

Pre-University Education Curricula in the Light of the Global Competitiveness Standards An Evaluation Study

By

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Abstract

The research addressed the deficiencies in primary education and the failure of some curricula to meet the international standards in Egypt. It focused on evaluating Arabic, science and mathematics curricula of the last three grades of the primary school in the light of the global competitiveness standards. Employing the descriptive analytical methodology, the research identified and evaluated how well these standards were addressed by the Egyptian curricula. Findings revealed that overall, the fifth-grade curricula were the best, highly addressing the global competitiveness standards in Arabic and science and moderately addressing these standards in mathematics. The sixth-grade curricula moderately addressed the global competitiveness standards in all three subjects. In contrast, the fourth-grade curricula poorly addressed the global competitiveness standards in Arabic and moderately addressed these standards in mathematics and science. Most curriculum elements showed moderate compliance with the global competitiveness standards. The research underscored the necessity of integrating these standards into the primary education curricula to enhance the quality education. It also recommended improving the teaching methods and providing continuous training for teachers to enhance their skills. **This comprehensive approach aimed to address the disparities and shortcomings in primary education. To achieve this, curricula should be aligned with global competitiveness standards and fostered by creating a conducive learning environment for students.** By implementing these recommendations, the research anticipated significant improvements in the quality of teaching and learning outcomes in the primary schools in Egypt.

Key Words: Pre-university education curricula; Global Competitiveness Standards; Curriculum planning.

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Introduction

Various studies (Ahmed Mohamed, 2017; Al-Hilali El-Sherbini, 2019; Bahaa El Din Arabi, 2019; Nadia Hassan, 2020; Maryam Zakaria, 2023; Sahar Issa, 2018; Iman Abdel Rahman & Khalaf Muhammad, 2021; Wael Rafiq & Sherif Mohamed, 2023) addressed global competitiveness and general education curricula. These studies indicated Egypt's low ranking in the Global Competitiveness Index and its need to benefit from the experiences of the developed countries in the field of improving competitiveness. Moreover, the International Development Report (2018) indicated that learning to achieve education goals leads to a major crisis concerning learning or schooling and emphasizes that the role of governments goes beyond allocating financial resources to education to invest in teachers and direct all the capabilities of society and institutions towards supporting learning, providing an environment that enhances and provides all sustainable opportunities. (The World Bank, 2018).

The development of pre-university education is one of the most important strategic goals of the state plan in the light of Egypt's Vision (2030), which aims to encourage Egyptian citizens to live with dignity in the new republic to achieve sustainable development in all economic, social and environmental fields.

To achieve Egypt's vision (2030) for sustainable development, the state is interested in gaining a competitive advantage in all fields, including education which is considered one of the most important indicators relied upon to develop human resources sustainably and human capital efficiently.

Therefore, there are some global classifications in which the state is keen to achieve advanced positions in their indicators, such as:

1. The Global Competitiveness Report issued by the World Economic Forum.
2. Organization for Economic Cooperation and Development (OECD) Report.
3. Pearson Foundation's report on the best educational systems.
4. Report of the UNESCO Institute for Statistics.
5. CITA. Commission on International and Trans-regional Accreditation Report.
6. Cogna standards for accreditation.
7. New England Association of Schools and Colleges (NEASC).

Looking at some of these reports that link education to the economy, it can be noted that the Global Competitiveness Report is issued annually by the World Economic Forum in Davos, Switzerland, which is an international economic organization that includes senior representatives of the international business community and senior policymakers in governments. It aims to enhance global understanding of the concept of competitiveness.

Hence, in the light of the findings of the previous studies and the numerous global reports to evaluate education in countries of the world; we must reach the definition of the global competitiveness standards in the field of education, especially in Arabic language, science and mathematics, due to their importance at this basic stage. By defining the global competitiveness standards in the field of the primary education, we can verify the extent to which these standards are achieved in school curricula and propose a perspective for achieving global competitiveness standards in education and even university curricula at the level of curriculum planning.

Thus, the problem of the current research is determined as follows:

The low level of the quality of the primary education and the failure of some educational curricula at the level of curriculum planning in the last three grades of the primary stage to achieve the international standards of quality and competitiveness.

Research Questions

The current research aims to answer the following questions:

1. What are the global competitiveness standards that should be included in the primary school curricula at the curriculum planning level?
2. What are the global competitiveness standards currently present in the courses for the last three grades of the primary school?
3. What is the proposed framework for incorporating the global competitiveness standards into the curricula of the last three grades of the primary school?

Conceptual Framework

Global competitiveness is the ability of a country to make optimal use of all its resources, policies and institutions to raise the efficiency and quality of services provided for individuals and the business sector, which contributes to achieving sustainable development for the country and placing it in an advanced competitive position.

The global competitiveness standards for the pre-university education refer to a set of indicators used to measure the quality and effectiveness of the education system. Competitiveness aims to provide a high-quality educational system that prepares students for modern challenges such as:

1. The emergence of green jobs that entail the preparation of an educational curricula capable of **equipping learners with the skills** needed to cope with the global competitiveness in the near future.
2. The urgent need to carry out skills development and continuous training in various specializations. This can only be done through developed educational curricula capable of addressing these requirements.
3. The need to address climate changes and prepare a generation capable of solving problems for sustainable development (The World Economic Forum, 2022).

The indicators of the global competitiveness standards for the pre-university education, which vary from one country to another are :

1. Quality of the curricula: The content of the curricula is reviewed and developed in terms of organizing and arranging the educational material appropriately as well as being consistent and appropriate for the age group and mental level of the students to reflect recent developments in various fields.
2. Efficiency of the teaching and evaluation methods and styles.
3. Pupils' skills: This is done in basic subjects such as reading, writing, mathematics and science through standardized tests that measure pupils' achievement.
4. Education level: These indicators identify individuals at compulsory or secondary education age and estimate school attendance.
5. Early education: Early education is one of the elements of the global competitiveness for the pre-university education. It greatly impacts the development and success of the child in the future. It appreciates the quality of the kindergarten programs and the provision of appropriate learning opportunities for this group.
6. The role of schools: These indicators evaluate the quality of schools infrastructure and available resources (West Martin, 2012).

Cognia organization provides some information and practices to support institutions reviewing and evaluating their teaching approaches and practices. The institution curriculum and teaching must emphasize the value of diverse cultures, backgrounds and abilities. Learners should be immersed in an environment that promotes and respects the learner's individual opinions and responsibilities. They should have equal opportunities to realize their educational potential and be immersed in an environment that enhances lifelong skills, develops their self-confidence and their love of learning. Learning environments are also designed to provide experiences that build lifelong skills for learners' learning and future success (Cognia, 2022).

The accreditation body "CITA" provides accreditation systems that encourage schools to raise the standards of the quality education and contribute to improving the conditions of the countries to which they belong in order to enhance the success of students and prepare them for the future. These are for schools outside the United States of America and school accreditation standards "Accreditation Standards" and quality indicators "Quality Indicators" for schools by the accreditation body "SITA". The criteria were on a five-level scale: Exemplary, Effective, Emerging, Missing and Not Applicable" (CITA, 2006).

The NEASC Accreditation Standards are a comprehensive, research-based set of practices and concepts that reflect the best educational practices as follows:

1. Ensure that structures, policies and systems are in place to support a high-quality and effective learning community in **effective community life**.
2. Provide a basis and framework for school communities and accreditation teams to identify the unique strengths and needs of each institution.
3. They are developed by each NEASC committee to meet the distinct needs of the schools served, whether public, independent or international.
4. Demanding schools to identify transferable skills, knowledge, values and dispositions needed for students' future success.
5. Challenge schools to focus more on impactful and personalized learning.
6. NEASC conducts periodic reviews of its standards and protocols to remain aligned with current educational research, best practices, government regulations and to remain responsive to member needs (NEASC, 2023).

Some of the outcomes related to the educational process, especially the educational curricula and what is hoped for in confronting these risks and crises can be expressed as follows:

1. Including climate change concepts in the educational curricula at the primary level.
2. Developing skills related to mechanisms for confronting the climate change.
3. Increasing learners' awareness of the necessity to preserve the environment.
4. Adapting content in the educational curricula at the primary level to suit the issues of confronting the loss of biodiversity and the collapse of ecosystems.
5. Viewing the process of developing the educational curricula as an economic process that provides the national economy **in the medium** and long terms with competencies capable of competing in the global labor market.
6. Viewing risks and crises as challenges that can be overcome through educational curricula that include an objective and scientific future vision. (Wael & Sherif, 2023).

Methodology:

The study used both the analytical and evaluative methods to assess how well the Egyptian primary school curricula meet the global competitiveness standards. This evaluation was conducted in three stages.

The first stage involved identifying the global competitiveness standards that should be integrated into the primary school curricula during the curriculum planning phase. This included a comprehensive review of relevant literature, previous studies and existing research. Additionally, the study compiled a detailed analysis of the various rating levels required for global competitiveness standards in the primary school curricula. Consequently, a list of analyses needed to meet these standards was prepared.

The second stage aimed to determine how well the global competitiveness standards were addressed in the curricula of the last three grades of the primary school. This involved analyzing Arabic, science and mathematics courses for grades four, five and six using a list of operationally determined global competitiveness standards. The analysis encompassed textbooks, teacher guides, evaluation guides, activities and resources included in the research. The Egyptian Knowledge Bank provided the necessary data for these subjects, which were then subject to course analysis, statistical processing and result recording and discussion.

The third stage focused on preparing a proposed framework to incorporate global competitiveness standards into Arabic language, science and mathematics courses for the last three grades of primary school. This framework was developed at the curriculum planning level and was informed by the research findings.

Participants:

The analysis sample was determined in all curricula topics (Arabic, mathematics and science) from the first semester of the primary cycle in the academic year (2023/2024).

The courses were analyzed, including textbooks, teacher’s guides, summary guides, concepts and questions as well as an analysis of the activities and resources included in the Egyptian Knowledge Bank and referred to in these books. It is scheduled in the first semester in Arabic, science and mathematics in the last three grades of the primary stage. The total number of the text books analyzed was (9) and their details are shown in table No. (1).

Table No. (1) The analysis sample of the textbooks and Curriculum guides

Study Material	Book Title	Grade	Number of Pages
Arabic	Arabic communication	Fourth Grade	144
		Fifth Grade	144
		Sixth Grade	146
	Teacher's Guide	Fourth Grade	384
		Fifth Grade	153
		Sixth Grade	156
Summaries, concepts and questions	Fourth Grade	46	
	Fifth Grade	-	
	Sixth Grade	-	
Mathematics	Mathematics	Fourth Grade	136
		Fifth Grade	141
		Sixth Grade	120
	Teacher's Guide	Fourth Grade	535
		Fifth Grade	378
		Sixth Grade	-
Summaries, concepts and questions	Fourth Grade	36	
	Fifth Grade	82	
	Sixth Grade	-	
Science	Science	Fourth Grade	127
		Fifth Grade	129
		Sixth Grade	139
	Teacher's Guide	Fourth Grade	370
		Fifth Grade	259
		Sixth Grade	-
Summaries, concepts and questions	Fourth Grade	115	
	Fifth Grade	137	
	Sixth Grade	-	

Data Collection and Measures

The study tools included:

1. A list of grading levels for global competitiveness standards that must be addressed in the last three grades of the primary school curricula at the curriculum planning level. The final list consisted of eleven elements of curriculum planning and (67) standards of global competitiveness in curriculum planning. The elements of the curriculum included the following items: general objectives (12), operational objectives (9), integrated concepts (6), issues included (5), teaching strategies (6), cooperative educational activities (5), digital educational activities (3), individual educational activities (8), non-electronic educational resources (4), electronic educational resources (3) and evaluation methods and styles (6).
2. A list of standards for the content of Arabic language curriculum for the fourth, fifth and sixth grades of primary school in light of global competitiveness. The final list consisted of (75) statements distributed among the checklist pivots as follows : communication competencies including (41) statements distributed among the main curriculum pivots, which are: my friends and me (13), my school and me (7), my family and me (10), the world around me. (11)and the topics contained linguistic knowledge including (20) statements distributed on phonology (9), vocabulary (2)and grammar (9). Language skills included (14) statements divided into : listening (4), speaking (4), reading (3)and writing (3).
3. A list of mathematics curriculum content standards for the fourth, fifth and sixth grades of primary school in the light of the global competitiveness. The final list included (69) terms distributed across the following checklist pivots : numbers (18), algebra (12), geometry and measurement (19) and probability and statistics (20).
4. A list of science curriculum content standards for the fourth, fifth and sixth grades of primary school in the light of global competitiveness. The final checklist included (37) statements distributed across the following checklist themes: scientific investigation (15), life and living organisms (2), environment (2), health and human nutrition (5), the physical world and natural phenomena (2)and energy and change (3). the Earth and Beyond (2), Science, Technology and Society (2) and Safety (4).

Data Analysis

For proceeding with data analysis, the units of analysis were determined by the topics included in each book subject of the study. Then, the categories of analysis have been identified in the curriculum elements and curriculum content standards.

1. A preliminary analysis was conducted for each questionnaire in each grade , followed by a second analysis two weeks later to verify the reliability of the analysis.
2. For determining the level of curriculum content standards in the checklist, the indicators and topics in the curriculum content were analyzed. The output for each indicator or topic was determined in two categories: included or not included and described qualitatively to come up with analysis results.
3. For determining the level of the curriculum elements in the checklist and after completing the analysis of each book, we converted the level to a high degree of availability to a degree of 3, the level to a moderate degree of availability to a degree of 2, the level to a weak degree of availability to a degree of 1 and we converted it to not available at all to a degree of 0. Then we calculated the score of each pivot (according to the number of items in each pivot where the number of items is multiplied by 3). After that, we calculated the score obtained by the pivot after analyzing the content and attribute it to the score of the

pivot before the content analysis. In the light of this, the degree of addressing each pivot is determined as follows:

- Zero – less than 0.75 (25%) barely addressed.
 - 0.75 (25%) -less than 1.50 (50%) poorly addressed.
 - 1.50 (50%) - less than 2.25 (75%) moderately addressed.
 - 2.25 (75%) – 3 (100%) highly addressed.
4. There were specific instructions for analysis control, as follows:
 - Reading the content with focus and attention.
 - Analyzing the books twice, two weeks interval, so that the researchers can verify the results of the analysis process and its reliability according to its rules and procedures.
 - Considering all the books of the class as one book and mapping the results from the sum of the notes of all the books for each class in one form.
 - Excluding the introduction to books from the analysis process.
 - Inserting footnotes into the analysis process because they help clarify what was stated in the original text.
 - Considering the questions that come after each lesson or after each chapter as part of the content of the books.
 - The analyst must adhere to the elements included in the analysis tool as “analysis categories.”
 - The person conducting the analysis determines the frequency of each category of analysis in the topics of each book (course) subject to analysis.
 - The person conducting the analysis must adhere to the specific units of analysis (the topic).
 - A separate analysis form should be allocated for each book in which repetitions and percentages for analysis categories are recorded.
 5. The reliability of the analysis was calculated in the light of the first and second analyses using the “Holesti” equation as shown in table (2).
 6. Finally, the course analysis data were recorded, statistical processing was performed and the results were recorded and discussed for each questionnaire in each grade.

Table (2): Reliability coefficient for the content analysis

Subject	Grade	Number of items	Number of items in common between analyses	Number of items of difference between analyses	Reliability coefficient
Arabic	Fourth Grade	67	62	5	92.54
	Fifth Grade	67	61	6	91.04
	Sixth Grade	67	63	4	94.03
Mathematics	Fourth Grade	67	60	7	89.55
	Fifth Grade	67	61	6	91.04
	Sixth Grade	67	62	4	92.54
Science	Fourth Grade	67	60	7	89.55
	Fifth Grade	67	61	6	91.04
	Sixth Grade	67	59	8	88.06

Findings / Results

1. Results for the checklist of grading levels for global competitiveness standards that must be addressed in the last three grades of the three subjects at the curriculum planning level:

The following elements of the three curricula for the fourth, fifth and sixth grades were analyzed. General objectives, operational objectives, integrated concepts, issues involved, teaching strategies, collaborative educational activities, digital educational activities, individual educational activities, non-electronic educational resources, electronic educational resources and evaluation methods and styles.

- Curriculum elements were analyzed for each grade, a preliminary analysis followed by a second analysis with a time interval of two weeks to ensure the reliability of the analysis.
- The score of analysis for each element of the curriculum was calculated from the results of the second analysis for each grade.
- The percentage score for each curriculum element in each grade was calculated.
- The score of how each element of the curriculum in the three grades, which was addressed, was determined : Table (3) shows the results of Arabic curriculum, Table (4) shows the results of mathematics curriculum and Table (5) shows the results of science curriculum.

1) Arabic Curriculum:

- Regarding the fourth-grade curriculum: None of the curriculum elements were highly addressed; instead, all curriculum elements were moderately, poorly, or barely addressed. This indicates deficiencies in addressing the global competitiveness standards.
- Regarding the fifth-grade curriculum: All curriculum elements were highly addressed. This indicates that the fifth-grade Arabic curriculum addresses the global competitiveness standards.
- Regarding the sixth-grade curriculum: The element of "teaching strategies" was highly addressed, while the rest of the curriculum elements were either moderately, poorly, or barely addressed. This indicates deficiencies in the sixth-grade Arabic curriculum in addressing the global competitiveness standards, except for the element of "teaching strategies."

Table (3): The results for the three grades of Arabic Curriculum

Curriculum elements	Fourth Grad		Fifth Grade		Sixth Grade	
	Percentage	Score	Percentage	Score	Percentage	Score
General Objectives	72.22	Medium	91.67	High	75	Medium
Operational Objectives	66.67	Medium	96.30	High	74.07	Medium
Integrated Concepts	16.67	Very weak	83.33	High	44.44	Weak
Issues included	26.67	Weak	86.67	High	26.67	Weak
Teaching Strategies	66.67	Medium	94.44	High	100	High
Cooperative Educational Activities	46.67	Weak	93.33	High	73.33	Medium
Digital Educational Activities	11.11	Very weak	88.89	High	11.11	Very weak
Individual Educational Activities	37.5	Weak	83.33	High	29.16	Weak
Non electronic Educational Resources	8.33	Very weak	83.33	High	16.67	Very weak
Electronic Educational Resources	33.33	Weak	88.89	High	55.56	Medium
Evaluation Addressed hods	61.11	Medium	88.89	High	72.22	Medium

2) *Mathematics Curriculum:*

Table (4): The results for the three grades of Mathematics Curriculum

Curriculum elements	Fourth Grade		Fifth Grade		Sixth Grade	
	Percentage	Score	Percentage	Score	Percentage	Score
General Objectives	69.44	Medium	38.89	Weak	72.22	Medium
Operational Objectives	74.07	Medium	77.78	Medium	92.59	High
Integrated Concepts	33.33	Weak	66.67	Medium	33.33	Weak
Issues Included	33.33	Weak	33.33	Weak	53.33	Medium
Teaching Strategies	44.44	Weak	88.89	High	100	High
Cooperative Educational Activities	73.33	Medium	73.33	Medium	73.33	Medium
Digital Educational Activities	66.67	Medium	77.78	High	55.56	Medium
Individual Educational Activities	37.50	Weak	50	Weak	37.50	Weak
Non-Electronic Educational Resources	41.67	Weak	8.33	Very weak	0	Very weak
Electronic Educational Resources	66.67	Medium	100	High	77.78	High
Evaluation Addressed hods	61.11	Medium	72.22	Medium	100	High

- Fourth-Grade Mathematics Curriculum: All elements were either moderately or poorly addressed. This indicates significant deficiencies in addressing the global competitiveness standards in the fourth-grade mathematics curriculum.
- Fifth-Grade Mathematics Curriculum: Curriculum elements showed a range of adherence to the global competitiveness standards, with some elements highly, moderately, poorly and suggesting that the majority of the global competitiveness standards were not addressed in the fifth-grade mathematics curriculum.
- Sixth-Grade Mathematics Curriculum: Similar to the fifth grade, the sixth-grade curriculum elements varied in their adherence to the global competitiveness standards, with some elements highly, moderately, poorly and barely addressing the standards. Only four elements highly addressed the standards, indicating that most of the global competitiveness standards were not addressed in the sixth-grade mathematics curriculum.

3) *Science Curriculum:*

- Fourth-Grade Science Curriculum: Curriculum elements highly, moderately and poorly addressed the global competitiveness standards, with no elements barely addressing the standards. Only three elements were highly addressed, indicating that most of the global competitiveness standards were not addressed in the fourth-grade science curriculum.
- Fifth-Grade Science Curriculum: All curriculum elements were either highly or moderately addressed, indicating that most of the global competitiveness standards were addressed in the fifth-grade science curriculum.
- Sixth-Grade Science Curriculum: Curriculum elements showed a range of adherence, highly, moderately, poorly and barely addressing the global competitiveness standards. Only four elements highly addressed the standards, suggesting that most of the global competitiveness standards were not addressed in the sixth-grade science curriculum.

Table (5): The results of the three grades of the science curriculum

Curriculum elements	Fourth Grade		Fifth Grade		Sixth Grade	
	Percentage	Score	Percentage	Score	Percentage	Score
General Objectives	58.33	Medium	77.٧8	High	0	Very weak
Operational Objectives	92.59	High	100	High	88.89	High
Integrated Concepts	55.56	Medium	88.٨9	High	61.11	Medium
Issues Included	40	Weak	60	Medium	33.33	Weak
Teaching Strategies	100	High	100	High	94.44	High
Cooperative Educational Activities	53.33	Medium	100	High	86.67	High
Digital Educational Activities	44.44	Weak	77.٧8	High	44.44	Weak
Individual Educational Activities	45.83	Weak	87.5٠	High	62.50	Medium
Non-Electronic Educational Resources	33.33	Weak	66.٦7	Medium	41.67	Very weak
Electronic Educational Resources	77.78	High	100	High	77.78	High
Evaluation Addressed hods	72.22	Weak	83.3٣	High	55.56	Medium

2. Results of comparing the three grades in the primary stage:

To identify the differences between the fourth, fifth and sixth grades for each academic subject, the differences between the academic subjects for each grade and the extent that the curriculum elements meet global competitiveness standards, a comparison was made between the percentages and the degree of verification for each grade in each subject. Table (6) shows the percentages of the total number of curriculum elements and the degree of how they were addressed for each subject (Arabic - mathematics - science) in the three grades, the last stage of primary school.

Table (6): Results of comparing the three grades in the three subjects

Grade Subject	Arabic Curriculum		Mathematics Curriculum		Science Curriculum		Total	
	Percentage	Score	Percentage	Score	Percentage	Score	Percentage	Score
Fourth Grade	47.26	Weak	55.72	Medium	63.18	Medium	٥٥.٣٩	Medium
Fifth Grade	89.55	High	60.20	Medium	86.07	High	٧٨.٦١	High
Sixth Grade	57.71	Medium	66.17	Medium	55.22	Medium	٥٩.٧٠	Medium
Total	٦٤.٨٤	Medium	٦٠.٧٠	Medium	٦٨.١٦	Medium		

3. Results of the three subjects curriculum content standards and their interpretation for the fourth, fifth and sixth grades of the primary stage in light of global competitiveness:

1) Arabic Curriculum:

In the fourth grade, the curriculum covers various areas of communicative competencies but lacks some specific criteria, such as expressions of thanks and apologies, identifying body parts and naming countries and nationalities. Standards related to school, family and the world around are outlined, highlighting included and excluded criteria. Additionally, the evaluation covers linguistic knowledge fields like phonetics, vocabulary and grammar, as well as language skills including listening, speaking, reading and writing, emphasizing simplicity and basic comprehension.

The fifth-grade curriculum for Arabic encompasses all the global competitiveness standards across various areas. In terms of communicative competencies, it covers introducing oneself and others, discussing time and date, expressing gratitude and apologies, identifying body parts, discussing future plans and more. Topics include oneself, friends, daily activities and the world around. School-related standards cover describing objects and activities, discussing school-related topics and more. Family-related standards include discussing family members, daily routines and health advice. The curriculum also includes standards for discussing the world around, including games, animals, weather and clothing. The linguistic knowledge field covers phonetics, vocabulary and grammar, emphasizing reading, writing and oral skills. Language skills include listening, speaking, reading and writing, focusing on comprehension, communication and expression on familiar topics.

The analysis of Arabic content standards for sixth grade highlights the included and missing standards across various pivots. In communicative competencies, included standards cover topics like date and time, abilities and self-description, while missing standards include expressions of thanks and introductions. School-related standards cover object descriptions and classroom commands but lack details on school-related questions and favorite objects. Family-related standards address daily routines but miss details on family members and activities. Standards for the world around include simple comparisons but lack coverage on various topics like clothing and weather. Linguistic knowledge encompasses phonetics, vocabulary and grammar, focusing on basic reading, writing and oral skills. Language skills include listening, speaking, reading and writing, emphasizing comprehension and communication on familiar topics.

2) Mathematics Curriculum:

The analysis of mathematics content standards for fourth grade identifies included and missing topics across various areas. In numbers, included content involves arithmetic operations, place value and basic operations with large numbers, while missing content includes fractions, decimals and negative integers. In geometry and measurement, included content covers shapes, area, volume and measurement units, while missing content includes angles, angle measurement and conversions between metric units. The curriculum also addresses algebraic concepts but lacks specific standards on algebraic quantities, linear equations and Cartesian coordinates. In probability and statistics, missing content includes data organization, measures of central tendency, probability concepts and data representation methods like pie charts.

The analysis of mathematics content standards and topics for fifth grade reveals comprehensive coverage across various domains. In numbers, the curriculum includes operations with integers and decimals, fractions, place value and rounding. Geometry and measurement standards encompass shape recognition, area, volume, angle measurement and

unit conversions. Algebra concepts involve understanding algebraic quantities, linear equations and Cartesian coordinates. Probability and statistics cover data collection, frequency tables, measures of central tendency, probability experiments and data representation. The curriculum emphasizes problem-solving and real-life applications across all areas of mathematics.

The analysis of sixth-grade mathematics content standards reveals included and missing topics across various domains. In the number domain, included content involves operations with integers, fractions and symbols, but lacks coverage of decimal numbers and place value. Geometry and measurement standards include concepts like shape recognition and measurement units, but miss topics like angle measurement and geometric properties. Algebraic concepts cover basic operations and linear equations but lack coverage of coordinate systems and data representation. Probability and statistics include methods of data collection and analysis but miss topics like pie charts and graphical representation of relationships between variables. The curriculum emphasizes problem-solving and real-life applications but has gaps in foundational mathematical concepts and advanced data representation techniques.

3) Science Curriculum:

The analysis of fourth-grade science content standards highlights several points. In scientific inquiry, most global competitive standards are included, covering inquiry methods, data recording and drawing conclusions. However, some standards like accurate measurements and test result predictions are missing. Life and living organisms' topics include human body structure and growth stages, but lack coverage of cell biology and reproduction. Environment standards cover weather and water changes but miss topics like food webs and human activity impacts. Physical world and natural phenomena content include heat and material properties but lacks coverage of electricity and magnetism. The Earth and beyond topics are missing, such as the solar system characteristics and the geological changes. Science, technology and society field include limited coverage of technology impact and societal problems. Safety criteria are entirely missing including rules, manners and accident prevention.

The analysis of fifth-grade science content standards shows comprehensive coverage of scientific inquiry, life and living organisms, environment, properties of air and water, energy and change, science, technology and society. However, some areas lack coverage, such as certain aspects of life science like human body structure and function, cell biology and reproduction. Similarly, topics like electricity, magnetism and celestial bodies are missing. The curriculum addresses safety concerns, but aspects like bullying prevention and fire safety are missing.

The sixth-grade science curriculum covers various aspects of scientific inquiry, life and living organisms, environment, physical science and natural phenomena, science, technology and society. However, there are gaps in certain areas. Notably, in life science, topics like human body structure, cell biology and human reproduction are not covered. Similarly, The Earth and space science topics such as the solar system, geological changes and celestial bodies are missing. Additionally, health and human nutrition concepts are missing from the curriculum. However, the curriculum addresses safety concerns to some extent, focusing on agreements, manners and respect.

Discussions/ Implications

1) *Arabic Curriculum:*

Fourth Grade: The educational content includes many of the global competitiveness standards across various areas but lacks some specific criteria.

Theme of "My Friends and Me" (Communicative Competencies):

- Included standards: Introducing oneself and others, asking and answering questions about time and date, friends, abilities, dreams and hobbies, locations, professions, describing simple abilities and places.
- Excluded standards: Expressions of thanks and apologies, identifying body parts, naming countries and nationalities and asking and answering questions about plans.

Theme of "My School and Me"

- Included standards: Describing the location and characteristics of objects and people, asking and answering questions about educational and recreational activities at school and favorite person/object/event.
- Excluded standards: Asking and answering questions about the school (location, name, school objects, subjects) and frequency.

Theme of My Family and Me"

- Excluded standards: Introducing family members (name, age, profession, workplace), identifying home address and location of objects in the house, asking and answering questions about family arrangements, devices and facilities, daily activities of family members, food and drink preferences and giving advice on common health problems.

Theme of The World around Me"

- Included standards: Asking and answering questions about games, pets and animals in the zoo, giving instructions, asking and commenting on location, expressing simple comparisons, stating simple reasons, making simple suggestions and responding to them.
- Excluded standards: Asking and answering questions about clothes, transportation, distances, seasons and weather.

Field of Linguistic Knowledge:

- Phonetics: Availability of reading and writing skills, literacy knowledge, oral language.
- Vocabulary: Common and simple words in communicative contexts.
- Grammar: Grammatical structures serving the development of communicative competencies.

Field of Language Skills:

- Listening: Executing simple classroom instructions and responding to short and simple conversations.
- Speaking: Speaking using simple phrases and sentences, giving simple instructions and requests.
- Reading: Reading and understanding short and simple texts.
- Writing: Writing simple answers, filling out simple forms, writing very short texts.

Fifth Grade: The educational content includes all global competitiveness standards specified in the curriculum across various areas/ themes:

Theme of My Friends and Me"(Communicative Competencies):

- Included standards: Introducing oneself and others, asking and answering questions about time and date, friends, abilities, dreams and hobbies, locations, professions, describing simple abilities and places, expressions of thanks and apologies, identifying body parts, naming countries and nationalities and asking and answering questions about future plans.
- Included topics: Myself, my friends, daily activities, future activities, habits, hobbies, etc.

Theme of My School and Me:"

- Included standards: Describing the location and characteristics of objects and people, asking and answering questions about educational and recreational activities at school, favorite person/object/event, asking and answering questions about school (location, name, school objects, subjects)and frequency.

Theme of My Family and Me:"

- Included standards: Introducing family members (name, age, profession, workplace), identifying home address and location of objects in the house, asking and answering questions about family arrangements, devices, facilities, daily activities of family members, food and drink preferences, giving advice on common health problems and asking and answering questions about time.

Theme of The World around Me:"

Included standards: Asking and answering questions about games, pets, zoo animals, giving instructions, asking and commenting on location, expressing simple comparisons, stating simple reasons, making simple suggestions and responding to them, asking and answering questions about clothes, transportation, distances, seasonsand weatherand asking and answering questions about the position of the body/phenomenon/person *Field of Linguistic Knowledge:*

- Phonetics: Skills in reading and writing sentences and texts, literacy knowledge, oral language including vowels, consonants, some consonant clusters, word stress, sentence stress and basic rhythm.
- Vocabulary: Common and simple words used in communicative contexts relevant to the curriculum, nearly three thousand words for the elementary level.
- Grammar: Structures supporting the development of communicative competencies, such as phrases, questions, commands, positive and negative sentences, simple sentences, present, past, future tenses, conditional verbs, singular and plural nouns, countable and uncountable nouns, possession, comparison, pronouns, cardinal numbers, ordinal numbers, common prepositions, conjunctions and articles.

Field of Language Skills:

- Listening: Discriminating sounds, stress, intonation and rhythm of different short and simple sentences, responding to short and simple classroom instructions, comprehending main ideas and specific content of texts (80-100 words), understanding main content of simple stories on familiar topics.
- Speaking: Asking and answering simple questions about familiar topics, giving instructions and making requests, initiating and responding to simple necessities inside and outside the classroom and responding to direct questions in simple interviews on familiar topics.

- Reading: Reading and understanding short texts on familiar topics, reading and understanding short texts (60-80 words), understanding short messages on postcards and simple instructions.
- Writing: Writing meaningful simple phrases and sentences on familiar topics, writing short texts (30-40 words) with suggestions and writing or filling out simple forms and text messages.

The Sixth Grade: The analysis of Arabic content standards for sixth grade revealed the following:

Theme of "My Friends and Me"(Communicative Competencies):

- Included standards: Asking and answering questions about date and time, friends, abilities, dreams, hobbies, self-description of simple abilities and places.
- Missing standards: Expressions of thanks and apologies, introducing oneself and others, identifying body parts, questions about locations and professions, naming countries and nationalities and future plans.

Theme of "My School and Me:"

- Included standards: Describing the location and characteristics of objects, questions about educational and recreational activities, people, common classroom commands and who does what.
- Missing standards: Questions about school (location, name, objects, subjects), describing people, favorite objects/events and frequency.

Theme of "My Family and Me:"

- Included standards: Questions about arrangements, daily work descriptions and food and drink preferences.
- Missing standards: Introducing family members (name, age, profession, workplace), home address and location of objects, questions about family devices and facilities, family activities, location and quantity, quick ownership and questions about time.

Theme of "The World around Me:"

- Included standards: Simple comparisons.
- Missing standards: Questions about games, pets, zoo animals, clothes (quantity, color, price), transportation, distances, instructions, seasons and weather, body position/phenomenon/person, commenting on location, stating simple reasons, making and responding to suggestions.
- Missing topics: Games, animals, favorite colors, clothes, direction and location, seasons and weather, transportation, etc.

Field of Linguistic Knowledge:

- Phonetics: Skills in reading and writing sentences and texts, letter-sound correspondence for spelling, reading and writing, oral language (vowels, consonants, some clusters, word and sentence stress, basic rhythm).
- Vocabulary: Common, simple words for basic communication, nearly three thousand words for elementary level.
- Grammar: Structures for developing communication skills, including phrases, questions, commands, positives, negatives, simple sentences, past and future tenses,

conditional verbs, singular and plural nouns, countable and uncountable nouns, possession, comparison, pronouns, cardinal and ordinal numbers, common prepositions, conjunctions and articles.

Field of Language Skills:

- Listening: Distinguishing sounds, stress, intonation, rhythm of simple sentences, responding to short classroom instructions, understanding main ideas and specific content of dialogues and simple stories (80-100 words).
- Speaking: Producing sounds, stress, intonation, rhythm of simple sentences, giving short instructions, speaking simple connected sentences on familiar topics, asking and answering brief questions about curriculum topics.
- Reading: Reading and understanding main ideas and specific content of dialogues and simple songs related to curriculum topics, short messages and notifications, texts (100-120 words) on familiar topics.
- Writing: Writing short texts (40-60 words) on curriculum topics, personal messages, cards, notes related to curriculum themes.

2) Mathematics Curriculum:

Fourth Grade: The analysis of the mathematics content standards and topics for the fourth grade showed the following:

Numbers:

- Arithmetic operations (addition, subtraction) with word problems.
- Mental arithmetic for large numbers.
- Reading, writing and ordering whole numbers, understanding place value.
- Working with numbers up to at least one million.
- Counting forwards and backwards by powers of ten.
- Using symbols (<, >, =).
- Adding and subtracting large whole numbers vertically.
- Rounding numbers and applications.
- Understanding division of whole numbers.
- Applications of multiplication and division with word problems.
- Identifying multiples and factors, finding all factors of a number and common factors of two numbers.
- Multiplying and dividing whole numbers and decimals by 10, 100 and 1000.

Missing Content:

- Adding and subtracting fractions with like and unlike denominators with exercises and real-life applications.
- Understanding decimal fractions, the relationship between fractions, decimals and percentages.
- Comparing and ordering fractions with related denominators.
- Writing decimal fractions represented by drawings.
- Understanding negative integers.

Geometry and Measurement:

Included Content:

- Differentiating between plane shapes (triangle, parallelogram, rhombus, rectangle, square, trapezoid, pentagon, hexagon) and solids (cube, rectangular prism, prism, pyramid, cone, cylinder) by their properties (sides, angles, diagonals).
- Identifying properties of 2D and 3D shapes through observation and drawing.
- Calculating the area of plane shapes.
- Understanding angle measurement units and using them.
- Learning key concepts (space, line, angles, directions, 2D shapes, 3D shapes, measurement, length, time, perimeter, area).
- Formulas for the perimeter and area of various shapes (triangles, parallelograms, trapezoids, rhombuses, rectangles, squares) and solving word problems.
- Formulas for volume and surface areas of cubes and solving related problems.
- Interpreting mathematical relationships algebraically and geometrically.
- Using and converting measurement units to find the perimeter or area of plane shapes.
- Using and converting measurement units to find the surface area and volume of solids.
- Validating measurement results; reviewing measurements.
- Calculating the perimeter of composite shapes in centimeters and meters.

Missing Content:

- Types of angles formed by parallel lines and a transversal, angles at a point on a line, interpreting algebraic and geometric relationships.
- Measuring angles using a protractor.
- Validating angle measurement results.
- Converting between metric units and solving related word problems.
- Converting between currency units and solving related word problems.
- Converting between weight units (grams and kilograms) and solving related word problems.

Text covers:

- Length measurement, mass measurement, units of capacity measurement, units of time measurement, elapsed time, measurement applications, finding perimeter, finding area, unknown dimensions and composite geometric shapes.
- Conversion between weight units (grams and kilograms) and applications with verbal problem-solving, excluding content related to weight units (grams and kilograms).

Algebra covers:

- Using elimination to solve simple linear equations and inequalities, understanding the four basic operations on rational numbers. Missing specific standards on algebraic quantities, symbols, equations, solving linear equations graphically and algebraically, proportionality, Cartesian coordinates and relationships between variables.

Probability and Statistics:

- Missing standards on data collection, organizing data in frequency tables, representing data graphically, inferring information, processing data, measures of central tendency, probability experiments and interpreting pie charts.

Fifth Grade: Regarding the results of the analysis of mathematics content standards and topics for the fifth grade of primary school, it became clear that:

Number:

- Understanding integers, decimal fractions and expressing whole numbers using the decimal system.
- Rounding and applying integers and decimal numbers.
- Understanding division operations for integers.
- Applying arithmetic operations (multiplication, division) to integers, including verbal problems.
- Understanding decimal fractions and their relationship to fractions and percentages.
- Performing arithmetic operations (addition, subtraction, multiplication, division) on numbers, including verbal applications.
- Adding and subtracting fractions with same and different denominators, solving exercises and real-life applications.
- Reading, writing, arranging and comparing numbers up to at least one million, identifying place value.
- Counting forward or backward in powers of ten up to a million.
- Vertically adding and subtracting integers with more than four digits.
- Using mental arithmetic for adding and subtracting large numbers.
- Identifying multiples and factors, finding all factors of any number and common factors of two numbers.
- Reading, writing, arranging integers and understanding place value.
- Using symbols ($<$, $>$, $=$).
- Multiplying and dividing integers and decimal numbers by 10, 100 and 1000.
- Comparing and arranging fractions with related denominators.
- Writing the equivalent decimal fraction of a diagram-represented fraction.
- Understanding negative integers.

Geometry and Measurement:

- Recognizing differences between plane shapes (triangles, parallelograms, squares, rectangles, trapezoids, pentagons, hexagons) and solid shapes (cubes, rectangular prisms, pyramids, cones, cylinders) by observing properties like sides, angles and diameters.
- Understanding properties of 2D and 3D shapes through observation and drawing.
- Calculating the area of plane shapes.
- Using units of angle measurement to measure angles.
- Understanding concepts such as space, line, angles, directions, shapes, measurement, money, length, time, weight, perimeter, area and speed.

- Recognizing and deriving formulas for perimeter and area of triangles, parallelograms, trapezoids, rectangles and squares and solving related problems.
- Recognizing and deriving formulas for volume and surface area of cubes and solving related problems.
- Interpreting mathematical relationships algebraically and geometrically.
- Recognizing angles formed by parallel lines and a transversal, angles at a point on a line and vertically opposite angles.
- Measuring angles with a protractor.
- Recognizing geometric properties of 2D and 3D shapes.
- Comparing and converting measurement units for finding perimeter, area, surface area and volume.
- Understanding and reviewing logical measurement results for angles and lines.
- Converting between metric units and solving related problems.
- Converting between currency denominations and solving related problems.
- Converting between weight units (grams and kilograms) and solving related problems.
- Calculating the perimeter of composite plane shapes in centimeters and meters.

Algebra:

- Understanding the concept of algebraic quantity.
- Understanding algebraic quantities representing relationships between numbers or quantities and solving their exercises.
- Recognizing concepts such as algebraic symbols and equations.
- Using algebraic symbols to solve exercises.
- Converting a specific linear equation into the general form of the straight line equation $y=mx+c$.
- Solving linear equations graphically and algebraically.
- Using elimination to solve simple linear equations and inequalities.
- Solving exercises on ratio, proportion and rates of change.
- Deepening understanding of the four basic operations (closure, identity, inverse, substitution) on rational numbers.
- Understanding Cartesian coordinates and representing data on them.
- Representing relationships ($>, <, =, \Rightarrow, \Leftarrow, \Leftrightarrow$) between two variables or quantities changing simultaneously (e.g., $y=x+1$).
- Describing simple mathematical relationships between two variables (bivariate data) and representing them using scatter plots and inferring information from them.

Probability and Statistics:

- Understanding methods of data collection and organizing them in frequency tables.
- Representing data with frequency tables and bar graphs and inferring information from them.
- Processing data, statistics and probabilities.
- Interpreting measures of central tendency accurately.

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- Collecting and presenting data through frequency tables and graphs.
 - Reading simple frequency tables and graphs.
 - Understanding the arithmetic mean as a measure of central tendency and identifying it in a frequency table.
 - Understanding simple probability experiments, randomness and unbiased outcomes.
 - Knowing that probabilities range between 0 and 1 and their total sums to 1.
 - Finding and graphically representing the sample space of probability experiments to calculate probabilities for events.
 - Recognizing and graphically representing discrete, continuous and compound data.
 - Creating and graphically representing cumulative frequency tables.
 - Recognizing and finding measures of dispersion (range) and inferring information from them.
 - Representing data using pie charts and inferring information from them.

The Sixth Grade: Regarding the results of analyzing the standards and topics of sixth-grade mathematics content, the following became clear:

In the field of numbers: The content includes some specified global competitive standards, as follows:

- Understanding division of integers and applying arithmetic operations (multiplication, division) to integers, including word problems.
- Identifying multiples and factors, finding all factors of a number and common factors of two numbers.
- Performing division operations and solving related word problems.
- Adding and subtracting fractions with the same or different denominators and solving exercises and real-life applications.
- Using symbols ($<$, $>$, $=$) to compare and order fractions with denominators that are multiples of a certain number.
- Understanding negative integers.

Content not included:

- Understanding decimal numbers and expressing integers using the decimal system.
- Approximating numbers and applying this with integers and decimals.
- Understanding decimal fractions and their relationship to ordinary fractions and percentages.
- Performing arithmetic operations (addition, subtraction, multiplication) with word problems.
- Reading, writing, ordering, comparing numbers up to at least one million and determining the place value of digits.
- Counting by powers of ten up to a million.
- Adding and subtracting integers with more than four digits by using vertical arrangement.
- Using mental arithmetic for large number addition and subtraction.
- Reading, writing, ordering integers and understanding place value.
- Multiplying and dividing integers and decimals by (10, 100, 1000).
- Writing decimal equivalents of fractions shown in diagrams.

Covered topics:

- Using the number line to describe data, compare numbers and explore absolute value.
- In geometry and measurement: Recognizing differences between plane shapes (triangles, rectangles, etc.) and solid figures (cubes, cones, etc.) by observing properties like sides, angles and diagonals.
- Identifying properties of 2D and 3D shapes through observation and drawing.
- Calculating the area of plane shapes and recognizing angular measurement units.
- Understanding concepts like space, line, angles, directions, 2D and 3D shapes, measurement, money, length, time, weight, perimeter, area and speed.
- Knowing formulas for perimeter and area of various shapes and solving related problems.
- Knowing formulas for volume and surface area of cubes and solving related problems.
- Interpreting mathematical relationships algebraically and geometrically.
- Recognizing types of angles formed by parallel lines and a transversal.
- Measuring angles using a protractor.
- Comparing and converting measurement units for finding perimeter, area and volume of shapes.
- Converting between metric units and solving related problems.
- Converting between currency denominations and solving related problems.
- Converting between units of measurement (grams and kilograms) and solving related problems.
- Calculating the perimeter of compound plane shapes in centimeters and meters.

In the algebra domain, the content includes some specified global competitive standards such as:

- Introduction to algebraic quantities.
- Understanding algebraic quantities representing relationships between numbers or quantities and solving their exercises.
- Using algebraic symbols to solve exercises.
- Understanding concepts such as algebraic symbols and equations.
- Solving linear equations graphically and algebraically.
- Using elimination to solve simple linear equations and inequalities.

However, the content does not include some specified global competitive standards such as:

- Converting a given linear equation in two variables to the general form of a straight line ($y = mx + c$).
- Solving exercises on ratio, proportion and rates of change.
- Deepening the understanding of the four fundamental operations (closure, associative, identity, inverse, commutative) on rational numbers.
- Introducing Cartesian coordinates and data representation in them.
- Representing relationships ($>$, $<$, $=$) between two different variables simultaneously (such as $y = x + 1$).
- Describing simple mathematical relationships between two variables (bivariate data) and representing them using scatter plots (scatter diagrams) and inferring information from them.

- Deepening the understanding of the four fundamental operations (closure, associative, identity, inverse, commutative) on rational numbers in the algebra domain.

In the probability and statistics domain, the content includes most of the specified global competitive standards such as:

- Understanding methods of data collection and organization into frequency tables.
- Data representation using frequency tables and graphical representations (histograms) and inferring information from them.
- Inferring information from frequency tables.
- Data processing, statistics and probability.
- Dealing with statistics (measures of central tendency) and interpreting them accurately.
- Collecting data from its sources and presenting it through frequency tables and graphs.

However, the content does not include some specified global competitive standards such as:

- Data representation using pie charts and inferring information from them.
- Representing the relationship between dependent and independent variables, analyzing the relationship between dependent and independent variables and graphical representation of dependent and independent variables.

The content also covers topics such as dependent and independent variables, the relationship between dependent and independent variables and graphical representation of dependent and independent variables.

3) *Science Curriculum:*

The Fourth Grade: Regarding the results of analyzing the criteria and topics of science content for the fourth grade, the following points have been clarified:

- *In the field of scientific inquiry*; the content includes most of the globally competitive standards specified in the checklist. It includes the following standards:
 - Planning different types of scientific inquiries to answer questions.
 - Identifying and controlling variables when necessary.
 - Recording data and results with increasing complexity using scientific diagrams, labeling, classification keys, tables, scatter plots, bar graphs and line graphs.
 - Recording conclusions, causal relationships, explanations and confidence levels in the results.
 - Presenting conclusions orally or in written form such as presentations.
 - Identifying scientific evidence used to support or refute ideas or arguments.
 - Identifying the causes and evidence leading to natural phenomena.
 - Understanding the nature, processes and methods of science through various types of scientific research, helping them answer scientific questions about the world around them.
 - Acquiring the necessary scientific knowledge to understand the uses and effects of science now and in the future.
 - Presenting ideas about relationships between living organisms.
 - Conducting research and exploration like scientists.
 - Conducting investigations, observations and simple interpretations of all science topics.

Some standards were not included, such as:

- Taking measurements accurately using a variety of scientific instruments with high precision and repeating readings when necessary.
- Using test results to make predictions for preparing further comparative and fair tests.
- Exploring the environment (e.g., visiting a park).
- *In the field of life and living organisms:* The content did not fully include a criterion for presenting ideas about the relationship between body structure and movement by exploring bone and muscle movement.

Some related topics included:

- Human body and stages of human growth, skeletal structure and movement; the relationship between human body structure and movement, bone and muscle movement, human and other animal movement and human organ systems.
- Topics not covered include animal and plant cells, biological processes, specialized cells, embryonic development, absorption and excretion, plant reproduction, flowering plants and human reproduction.
- *The field of life and living organisms* includes a criterion for presenting ideas about the relationship between seasons and animal activities and plant growth by finding and raising familiar animals and plants.
- Included topics are: living organisms and habitats, basic characteristics of living organisms and non-living components in the environment, plants and animals, digestion, respiration, human respiration, air and respiration in plants, genetics, causes of variation and classification of living organisms.
- Not included topics are; plant reproduction, flowering plants, food and nutrition, food sources and production, factors affecting photosynthesis, photosynthesis and food production. Topics not covered; plant and animal growth and life stages, raising familiar animals and plants, common types of plants, fungi and animals in students' direct environment.
- *In the field of environment*, the content largely includes a criterion for understanding weather conditions and water changes in the natural world by observing changes in temperature throughout the day and the process of water changing to vapor and by exploring changes in weather, temperature and the relationship between water and water vapor.
- Some related topics include; changes in temperature throughout the day and the process of water changing to vapor, changes in weather, temperature and the relationship between water states.
- The content also includes a criterion for exploring types of environments and their characteristics, biodiversity, renewable and non-renewable environmental resources and environmental pollution.
- Included topics are: food chains, the world as a human habitat, natural conditions, human-made environment, different living environments, types of environments and their characteristics, adaptation of living organisms to the environment, nature throughout different seasons, animal activity and plant growth in different seasons of the year, original habitat region of living organisms, relationship of our region with

neighboring areas. Topics not included are food webs, human activity, clean energy and sustainable development.

- *In the field of human health and nutrition:* the content does not include criteria for this field to a large extent, such as: understanding the human body and its general growth and development stages, daily healthy habits and individual health care, common children's diseases, preparing for emergencies and simple first aid measures, the importance of family, friendship, interaction and acknowledging individual emotions for their well-being and mental health.
- Only one topic is included: daily healthy habits and individual health care.
- The following topics are not included: personal and environmental hygiene, healthy lifestyle habits and adolescence, smoking and drugs and health, disease prevention, healthy nutrition, common children's diseases, disease prevention, preparing for emergencies and simple first aid measures, the importance of family, friendship, interaction and acknowledging individual emotions and mental health.
- *In the field of physical world and natural phenomena:* The content does not include all criteria of this field, such as understanding the properties of air and water, exploring changes in volume and pressure when compressing air and water in a closed space, understanding combustion and fire safety and identifying properties and changes in the state of water.
- *Missing Related Topics:*
 - Matter and materials around us
 - Elements, mixtures and solutions
 - Combustion, physical and chemical changes
 - Separation of mixtures
 - Everyday materials (solid, liquid, gaseous)
 - Properties of air and water
 - Identifying and labeling materials (wood, plastic, glass, metal, water, rocks)
 - Comparing and classifying materials based on hardness, solubility, transparency, conductivity and magnetism
 - Specific uses of materials (metals, wood, plastic)
 - Compounds, naming compounds, chemical reactions, acids and bases, metal and non-metal properties
 - Distinguishing between objects and their materials.
- *In the field of energy and change:* The content includes a criterion for understanding phenomena.
 - The content covers heat and the properties of metals, water and air, focusing on changes during heating and cooling. Topics included heat, temperature, heat sources, properties of materials, energy transfer and conservation. However, it lacks coverage of heat phenomena and physical changes.
 - It omitted criteria for understanding electricity, including exploring battery and solar cell functions, magnetic properties and related phenomena. Topics not addressed were: weight, force, reaction, friction, pressure, torque, principles of machines, electric circuits, magnetism and electricity generation.

- In contrast, it includes topics on sound, hearing, vision, light, colors, reflection, refraction, motion, structural strength, displacement and speed.
- *In the field of The Earth and beyond:* The content does not include any of the criteria of this field, which are: knowing the solar system (The Earth - Sun - The moon - Stars - meteoroids - meteors); and knowing the characteristics and movement of the moon and stars by observing them, exploring the location of the moon, color of the stars, their brightness and positions.
 - It does not include topics related to this criterion such as: combustion, properties and changes of water state, water cycle, water use, geological changes, rock formation, rocks and soil, weather, climate, night and day, times of day and seasons, characteristics of the four seasons, night sky, solar system, the Earth, solar system, the sun, the moon, stars, meteoroids, meteors, movement of the moon and stars, exploring the location of the moon, exploring the color of the stars, their brightness and positions, satellites.
 - The field of the Earth and beyond includes topics such as properties of air, weather and climate, night and day, times of day and seasons and solar energy.
- *In the field of science, technology and society:* The content does not include the criteria of this field to a large extent, which are: understanding the uses of technology in daily life and the impact of technology on society; and solving problems such as: maintaining health, energy resource depletion, environmental pollution.
 - This field is limited to addressing some topics such as our community, the relationship between our country and the world and solving health preservation problems.
 - It does not include topics such as: solving problems of energy resource depletion; whereas it includes topics such as uses of technology in life, information technology in daily life, global problems (such as famine, war, poverty) and the impact of technology on society.
- *In the field of safety:* The content does not include the criteria of this field such as are: agreements and rules, good manners, consideration for others, money use, respect for others' property, prevention of bullying and violence, respect for bodily sanctity, safety at school; behavior in traffic, avoiding dangerous situations and accidents at home and during leisure time.
- It also does not include any of the topics related to this criterion, such as: prevention of bullying and violence, behavior in traffic, fire safety and respect for bodily sanctity.

The Fifth Grade: The analysis of the science content standards for fifth grade revealed the following:

- *Scientific Inquiry:* The curriculum includes planning scientific inquiries, controlling variables, taking accurate measurements, recording data, using test results for predictions, presenting conclusions, identifying scientific evidence, understanding natural phenomena and acquiring scientific knowledge.
- *Life and Living Organisms:* Topics not covered are related to human and animal body structures, bone and muscle movement, human organ systems, vital processes, specialized cells, embryo development, digestion, reproduction, respiration and genetics. Topics covered are relationships between seasons and activities of familiar animals and plants.
- *Environment:* Topics partially covered are: weather conditions, water changes and exploring weather changes.

- *Understanding Properties of Air and Water:* Topics explore changes in volume and pressure when compressed, combustion processes, fire safety, and states of water.
- *Covered Topics:* Matter and materials, elements, mixtures, solutions, combustion, physical and chemical changes, separation of mixtures, daily life materials, properties of air and water and specific uses of materials.
- *Not Covered Topics:* Compounds, chemical reactions, acids and bases, metal and non-metal properties.
- *Energy and Change:* Topics include heat-related phenomena, properties of metals, water and air and changes when heated or cooled.
- *Covered Topics:* Heat, temperature, energy sources, transfer and conservation.
- *Not Covered Topics:* Electricity, battery and photovoltaic cell functions and magnetic properties.
- *The Earth and Beyond:* It does not include the solar system, the moon and stars movements and exploration of the moon and star characteristics.
- *Not Covered Topics:* Geological changes, rock formation, weather, climate, seasons, night sky, solar system and star exploration.
- *Covered Topics:* Combustion, water characteristics and changes, water cycle, water use and solar energy.
- *Science, Technology and Society:* It includes technology uses, impact on society and solving problems like health preservation and environmental pollution.
- *Not Covered Topics:* Global relationships and energy resource problems.
- *Covered Topics:* Society, technology uses, global issues and solving health preservation problems.
- *Safety:* It includes standards on good manners, consideration of others, money use and respect for property.
- *Covered Topics:* Physical privacy, school safety, avoiding dangers, following rules and respect for others.
- *Not Covered Topics:* Bullying prevention, traffic behavior and fire safety.

The Sixth-Grade: The analysis of content standards for sixth-grade science revealed the following:

1. *Scientific Inquiry:* The curriculum addresses all global standards, covering planning scientific inquiries, controlling variables, accurate measurements, data recording using various scientific tools, making predictions, drawing conclusions, presenting results and understanding scientific methods and evidence. It also includes environmental exploration and investigating relationships between living organisms.
2. *Life and Living Organisms:* The curriculum does not cover relationships between body structure and movement, human body growth stages, skeletal structure, specialized cells, digestion, reproduction, respiration and genetics.
3. *Environment:* The content covers weather conditions, water changes, environmental types, biodiversity, renewable and non-renewable resources, pollution and clean energy. Missing topics include different living environments, organism adaptation, seasonal changes and the native habitats of organisms.
4. *Health and Human Nutrition:* The curriculum lacks standards on human growth, daily healthy habits, common childhood diseases, emergency preparation, family and friendship importance and mental health. It includes personal and environmental hygiene and healthy lifestyle habits.

The Sixth Grade: The content standards for the field of physical science and natural phenomena encompass the following:

1. *Understanding Air and Water:* The curriculum covers properties of air and water, changes in volume and pressure when compressed, combustion, fire safety and states of water. Topics include matter, elements, mixtures, physical and chemical changes, separation of mixtures, everyday materials and their properties and uses.
2. *Energy and Change:* The content includes heat-related phenomena, properties of metals, water and air, changes due to heating or cooling, energy sources, transfer and conservation.
3. *The Earth and Beyond:* No standards are included for this field. Missing topics are the solar system, the moon and stars movements, geological changes, rocks, soil, weather, climate, seasons and satellites.
4. *Science, Technology and Society:* The content covers the use of technology in daily life, its impact on society and solving issues like health maintenance, energy scarcity and environmental pollution.
5. *Safety:* The content includes good manners, consideration for others, respect for property, bodily privacy, school safety, avoiding dangerous situations and following traditions and rules. Missing topics are bullying prevention, traffic behavior and fire safety.

Conclusions

The researchers came up with the following conclusions:

- The fifth-grade curricula were the best across all three subjects. Arabic and science curricula highly addressed global competitiveness standards, while the mathematics curriculum moderately addressed these standards.
- The sixth-grade curricula moderately addressed the international competitiveness standards in all three academic subjects.
- The fourth-grade mathematics and science curricula moderately addressed global standards, but Arabic language curriculum poorly addressed these standards.
- It was found out that the global competitiveness standards were moderately addressed across the three curricular elements, based on the marginal totals of the subject curricula.

Given these findings, the fifth-grade curricula were identified as the best in terms of addressing global competitiveness standards. Both the fourth and sixth-grade curricula moderately addressed these standards. Consequently, a proposed framework was prepared to align the curricula of Arabic, science and mathematics for the last three grades of primary school with the global competitiveness standards, based on the evaluation of curriculum planning.

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