics teaching on students' academic performance and have generally supported positive results, but the extent of the effect will depend as a function of individual teacher and the educational environment. Egara and Mosimege (2024) found that the flipped classroom approach significantly increased mathematics achievement in secondary school students compared to conventional teaching. Pham et al. (2024) used data from 5,711 students in Vietnam and found a positive association between inquiry-based pedagogy and mathematics performance, showing that students need to be encouraged to engage in inquiry and mathematical thinking (Egara & Mosimege, 2024; Pham et al., 2024).

As for cooperative learning, Phiwkham and Thienyutthakul (2024) showed that using the STAD cooperative learning strategy with skill exercises improved mathematics achievement among fifth-grade students, achieving better than the pre-defined criterion. (Suttivilai and Kamrat, 2024) also showed that using the STAD strategy with graphic organizers improved mathematics achievement among lower-secondary students, with post-test performance exceeding the pre-defined criterion (Phiwkham & Thienyutthakul, 2024; Suttivilai & Kamrat, 2024). In terms of project-based learning,

(Rijken and Fraser, 2024) investigated the effectiveness of project-based learning among 284 high school students and found that the impact on student outcomes was sensitive to the learning context and the project-based group had a lower score than the traditional group in some achievement measures. On the other hand, Safitri & Rizki (2024) observed that students who participated in project-based learning had a higher mathematics score than the traditional group.

Regarding technology-supported learning, Eraytaç and Tarım (2024) studied the impact of technology-supported mathematics instruction on students' academic achievement and found positive effects on learning outcomes. In the same vein, a second-order meta-analysis conducted by Demir et al. (2024) combined results of previous meta-analyses and found that technology-based mathematics instruction was beneficial for students' mathematics performance. Such findings imply that digital technologies can enhance mathematics learning and be implemented into instructional practices in a satisfactory manner (Eraytaç & Tarım, 2024; Demir et al., 2024).

In terms of artificial intelligence, Pardos and Bhandari (2024) found that teaching with ChatGPT-generated instructional assistance provided similar learning results as that by human tutors. Mathematical topics such as algebra and statistics were covered in the study, suggesting that generative artificial intelligence could be useful for mathematics education. In addition, Hwang (2022) reviewed 21 experimental studies and 30 independent samples to find a positive effect of artificial intelligence on the mathematics achievement of elementary students, but the overall effect was small. These studies show that there are different ways in which mathematics teaching methods, such as flipped learning, inquiry-based learning, cooperative learning, project-based learning, technology-enhanced learning, and artificial intelligence, can be used to enhance students' mathematics learning, but the results do not support the claims of being an overall good mathematics teaching method and their effectiveness is not uniform, as well as dependent on the instructional design, students' characteristics, educational level, learning environment, and how technology is incorporated into the learning environment. How effective the modern mathematics teaching methods are to teach is still of necessity to identify the teaching methods which students need to work on to improve their learning and learning performance.

The most significant studies that have considered the teaching methods of mathematics and their applications to academic achievement can be summarized in terms of the type of teaching, the main focus of the studies, the samples used and the most important results. Table 1 summarizes these studies in a systematic manner to describe the trends and findings of previous research in mathematics teaching and student academic achievement.

Table 1. Previous Studies on Modern Mathematics Teaching Approaches and Their Effects on Students' Academic Achievement

Author(s) & Year	Modern Teaching Approach	Study Objective	Sample /Method	Main Findings
Egara & Mosimege (2024)	Flipped Learning	Looking at the impact of flipped classroom techniques on student mathematics success and interests.	Secondary school students / Experimental study	Students who taught through the flipped classroom achieved significantly better math achievement than those who taught through traditional coaching.
Liu et al. (2024)	Inquiry-Based Learning	Exploring the relationship between inquiry-first pedagogy and mathematics achievement.	5,711 students in Vietnam / PISA 2022 data	Inquiry-based pedagogy was positively associated with overall mathematics achievement, suggesting the importance of vigorous inquiry in mathematics mastery.
Rijken & Fraser (2024)	Project-Based Learning	To examine the effectiveness of project-based mathematics learning in relation to the learning environment and student outcomes.	284 high-school students / Empirical study	The effects of project-based learning varied across learning outcomes and depended on the educational context and implementation.
Eraytaç & Tarım (2024)	Technology-Enhanced Learning	To investigate the effect of technology-supported mathematics instruction on students' academic achievement.	Grade 6 students / Experimental study	Technology-supported mathematics instruction had a positive effect on students' academic achievement.
Demir et al. (2024)	Technology-Based Teaching	To synthesize previous evidence concerning the effect of technology-based mathematics instruction on students' mathematics performance.	Second-order meta-analysis	The findings indicated a positive overall effect of technology-based mathematics instruction on students' mathematics performance.
Pardos & Bhandari (2024)	Artificial Intelligence / ChatGPT	To examine whether ChatGPT-generated instructional assistance can support the acquisition of mathematics skills.	274 participants / Experimental study	ChatGPT-generated assistance produced learning gains comparable to those achieved through human tutor-authored assistance in mathematics skills.

Analysis and Discussion of the Previous Studies

The study results presented in the table indicate a growing interest in modern mathematical teaching to enhance students' academic performance. In general, most of the studies studied found a positive impact of modern teaching methods compared to traditional teaching methods, as such methods are more productive (engaged students, interaction, mathematical thinking, and problem solving) (Egara & Mosimege,

2024; Liu et al., 2024). There are positive outcomes in mathematics achievement and learning in flipped learning and inquiry-based learning, so students get better math performance (Egara & Mosimege, 2024; Liu et al., 2024). Technology-enhanced learning is found to enhance students' mathematics performance and academic performance (Eraytaç & Tarım, 2024; Demir et al., 2024). Project-based learning, however, does not show that the effectiveness of modern teaching is consistent across different educational settings. The study of artificial intelligence in mathematics education is also earlier research in mathematics education and demonstrated that AI-driven teaching assistance can assist students in learning mathematics and can have similar educational benefits to human tutoring (Pardos & Bhandari, 2024).

Taken together, these studies indicate a transition from teacher-centered teaching to a new kind of teaching in mathematics education and to teaching methods that invite students to be more active in building mathematical knowledge. However, the differences between studies in the literature are more evidence that modern teaching approaches not only need to be effective but also are designed for the purposes of teacher-based teaching and the implementation of the techniques for students and the educational environment is also important (Rijken & Fraser, 2024; Demir et al., 2024). There is also more research that is needed to test the effectiveness of the modern mathematics teaching approaches in different educational systems and to assess its effect on students' performance.

Role of Modern Teaching Approaches in Developing Academic Achievement

The contemporary mathematics teaching approach is important in students' academic achievement and can shift the learning process from passive reception of information to active engagement, interaction and formation of knowledge. These methods allow students to learn how to do math in a more realistic way, learn about mathematical concepts, discuss different solution ideas, and use mathematical knowledge in actual life situations. These activities can help in understanding mathematics and mathematical skills in a more meaningful way (Egara & Mosimege, 2024; Liu et al., 2024)T. his approach is crucial also in developing students' mathematical thinking and problem-solving skills. Inquiry-based and project-based learning will get students to analyze problems, develop explanations, make sense of and connect mathematical concepts to real-world situations. Students are better able to get an understanding of mathematics by engaging in this activity and the mathematics (Liu et al., 2024; Rijken & Fraser, 2024). And cooperative and interactive learning environments will enable students to share ideas and explain their mathematical reasoning and can help students develop ideas and classroom participation.

Digital technologies further enhance the current teaching framework by giving hands-on representations, immediate feedback, opportunities for exploration and broad learning resources. If technology is incorporated into mathematics instruction it may help students visualize abstract mathematical concepts and learn more actively, which will help them better in mathematics (Eraytaç & Tarım, 2024; Demir et al., 2024). Similarly, artificial intelligence has brought new opportunities for personalized learning and instructional support, where AI-generated assistance has been shown to enhance

learning in mathematics skills (Pardos & Bhandari, 2024). In other words, modern mathematics teaching methods are at the heart of their successful delivery because they encourage students to actively develop knowledge (and not just teach it in order to make it more accessible).

4. Conclusions

The literature reviewed is clear that modern mathematics teaching can improve students' achievement but the effectiveness of modern methods depends on the context in which it is implemented. Flipped learning and inquiry-based learning have been shown to increase mathematics learning in students and they have more opportunities for interaction and mathematical thought (Egara & Mosimege, 2024; Liu et al., 2024). And technology-enabled mathematics teaching has shown positive effects as well, that if digital tools are integrated into teaching practices, they can enhance learning (Eraytaç & Tarım, 2024; Demir et al., 2024). However, project-based learning research also suggests that modern methods may not produce the same outcomes as old methods because they vary in the learning environment, teaching method, and learning outcomes (Rijken & Fraser, 2024). So, modern teaching methods are not enough to lead to improved academic achievement, but learning is designed to be successful, implemented and aligned to the students' needs.

Another important conclusion of the reviewed works is that digital technologies and artificial intelligence are replacing traditional educational methods in mathematics education. As technology-driven learning has given students a better experience with visualization and exploration, interaction and feedback, artificial intelligence can help in providing support for their learning by focusing on students in their learning (Demir et al., 2024; Pardos & Bhandari, 2024). But these technologies should be viewed as complementary to the teaching process and not as substitutes for the best teaching practices. In general, the studies reviewed indicate that we are moving towards learner-centered mathematics education in which students are encouraged to participate, understand mathematics, solve problems and use knowledge to help students, but different dimensions of the results are studied differently and further empirical research and data to be done in other fields and in different contexts should be done. So, studying the role of modern mathematics teaching approaches in developing academic achievement remains important for identifying instructional practices that can effectively enhance students' mathematical learning and achievement.

The study suggests that mathematics teachers should be encouraged to use contemporary teaching approaches (flipped learning, inquiry-based learning, project-based learning and technology enhanced learning) according to the nature of mathematical content and students' needs and implement continuous professional development programs so teachers have the knowledge and skills to design and apply them. Digital technologies and artificial intelligence should also be appropriately used in mathematics instruction to enable interactive learning experiences; mathematical representation support; personalized learning; immediate feedback. Mathematics

curricula should offer more opportunities for active learning through mathematical inquiry, problem solving, practical applications, classroom discussion and collaboration than traditional instructional presentations only.

When selecting modern teaching approaches and implementing them teachers need to take individual differences among students into account as well as how learner characteristics and educational contexts influence effectiveness of instruction. Schools and universities must provide technological infrastructure and digital resources for technology enhanced mathematics education. Assessment practices should also be aligned with contemporary teaching approaches — rather than memorization they evaluate students' mathematical understanding, reasoning, problem solving abilities and practical application of knowledge. Finally empirical research should be conducted to evaluate modern mathematics teaching approaches at different educational levels and contexts (comparing instructional approaches), long term effects on students' academic achievement.

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