

## Teachers' perceptions: What happened after more than 10 years of developing the mathematics textbook

Essa A. Alibraheim<sup>1\*</sup> 

<sup>1</sup> Department of Curriculum & Instruction, College of Education, Imam Abdulrahman Bin Faisal University, Dammam, SAUDI ARABIA

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### Abstract

This qualitative study describes teachers' perceptions of a mathematics textbook after more than a decade of developments in Saudi textbooks, including introducing English terms into Arabic textbooks. The sample of this study was 14 mathematics teachers at the high school level. The analysis of teachers' interviews allowed the researcher to develop a deep understanding of the perceptions of fundamental changes in mathematics education. The findings expose the concerns of teachers regarding resource adequacy in light of the modern learning style that considers students as the center of the education process, and language issues in connection with textbook comprehensibility. These findings indicate that the Saudi Ministry of Education and leaders in mathematics education should focus on all elements of constructive alignment if they seek to meet the targets set to reform mathematics education.

**Keywords:** teachers' perceptions, mathematics textbook, high school education, developed textbooks, Saudi Arabia

## INTRODUCTION

Teaching mathematics to students at various educational levels may seem a difficult matter for both the teacher and the students. The disparity in achievement abilities among students as well as the disparity in training qualification among teachers has created a big gap in teaching this subject. The delivery of mathematics training to students in the required manner requires a review of the nature of the textbook for the subject of mathematics itself, the nature of the study methods used in its explanation, and finally the extent of students' acceptance of its content and their achievement results at the end of each semester.

In the past decades, Saudi Arabia has undertaken huge efforts to reform the education system and the teacher preparation programs (Abuzaherah et al., 2022; OECD, 2020). Comprehensive reform programs are expected to develop a skilled workforce to accomplish national goals of Saudi vision 2030 (Allmnakrah & Evers, 2020; Vision 2030, n. d.). One of the aims of the Saudi education system in high school is to strengthen the mathematical thought of students and deepen their

desire to participate in experimental studies and thus enhance their academic performance (Ministry of Education, n. d.).

For students, textbooks are one of the most important, if not the first, sources for acquiring knowledge. According to Basyal et al. (2023), text is often used to express mathematical ideas, and the ability to interpret textbooks may be important for learners to understand mathematics. It is important to examine how teachers use these textbooks to enhance their students' mathematical concepts and skills (Mithans & Grmek, 2020).

### Context of Saudi Mathematics Education

The Saudi education system is centralized, and all the policy making and strategic planning is issued by the Ministry of Education who provide textbooks for free for both teachers and students (Meemar et al., 2018).

The teacher has a prominent role in developing an appreciation of mathematics (Elsayed & Al-Abbad, 2023). Ashetwey (2019) stated that one of the most prominent difficulties facing public education in Saudi Arabia is the lack of qualification of teachers, as many of

### Contribution to the literature

- The research offers an in-depth analysis of Saudi high school mathematics teachers' perceptions more than a decade after adopting a translated and adapted American textbooks.
- It highlights the challenges and adaptations associated with using English-infused Arabic textbooks, emphasizing the cultural and linguistic misalignments in the reform process.
- The study underscores the necessity of comprehensive teacher training and adequate classroom resources to support modern, student-centered pedagogical practices. These insights contribute to a deeper understanding of the complexities of textbooks localization and its impact on educational reforms in culturally distinct settings.

them are missing updated practices in teaching and learning processes. In the Saudi education system, the predominant method of teaching and learning has been memorization. Therefore, the current reform of the education system has stressed the development of practical skills for learners (OECD, 2020).

The Ministry of Education announced its aim to develop high school education and to provide the requisite skills for students. (Mirghani, 2020). The recent reforms in Saudi secondary schools are intended to overcome obstacles in the area of teachers' beliefs, in both the textbooks and teaching methods (OECD, 2020). Mathematics is offered in the first year of secondary education in Saudi Arabia along with other scientific subjects such as physics, biology, and chemistry. Then, students are allowed to choose between five tracks (general track, computer science and engineering track, health and life track, business administration track, or religious studies track) when they complete grade 10 (Ministry of Education, n. d.).

### New Mathematics Textbooks

King Abdullah launched the education development project in 2003 with a duration of 10 years. This project was in effect from 2004 to 2014 and was implemented by Tatweer company for education services (Allmnakrah & Evers, 2020). This project was based on the development and improvement of mathematics and natural science subjects in general education in Saudi Arabia based on the distinguished American McGraw-Hill textbooks series for mathematics and natural sciences (Khormi & Woolner, 2019). The project focused on the textbooks by developing them and creating better educational environments, on teachers by training them and enhancing their teaching methods, and on students by improving their skills inside the classroom and outside it (OECD, 2020). The McGraw-Hill's mathematics textbooks have been translated from English into Arabic by Obeikan Education (OE). The OE company has also adapted textbooks to suit the educational climate and culture of Saudi society (OE, n. d.a). Little information on the methods used in the translation and adaptation has been made public because this work was commercially licensed. The website of the Obeikan company reports that their translators collaborated with

educators to guarantee the translation accuracy (OE, n. d.b).

In the second phase, the Ministry of Education launched the national strategy for education development project in 2013 for a period of 10 years. This project started in 2013 and continued into 2023 and is implemented by Tatweer company for education services (Planning & Development Agency, 2020). One of the objectives of this project is to improve textbooks, teaching methods and assessment processes, which will reflect positively on student learning (Tatweer, n. d). The same textbooks for mathematics (McGraw-Hill's textbooks) continued to be used during this phase as well, with minor development and improvement if needed.

When McGraw-Hill's mathematics textbooks were used for the first time, teachers were frustrated by being asked to transition directly from the old textbooks to teaching the new textbooks without a gradual application of this program. It appears that the Ministry of Education, when attempting to reform education, chose this set of textbooks and accepted their translation quickly without absolute certainty of their suitability. The new textbook for mathematics in high schools was first provided in 2010-2011 and revised and developed in 2014. This caused many concerns, doubts and questions about translation, the basis for choosing the text, and its suitability for the Saudi context. Some essential principles and concepts may be absent from translated texts, and the approach proposed to develop the critical thinking of students may have been inadequate for Saudi students at that time (OECD, 2020). Consequently, the goal of this paper is to discover the views of teachers regarding improvements in mathematics education, especially textbooks and their translating into Arabic more than 10 years after the adoption of new textbooks in the Saudi education system.

Mathematics teachers found the previous textbooks to be dull and monotonous, to lack details, and to concentrate on answering mathematics problems which did not inspire student involvement in experimental study. More recent pedagogy involves student-centered learning which allows students to engage with the content (Alkhalifa, 2017). However, there are concerns

about whether or not these recent reforms will be entirely successful, as the content and consistency of the McGraw-Hill's textbook is focused on a particular American culture that may not necessarily suit the Saudi learners' needs (Aldera, 2017).

### Students and Teachers Roles in Saudi Arabia

Student performance is based on the quality of the teachers, as they impart information and knowledge in a professional way in the classroom (Al-Srouf, 2018). The traditional style of teaching mathematics in the classrooms in Saudi Arabia is based on memorization techniques and lacks communication and engagement between the students and the teachers. Much research indicate that the traditional style of teaching does not initiate students into learning on their own (Alzahrani, 2015). Students find that the teachers are the only source of knowledge. Therefore, there has been increasing calls recently for teachers to develop their students' problem-solving and critical thinking skills and help them to improve decision-making skills across the subject (Madani, 2020).

Teachers should participate in implementing the new educational goals by increasing students' motivation to participate in an effective manner (Bentahar et al., 2021). Although Saudi teachers have obviously found the new mathematics textbook exciting for students, external training for teachers may not prepare them sufficiently to teach the new textbook (Alsaleh, 2019). Add to that the intensity of teacher discontent with overcrowded classrooms and scarce funding (Alrashidi, 2022).

In this new change in mathematics education, literature discloses another issue in this reform which is language. Arabic is the language used in all subjects and classes in Saudi Arabia; however, the new mathematics textbooks contain English in terminology, numbers, symbols, and units. This method of preparing the textbooks is met with support from some studies and opposition from others. Cook (2017) supports the necessity of using English terminology in mathematics textbooks in order to help Arabic speakers communicate with other societies. Gharib and Hamdun (2017) added that learning mathematics using the English terms will contribute to the introduction of technology in the Arab world because English is the language of mathematics today and it is the language of research, studies, and various sciences. Macaro (2018) supported this result and considered that there is a great difficulty in reading and learning mathematics in the Arabic language because it is mainly translated from the English. Additionally, owing to the linguistic variations between the spoken language and the written language in the textbook, understanding Arabic itself may be a problem for students. In order to keep up with new developments being written in English, as it is a global language, the importance of improving English teaching and learning in the Saudi context must be reconsidered (Mitchell &

Alfuraih, 2017). On the other hand, Al-Rubaie (2023) confirms that learning mathematics in the native language eliminates misunderstandings of learners. Cook (2017) supported the idea that there is some criticism of translating Arabic mathematics textbooks from their English source, which causes students to not develop their critical thinking when they are learning. If the Ministry of Education wants to improve the understanding of the next generation, it needs to pay more attention to textbooks, the language used in them, and the method of teaching (Yusuf, 2014).

### Purpose

The purpose of this study was to identify the Saudi teachers' perceptions after more than 10 years of development in the mathematics textbook, especially with regard to the language of the textbook and the necessary new teaching strategies.

### METHODOLOGY

This is a qualitative study. Interviews were used to collect the data. The teacher interview included three major themes (content, activities, and language) with each theme containing three to four questions. The researcher used open-ended questions in interviews to enable the participants to share more details about their perceptions and experiences.

### Participants

The participants of this study included 14 mathematics teachers at the high schools in the cities of Dammam and Al-Ahsa. Dammam and Al-Ahsa are the largest cities in the eastern province in Saudi Arabia. The sample was randomly selected, so all participants were volunteers. **Table 1** indicates the number of participating teachers, their city, gender, and teaching experience. All teachers that participated in this study had responsibility for more than three mathematics classes. There were more than 25 students in each classroom. Consent forms were obtained from the teachers before the beginning of the study. Participants' confidentiality was protected. The interviews were then undertaken and recorded. The interviews took about 25 minutes of teacher time.

### Data Analysis

After meeting with the participants and recording all interviews, which each lasted approximately 25 minutes, the researcher conducted a thematic analysis following the six-phase process described by Braun and Clarke (2006). First, the researcher transcribed the audio recordings of the interviews verbatim, converting all details into written texts. These transcripts were read repeatedly to ensure immersion in the data and facilitate careful identification of patterns and insights (familiarization with the data). Second, the researcher

**Table 1.** Participant characteristics

Teacher	City	Gender	Years of experience
Teacher 1	Dammam	Male	16 years
Teacher 2	Dammam	Male	19 years
Teacher 3	Dammam	Male	14 years
Teacher 4	Dammam	Male	21 years
Teacher 5	Dammam	Male	13 years
Teacher 6	Dammam	Female	17 years
Teacher 7	Dammam	Female	22 years
Teacher 8	Dammam	Female	15 years
Teacher 9	Al-Ahsa	Male	10 years
Teacher 10	Al-Ahsa	Male	8 years
Teacher 11	Al-Ahsa	Male	10 years
Teacher 12	Al-Ahsa	Female	25 years
Teacher 13	Al-Ahsa	Female	9 years
Teacher 14	Al-Ahsa	Female	7 years

systematically coded interesting data and information, organizing them into meaningful categories. Coding focused on identifying both explicit statements and implicit patterns related to teachers' perceptions of mathematics textbooks. These codes were aligned with the research objectives, ensuring relevance and clarity (generating initial codes). Third, the coded data were reviewed and grouped into potential themes based on shared characteristics and interrelationships. Themes were structured to align with the study's primary areas of focus: content, activities, language, material availability, and classroom environment (searching for themes). Fourth, the identified themes were reviewed to ensure coherence and relevance to the research objectives. Data extracts within each theme were checked for consistency and alignment with the overarching research questions, ensuring that the themes accurately reflected the data (reviewing themes). Fifth, at this stage, the researcher refined and renamed the themes to clearly describe their key features. Subthemes were identified where applicable to provide a nuanced understanding. This process ensured that the analysis was comprehensive and effectively captured the essence of the data (defining and naming themes). Finally, the researcher prepared the final analysis and report, incorporating a detailed discussion of the findings. Representative quotes from participants were included to illustrate key insights and support the identified themes. The themes were seamlessly integrated into the results and discussion sections of the manuscript, providing a thorough and meaningful interpretation of the data (producing the report).

The following themes were identified and coded during the analysis:

1. **Teacher preparation:** Issues related to training adequacy, training content, and readiness to implement the new textbooks,
2. **Content of the textbook:** Teacher perceptions of the textbook's organization, clarity, and relevance to student needs,

3. **Difficulties in comprehension:** Challenges faced by teachers and students, including language barriers and the integration of English terms in the textbook,
4. **Material availability and classroom environment:** The adequacy of resources and infrastructure required to effectively teach the updated textbooks, and
5. **Students' mathematical foundations:** The impact of students' prior knowledge and foundational skills on implementing the new textbooks.

### Trustworthiness of Study

To enhance the trustworthiness and rigor of the research, the criteria of credibility, transferability, dependability, and confirmability, as outlined by Lincoln and Guba (1985), were rigorously applied. Credibility was established by engaging extensively with participants during interviews to build trust and gain deep insights into their perceptions and experiences. Participants reviewed preliminary findings to clarify or confirm their statements, and the findings were further validated through discussions with colleagues and experts in the field of education, ensuring alignment with the data. For transferability, detailed descriptions of the research context, participants, and themes were provided, enabling readers to assess the applicability of findings to other settings. Additionally, a diverse sample of mathematics teachers from two cities, Dammam and Al-Ahsa, was included to capture a range of experiences and enhance relevance across different educational contexts. Dependability was ensured by maintaining a comprehensive record of research activities, such as interview transcripts, coding decisions, and thematic analyses, which allowed for external auditing and validation. The research design, data collection methods, and analysis processes were systematically applied and thoroughly documented to ensure replicability. Confirmability was achieved through the use of a triangulation, where the researcher employed by cross-verifying findings through multiple data sources, including participant interviews, literature, and peer feedback, to ensure objectivity and reliability.

## RESULTS

The aim of the current research is to find out and investigate the perceptions of high school teachers after more than a decade of development of mathematics textbooks in Saudi Arabia. The results of the current study refer to four axes, namely: teacher preparation of teaching the new textbooks, the content of the new textbooks, difficulties in comprehending the new textbooks, and material availability and classroom environment.



## Teacher Preparation

The participants agreed that there is a great lack of training and preparation of teachers to teach the developed textbook. The training problem lies in two areas, which were training time and training content. Some of them shared that training takes place during the semester, and this wastes many of the skills that teachers must have when teaching mathematics. Teacher 2 said that training before starting the semester would be much better so that teachers have the necessary skills to present the topics of the textbook; however, in fact all the training courses are distributed during the semester, which causes a loss of the main objective of the training, which is the preparation to teach the textbook. On the other hand, some teachers indicated that even that training is not very useful in teaching the developed textbook because the training is only conducted on teaching methods in general and some modern strategies. Teachers are not trained in how to apply those strategies to this textbook. Teacher 13 emphasized,

“To be honest with you, I attended 6 training courses and did not benefit from them in teaching the mathematics textbook, because we are trained and introduced to teaching strategies in general without applying those strategies to the new textbook topics.”

In addition, eleven teachers claimed that they were still using traditional methods and strategies in teaching the developed mathematics textbook. Teacher 5 mentioned that,

“The developed mathematics textbook requires special strategies in its teaching, but I still use the traditional strategies in teaching because there is no training on how to apply strategies to the new textbook.”

On the opposite side, the rest of the participants believe that the new mathematics textbook does not require training to teach it, as there are many external materials that are very useful in teaching that subject. Teacher 4 pointed out that one of the advantages of the developed textbook for mathematics is the presence of many auxiliary materials in its teaching. He said,

“One advantage of this textbook is the availability of many auxiliary materials in teaching it on the Internet. I do not need any training. I use videos to convey the required mathematical concepts, and this helps me a lot in teaching mathematics.”

Teacher 12 and teacher 14 supported teacher 4’s view. Teacher 12 noted that the new textbook is clear and does not require training. She said,

“Perhaps the problem lies with the teachers.”

Teacher 12 believes that it is the teacher’s task to make use of what their peers have shared on the Internet in order to become more confident in his/her abilities to present the new mathematics textbook to the fullest extent.

Some participants pointed out another obstacle they face in the new textbook, which is what teachers 3, 8, and 11 referred to, as they indicated that there is a teacher’s guidebook to be provided with the new textbook and the aim of it is to ensure that all questions and exercises of the new textbook are answered correctly. The teacher 11 emphasized that the teacher’s guide contains only the final answer to the questions and exercises of the new textbook, and this is not helpful in teaching the textbook, because knowing the steps for getting the correct answer is more important than the answer itself. Teacher 3 said,

“The developed textbook contains exercises that require the use of higher levels of knowledge, such as evaluation, but the teacher’s guide does not help in knowing the steps to solve these exercises so that students can be taught the correct steps to reach an answer.”

On the other hand, teacher 8 explained that the problem of not mentioning steps to solve the exercises was actually solved in the recently developed teacher’s guidebook. Teacher 8 said,

“One of the problems that we faced with the new textbook was that the steps to arrive at the correct answer were not mentioned; however, it was finally solved in the upgraded edition of the textbook. Currently, I am ready for all students’ questions about solving any question in the developed book.”

## Content of the Textbook

Five teachers from Dammam had negative opinions on the content of the new textbook. Teacher 4 said,

“The old textbook is easy to understand, and the information contained in it is clear. Students can learn it on their own, and it is also understandable to parents.”

Regarding the new reforms to the textbook, he stated,

“The Ministry of Education claims that the reason for changing the textbook is to make education dependent on the student, but what we see today is the student’s urgent need for the teacher’s explanation and clarification of the book’s concepts. The new textbook does not help individual learning.”

Teacher 7 supported her colleague’s point of view by commenting,

"The examples and activities used in the textbook are very difficult and not appropriate for the students' level."

Teacher 2 praised the old textbook saying,

"The previous textbook was distinguished by the clarity of information and the ease of exercises. We never suffered from the need for more time to complete the syllabus."

By contrast, mathematics teachers from Al-Ahsa had more positive attitudes toward the new textbook. All Al-Ahsa teachers agreed in their criticism of the old book with regard to the repetition of topics and their incoherence, the ambiguity of examples, and the book's absence of examples related to the students' lives. Teacher 12 said that,

"The new book has the advantage of relating mathematical concepts to reality. I struggled a lot when I asked, what is the use of this topic? I was embarrassed when I didn't have an answer for my students. Today, the examples are carefully selected and illustrate the applications of this concept on the ground."

Teacher 9 indicated that,

"There is no comparison between the old textbook and the new one. I don't deny the need for training for the new textbook, but the new textbook is much better in all aspects."

Teachers' opinions differed about the organization of topics in the modern book. Dammam teachers, who are the most experienced, had negative opinions about the organization of subjects and their repetition in the new textbook. Teacher 1 explained that,

"The old textbook is sequential, and the topics included in it are interrelated and have an extension in the following grades."

On the contrary, in the new textbook, he indicated,

"The topics in the new textbook are separate. You do not know why a topic that no basis in the previous grade had is mentioned and has no extension in the next grade."

Teacher 7 emphasized that the old textbook presents mathematical concepts in detail. Topics revolve around the concept until the student reaches an advanced stage in understanding and comprehending that concept. Teacher 7 commented,

"In the old textbook, the student becomes proficient in mathematical concepts. They study the concept in detail. While in the new textbook, the topics are general and repetitive. You find the

same topics repeated in other chapters. You may introduce this concept in the first semester and then find the same. The concept repeats in the second or third semester."

In contrast to their colleagues in Dammam, the teachers in Al-Ahsa had positive opinions on organizing the topics of the new textbook. Teacher 11 praised the organization of topics, saying,

"It should be noted that the old book contains topics of no importance, while the new textbook is clear, understandable, and organized in a way that makes the educational process active."

Teacher 10 and teacher 12 agreed with this view. Teacher 12 indicated,

"The new textbook is organized and easy to learn. The most important terms are prominent and specific. The lesson begins with an introduction to the main idea, then provides solved examples, and ends with a set of exercises to help the students practice. It also contains some important information that relates the lesson to real life. The new textbook is amazing and clear."

Regarding the number of topics that teachers are required to cover in one semester, all participants agreed that there is not enough time to cover the entire syllabus. Teacher 3 explained that there are too many exercises, and it is not possible to solve all the exercises in the book, as he said,

"If I commit to solving all the exercises in the book, I will only cover one lesson per week. There are dozens of exercises in the book that cannot be solved at the expense of explaining the rest of the topics."

Teacher 10 supported this view and pointed out that he often had to do only some of the exercises and leave the rest to the students to do at home. Teacher 13 indicated that the only way to make enough time to cover the entire textbook was to miss the pedagogy required by the new textbook. Teacher 13 said,

"When teaching the new textbook, teachers are supposed to follow appropriate teaching methods for this textbook. However, in fact, I do not adhere to what is imposed because I am required to cover all the topics of the book in a short period. Therefore, I do not adhere to the appropriate teaching principles for the new textbook."

The eight Dammam teachers explained that there is another problem that hinders the application of the new textbook, which is the weak mathematical foundation of high school students. Many students struggle with basic

mathematics such as adding and subtracting fractions and solving equations. Teacher 6 commented,

“Sometimes the problem is not with the topics of the new book, but with the students themselves. I often must waste a class or two explaining some of the basics of mathematics. Before explaining and showing how to solve polynomial equations, I am surprised that students have a problem with solving first and second-degree equations. How can I achieve the goal of the new textbook when there is a problem dating back to a previous stage or previous chapters?”

Teacher 8 had a similar problem with her students, noting that,

“I am ashamed to say that some students in high school have great problems with basic mathematics. Take for example fractions. Many of them do not know how to add or subtract fractions. This is very stressful. It requires that I have to make a double effort in an attempt to correct this defect and also in teaching all the topics of the textbook.”

Teacher 4 added that the students are still relying on the teacher to explain and clarify what is important and required in the new textbook. This contradicts the goal of the last development in the mathematics course, which is to make the student the center of the educational process.

### Difficulties in Comprehending the Textbook

The eight Dammam teachers agreed that the introduction of English in the recent development of the textbook caused problems for the teachers themselves and for their students. Teacher 6 commented,

“I suffered a lot at the beginning of using English letters and symbols in teaching. I was used to writing in Arabic.”

On the students’ side, he commented,

“The introduction of English in the last book confused the students. Even in tests, you find some students mix up the solution using Arabic and English numbers together. I do not know what the reason is for introducing the English language into a textbook taught in Arabic.”

Some teachers talked about the problem of language weakness among students and its impact on their learning of mathematics. Teacher 7 indicated,

“The students have a problem with the English language. This problem is reflected when studying mathematics. Previously, the student

derived formula and units from the first letter of the term. Today, the student does not know the English term, nor does he/she know why this letter was chosen to represent that term. This is a problem that causes confusion for many students.”

Teacher 3 added,

“Students used to write and solve from right to left in their previous years of education. In high school, they must write equations, for example, from left to right. It is a suffering not only for the student, but for the teacher and the parents as well.”

By contrast, Al-Ahsa teachers did not comment on the English language problem with their students. Teacher 11 indicated that the students struggle a little at the beginning of using English terms, then they get used to it. The remaining teachers 9, 10, 12, 13, and 14 agreed with their colleague’s opinion.

Participants commented on some of the challenges added by the new textbook. Teacher 9 pointed out the weakness of the Arabic language in the new textbook. He said,

“The book was written in poor Arabic language. Sometimes we suffer from incomprehensible sentences. There are some letters missing from some words, wrong use of prepositions, and sometimes some distracting words are added to the sentence. In my opinion, the reason for this linguistic weakness is because the original language of the textbook is English, and the textbook was translated into Arabic in an improper manner.”

All participants agreed that the new textbook is not easy to read. Teacher 7 emphasized,

“There is suffering in reading the new textbook and understanding it, not only for students, but also for teachers and parents. The student still needs a teacher to understand the book’s topics and summarize important information. The difficulty of reading the book and its lack of organization in a way that helps understanding hindered the application of self-learning, which the recent development of the textbook calls for.”

### Material Availability and Classroom Environment

Although there is a newly developed mathematics textbook, the classroom environment and availability of important teaching materials remain a problem facing many schools in Saudi Arabia. Over half of those interviewed reported that just changing the textbook while retaining the same pattern and the school

environment will not greatly improve mathematics education. This is confirmed by the teacher 1 when he mentioned that the Saudi education system doesn't only need to develop textbooks but also needs to provide many materials that help in teaching the textbook. Teacher 1 said,

"You can imagine that the school that I work in doesn't have a projector in the classroom. How can I take advantage of this modern textbook? and I still use the white board with markers."

Similarly, teacher 9 stated that,

"In my school, there are handmade materials such as cubes, balls and others, and these materials are not a great help in teaching this new textbook. We need electronic materials that use enhanced reality to help approaching the concept."

And teacher 7 commented,

"Take for example, in the bisectors of triangle lesson, I have a difficulty in teaching my students how to link what they have learned in the theory of circumcenter in their reality because there are no educational programs in our school that help to apply this theory on reality."

In complete contrast, a minority of participants indicated that their schools are equipped with all materials that they need to teach the new mathematics textbook such as computers, projectors, and interactive boards. For instance, teacher 12 stated that,

"The school I work in contains smart classrooms."

Teacher 8 stressed this situation also where he said that,

"All the materials that I need are available in school."

Other responses include reference to the need to reduce the number of students in each classroom so that the teacher can ensure the absorption by students of mathematical concepts included in the new textbook. Teacher 13 said,

"Not only the availability of materials is most important, but also reducing the overcrowding of students within the classroom is important too."

## **DISCUSSION**

This section discusses the themes that the current study reached through interviews with mathematics teachers in the cities of Dammam and Al-Ahsa, east of Saudi Arabia. The results indicated that there were conflicting opinions among the participants regarding the recent developments in the new textbook.

Dammam's more experienced teachers showed more negative attitudes towards the new textbook in terms of difficulty for students to understand, continued need for teacher assistance, and the existence of obstacles and challenges to applying self-learning, while Al-Ahsa teachers were more positive towards the new textbook and considered it interesting.

Although the less experienced Al-Ahsa teachers were happy and supportive of the recent reforms in the mathematics textbook, all the teachers still used the traditional methods of teaching. This result agrees with the result of Alrouqi (2019), which stated that the teachers expressed their enthusiasm at the beginning of applying the new textbook based on self-learning and centered on the student; however, they soon returned to the traditional methods due to the lack of tools to activate the textbook in the classroom, the difficulty of reading and understanding the textbook for many students, and the shortness of the class periods (OECD, 2020). Some teachers referred to their use of technology and group learning if it was available and possible, and argued that the aforementioned obstacles prevented them from benefiting from recent developments in the textbook, which is confirmed by the results of a study of Alharbi (2017). Educational studies indicated that teachers need enough time to be able to use the developed textbook effectively in the classroom (Collinson & Cook, 2001).

On the other hand, teachers raised the problem of translating textbooks from foreign languages, and its impact on teaching and learning mathematics. The translation from English into Arabic had obstacles that prevented the understanding of some sentences, misuse of prepositions, and the omission of some letters from some words. The teachers also explained that the Arabic language in which the textbook was written after its translation was often poor and not clear enough for the Arabic audience. In addition, reading and understanding the language of a mathematics textbook is no less important than learning mathematics itself. Saudi students in high schools suffer from the obstacle of reading and understanding the Arabic language written in school textbooks, which is a modern language derived from Standard Arabic and different from the Arabic language used by people in their daily lives (Harbi, 2022; Karim, 2016). The addition of English language terms exacerbated this suffering for students, especially for students with English language problems. In the past, when writing formulas and theories, students used to use the first letters of the Arabic term, but today they are forced to use the first letters of the English term. The results of the current study support the suggestions of other studies, which indicate that importing foreign textbooks to reform education in different cultural and educational contexts, whether global or regional, leads to unsuccessful reforms in many cases (Fathallah, 2016; Priestley, 2002; Shak et al., 2021).



Language issues noted in this study, such as difficulties in using English terminology in Arabic textbooks, echo findings from the UAE and Qatar, where the introduction of English-medium mathematics textbooks created barriers for non-native speakers (Macaro, 2018; Yushau, 2009). The emphasis on the use of students' native language in mathematics education aligns with research from Latin America and Africa, where teaching in native languages has been shown to improve comprehension and critical thinking (Heugh et al., 2017; Trudell, 2016).

Participants mentioned the difficulties their students face in understanding the new textbook when they are absent from the mathematics class. It is not easy for students to apply self-learning and understand the content of the textbook without the help of the teacher. This sensitive issue has been raised even by teachers most impressed by the recent reform of mathematics textbooks. Perhaps the reason for this difficulty is due to the method of presenting the information and the linguistic style in which the new textbook was written. Some of the more experienced teachers have demonstrated that they use specific teaching strategies to help students overcome this difficulty, including reading the textbook first with the students and identifying important points that they feel the students will not be able to understand.

The participants raised the issue of training and preparing teachers in an adequate way to implement the new textbook. All participants confirmed that they had received training in using the new textbooks, which is consistent with the results of Alghamdi (2019); however, some of them indicated that they were not interested in attending these training because they claimed that these training workshops are a waste of their time and not useful as required. Comparison with studies such as Collinson and Cook (2001), which emphasize the global challenge of inadequate teacher training for textbook reform. Similar findings were observed in countries like South Africa and India, where rapid textbook changes often outpace teacher training efforts (Chisholm & Leyendecker, 2008; Sriprakash, 2012). The concerns raised by Saudi teachers about limited training and misaligned professional development mirror findings from the UK, where a lack of subject-specific training impacted the implementation of new mathematics textbooks (Brown, 2011). The time for implementing the training workshops coincides with the time when teachers are expected to be teaching in the classroom. Teachers are expected to leave the school and go to a training workshop, taking away from their time spent teaching mathematics. Also, due to the fact that the training sessions are held throughout the semester, rather than before the school year begins, some of the skills that they acquire from the training provided can't be applied until the following year, because they may already have taught that lesson earlier in the semester.

Teachers may need to take enough time and focus preparation for training in the new textbooks (Ashetwey, 2019). Many studies (e.g., Alruqi & Alharbi, 2022; Alsubaie, 2016; Bashayr, 2022) indicated the importance of professional development for teachers through appropriate and realistic training in the nature of the textbooks, and the exchange of experiences with other trainees to benefit from each other. According to Hommdi and Al-Maliki (2020), teachers need to be trained on how to transform their teaching method from the traditional method to modern methods that focus on the students and open the way for their students to inquire and experience discovery learning.

The more experienced participants showed higher confidence in teaching the new textbook, although they had more negative attitudes toward it. However, they pointed to the lack of time as one of the obstacles caused by the new textbooks, which prevented the application of appropriate teaching strategies. This finding differs with the result of Alshamrani and Al-Aqali (2019), which indicated that more experienced teachers were more effective and engaged with the new textbooks.

## CONCLUSION

The current study investigated teachers' perceptions and opinions about the current mathematics textbook after more than a decade of reforms in mathematics education in Saudi Arabia. The data indicates a diversity of the participants' opinions about the current textbook; however, the traditional method of teaching is still prevailing among teachers in teaching mathematics. The reason for the continuation and spread of the traditional method of teaching among teachers is due to the insufficient training on the new textbooks, the lack of technological means in the required form in the classroom, the insufficient class time to explain the topics of the textbook, and the design and organization of the book in a way that made it more difficult for students to understand and difficult for teachers to explain. Therefore, the educational policy, textbooks development plan, and resources do not seem to match the reality of the classroom experience. Furthermore, the results of this study indicated the linguistic problem in the textbook. Participants explained that using an American textbook to develop an Arabic textbook in a different cultural environment and context was and still is a problem in this reform. The results showed that this linguistic problem is divided into two parts. The first part is about translation from the textbook's original language (English) into Arabic, and the continued use of English terminology in the translated textbook. The second part is the problems in the Arabic translation, and the difference between the language used in the textbook and the Arabic language used among the students. These language problems in the textbook caused difficulty in reading and understanding the content among the students, which produced the need for the teacher to

explain and clarify, and this opposes the self-education that the recent reform calls for. The current study recommends the importance of intensifying cooperation between the Ministry of Education and mathematics teachers to diagnose problems and develop solutions to the problem of globalizing mathematics textbooks. The current study also suggests conducting more diagnostic research on the reality of applying and implementing the developed mathematics textbooks at the high school level in different regions in Saudi Arabia, and also in different educational stages, which will help stakeholders in the Ministry of Education to implement the desired educational reforms.

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