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The Evaluation of Grades 5 Omani Science Curriculum (Cambridge) in Alignment with Oman Vision 2040

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Abstract

The purpose of this study was to evaluate the Omani Science Curriculum (Cambridge) for grades 5 in Oman and to conduct a comprehensive analysis in line with the Omani Vision 2040. To address the research questions, a descriptive-analytical approach based on quantitative analysis was used. Two tools were used for the study: examining the content of the Omani science curricula and a questionnaire that was distributed to the relevant authorities, including supervisors and teachers. The study sample included 2,092 science teachers, 150 science supervisors, and science textbooks for grade 5. The results of the study are important because they provide insights into potential improvements to Omani science curricula. The results suggest that the curriculum should focus more on enhancing critical thinking and problem-solving skills. In addition, it should be updated to reflect the requirements and challenges of the twenty-first century. The findings also underscore the importance of crafting a curriculum that embraces inclusivity and provides strong support for diversity. Key findings of the study include: The curriculum is generally consistent with Vision 2040, but some areas need improvement. There is a need to intensify the focus on developing critical thinking and problem-solving skills. Curricula should be compatible with the needs and complexities of the twenty-first century. Specific recommendations for improving the curriculum are as follows: Review curriculum content: Introduce more content that encourages critical thinking and problem-solving skills. This can be achieved by incorporating hands-on activities and projects that require students to engage in critical thinking and address challenges through problem-solving.

Keywords: Curriculum evaluation, Evaluation criteria, Omani Science Supervisors, Omani Science teachers, Oman Vision 2040.

1. Introduction

The rapid change and progress in various fields of science have made it necessary for educational systems to adapt and improve their outputs. This adaptation is crucial for cultivating individuals who are confident in their identity, committed to their social values, innovative, and economically active. One effective approach to achieving this is by focusing on raising the quality of school education and developing curriculum and educational programs. Curriculum evaluation is essential for ensuring that the curriculum aligns with the needs of the learners and is effective in achieving the desired outcomes.

The curriculum serves as the primary source of knowledge for students, particularly in schools. Ensuring a high-quality curriculum that meets students' needs is paramount. Oman's Ministry of Education is

committed to maintaining rigorous curriculum standards, emphasizing principles such as continuous personal growth, national identity, values, and sustainable development. Additionally, they prioritize education responsibility, critical thinking, leadership, and technology (Ministry of Education, 2018).

The Ministry of Education in Oman also conducts regular evaluations of the curriculum to ensure that it meets the needs of learners and aligns with the goals of the educational system. This process is crucial for maintaining the highest quality curriculum. I believe that the Ministry of Education in Oman is taking the necessary steps to ensure the curriculum's excellence. By prioritizing these principles and objectives, they can develop a curriculum that is relevant, engaging, and effective. This commitment will ensure that learners in Oman receive the best possible education (Ministry of Education, 2018).

Science education plays a vital role in developing skills such as critical thinking, problem-solving, and teamwork, enabling students to contribute positively to society and the economy (Ghanem, 2016). The CAMBRIDGE project leverages modern trends and theories in science education to enhance Omani students' competencies, enabling them to compete internationally (Trends in International Mathematics and Science Study (TIMSS)). The project emphasizes surveying, research, and problem-solving to equip students for the challenges of the 21st century. Evaluation, as discussed by Stake and Ten Brink, involves gathering information and making judgments (Allam, 2019). Assessment includes evaluating curriculum objectives, content, activities, and the evaluation process itself, all of which are related to student learning (Al-Sir, 2018).

Vision 2040 encompasses various domains, with education being one of the key areas emphasized for achieving objectives. The education domain delineates seven main goals, which include enhancing curricula, integrating Islamic principles, preserving Omani heritage, and aligning with sustainable development and future skills. While there are overlaps between Oman Vision 2040 and science curricula, further evaluation is necessary to bridge any existing gaps. This study aims to evaluate science curricula in grades 5-8 in Oman, to align them with the goals outlined in Oman Vision 2040. The proposed vision will contribute to this alignment process.

The Ministry of Education in Oman demonstrates a commitment to aligning its science education standards with international criteria. This alignment allows Omani students to benefit from the latest advancements and best practices in science education globally. Integration of Research, Investigation, and Critical Thinking: The chosen curriculum emphasizes the development of students' research, investigation, and critical thinking skills. This approach goes beyond rote memorization and encourages students to actively engage with scientific concepts. Fostering these skills is crucial for producing scientifically literate individuals who can contribute to innovation and problem-solving. Deepening Understanding of Scientific Phenomena: The curriculum aims to deepen students' understanding of various scientific phenomena. This indicates a focus on not just covering content but also ensuring that students have a meaningful grasp of scientific principles and can apply their knowledge in practical contexts. International Expertise and Collaboration: The decision to adopt an international curriculum implies a desire to benefit from international expertise. This approach provides an opportunity for collaboration with global educational communities, allowing Oman to tap into a wealth of knowledge and experiences in science education. (Ministry of Education, 2017).

Many studies have evaluated the curriculum based on specific criteria, but they have not done so by the criteria and objectives of Oman Vision 2040, such as (Badri (2020), Algaseem & Al-Omari (2020), AL Sadiq (2019), Abu Atra (2019), and AlShehri (2018)). The study by Al Badri (2020) recommended evaluating the curricula to ensure they achieve the required objectives. The study also suggested reviewing

the content of science books, including educational experiences, to ensure that they achieve the percentages referred to in the frameworks for evaluating science learning and fulfilling other educational and societal goals. The studies by Algaseem & Al-Omari (2020), AL Sadiq (2019), Abu Atra (2019), and AlShehri (2018) have recommended having standards for evaluating science curricula. These studies argue that standards are necessary to ensure that the curricula are aligned with the objectives of Oman Vision 2040 and that they are effective in meeting the needs of Omani students. Al-Ahmadi (2018) has urged the need to start developing programs to develop the curriculum of sciences in light of the objectives of Vision 2040. This study argues that the curriculum needs to be updated to reflect the latest scientific developments and to meet the needs of the 21st-century workforce.

From the previous studies (Al Badri, 2020; Algaseem & AL-Omari, 2020; AL Sadiq, 2019; Abu Atra, 2019; AlShehri, 2018; Al-Ahmadi, 2018), none have specifically aimed at evaluating the Omani Science curriculum (CAMBRIDGE) in the light of Oman's 2040 vision. Therefore, the researcher needs to evaluate the Omani Science curriculum (CAMBRIDGE) for grade 5 according to the criteria of Oman Vision 2040. To achieve this, a scale was designed to measure the extent to which these curricula align with the standards of Vision 2040. Grade 5 was chosen for this study because more than two academic years have passed since the implementation of the Omani Science Curriculum (CAMBRIDGE) began. This ensures that the supervisors and teachers who apply the curriculum have obtained sufficient practical experience in teaching its objectives. As a result, they can provide valuable insights by answering the questions included in the questionnaire.

2. OBJECTIVES OF THE STUDY

This study aims to:

1. To List drawers' evaluation criteria for the Omani Science Curriculum (CAMBRIDGE) for grades (5-8), Aligned with Oman Vision 2040.
2. Analyzing the content of the Omani Science CAMBRIDGE Curriculum for grades (5-8) to evaluate the availability of Oman Vision 2040-based evaluating curricula criteria.
3. Evaluate the availability of Oman Vision 2040-based evaluating curricula criteria in the Omani Science CAMBRIDGE Curriculum for grades (5-8) from science supervisors' and teachers' points of view.

3. RESEARCH QUESTIONS

This study addresses the following research questions:

1. What are the evaluation criteria for the Omani Science Curriculum (CAMBRIDGE) for grades 5 based on Oman Vision 2040?
2. What is the availability of criteria for evaluating the curricula based on the Oman Vision 2040 in the Omani Science Curriculum (Cambridge) for grades 5 according to the results of the content analyze of these curricula?
3. What is the availability of criteria for evaluating the curricula based on the Oman Vision 2040 in the Omani Science Curriculum (Cambridge) for grades 5 according to the point of view of science supervisors and teachers?

4. RESEARCH APPROACH

The selection of a descriptive-analytical approach grounded in quantitative analysis is a prudent choice

for this study, which aims to assess the alignment of the Omani Science Curriculum (CAMBRIDGE) for grade 5 with the fundamental objectives of Oman Vision 2040 through content analysis of science books. The descriptive-analytical approach facilitates the systematic collection of data, particularly through structured content analysis of the science books, ensuring a methodical examination of the curriculum's components. The quantitative nature of the analysis enhances objectivity by utilizing numerical data and statistical measures, thereby minimizing subjectivity, and providing a more impartial evaluation of alignment.

This approach enables the use of quantifiable measurements, facilitating the assessment of alignment through numerical data. It allows for the calculation of percentages, frequencies, and other statistical measures, providing a clear and measurable indication of alignment. The descriptive-analytical approach allows for structured content analysis of the science books, ensuring that specific criteria and objectives outlined in Oman Vision 2040 are systematically examined and quantified, contributing to the precision of the study. Moreover, the use of quantitative methods often results in efficient data processing. Numerical data can be analyzed using statistical software, streamlining the analysis process, and facilitating the extraction of meaningful insights. The application of statistical measures adds rigor to the study, providing a robust foundation for drawing conclusions and making inferences based on the data collected from the content analysis.

The quantitative approach enhances the generalizability of findings. Results obtained through statistical analysis can be extrapolated to a larger population, providing insights that may be applicable beyond the specific context of the study. By assigning numerical values to different criteria, quantitative analysis allows for an objective assessment of alignment. The study aims to objectively measure the extent to which the curriculum aligns with the objectives of Oman Vision 2040.

In summary, the descriptive-analytical approach, rooted in quantitative analysis, is well-suited for assessing the alignment of the Omani Science Curriculum with Oman Vision 2040. It ensures a systematic, objective, and quantifiable examination of the curriculum's content, contributing to the robustness and reliability of the study's findings.

The primary aim of content analysis is to achieve a deeper comprehension of communication materials. This is accomplished by identifying key themes and concepts within the material, as well as understanding how these themes and ideas are presented. Additionally, content analysis quantifies the frequency of different words, phrases, and images within the material. This enables tracking changes in content over time and facilitates comparisons across different materials (Al-Obaidat, 1996)."

The mentioned criteria are essential for evaluating curriculum content. The 'containment and embedding' standard assesses the curriculum's incorporation of essential content necessary for student learning. The 'inclusion' standard evaluates the relevance of curriculum content to student needs. The 'realism' standard gauges the degree to which the curriculum presents accurate and realistic information. The 'accuracy' standard measures the curriculum's freedom from errors. The 'balance' criterion examines the presentation of diverse perspectives within the curriculum's content. The 'learning level' standard evaluates the curriculum's suitability for the student's educational level (Tamiya, 2004).

Content analysis stands as a valuable tool for curriculum evaluation. It ensures that the curriculum is comprehensive, relevant, accurate, and well-balanced. Additionally, it aids in pinpointing areas where the curriculum could be enhanced."

The descriptive survey method is a suitable choice for this study because it enables the collection of information and data regarding the Omani Science curriculum (CAMBRIDGE) for grades (5-8) from the

perspectives of science supervisors and teachers. This approach allows for the identification of curriculum strengths and weaknesses and assists in determining the degree to which it aligns with the core objectives of Oman's vision.

Obaidat and Abdel Haq (1999) define the descriptive survey method as a quantitative approach involving data collection from a sample of respondents. Data can be gathered through questionnaires, interviews, or focus groups, followed by analysis to identify patterns and trends. The descriptive survey method serves as a valuable tool for gathering information about a variety of phenomena. It is a relatively straightforward technique capable of amassing a substantial amount of data within a short timeframe.

In conclusion, the descriptive survey method is a valuable tool for acquiring insights into the Omani Science curriculum (CAMBRIDGE) for grades (5-8) from the vantage point of science supervisors and teachers.

5. THE POPULATION OF STUDY

The study population includes three main groups:

Science Book Community: This group comprises science books designed for the Omani Science curriculum (CAMBRIDGE) for grade 5, as used in Oman.

Science Supervisors Community: This group consists of 150 science supervisors affiliated with the Ministry of Education during the second semester of the academic year 2021-2022 (The Ministry of Education, 2021).

Science Teachers Community: This group includes 2,092 science teachers affiliated with the Ministry of Education during the second semester of the academic year 2021-2022 (The Ministry of Education, 2021).

The selection of supervisors and teachers as the sample is based on their significant involvement with the curriculum. Teachers teach students using this curriculum, while supervisors guide teachers in its implementation, making them reliable sources of curriculum-related information.

Distribution Across Governorates: The study population is distributed across different educational governorates, with the highest concentrations of science supervisors and teachers in the Muscat governorate, followed by the North Al Batinah governorate and the South Al Batinah governorate. This distribution corresponds to the number of schools and students in these governorates.

Table 1: The Population of Supervisors and Teachers

Governorate	Number of Teachers	Number of Supervisors
Muscat	495	20
Al Batinah North	445	28
Al Batinah South	250	23
Al Dhakhiliyah	256	10
North Sharqia	120	10
South Sharqia	113	11
Al Dhahirah	84	13
Al Buraimi	49	8
Musandam	8	7
Al Wusta	135	5
Dhofar	137	15
Total	2092	150

6. THE SAMPLE OF THE STUDY

The sample includes:

Science Books: Omani Science Curriculum (CAMBRIDGE) books for grade 5, in the academic year (2021-2022), totaling eight books, one for each semester.

Table 2: The Textbook Sample

Lessons	Units	Pages	Edition	semester	Class
24	3	71	2021	first	Fifth
22	3	60	2018	second	
43	6	124	2019	second	

Sample of Science Supervisors: Science supervisors are selected using the stratified random method, which divides the population into distinct groups, such as educational directorates (governorates). The sample selection process involves determining the sample size, defining the groups, categorizing society members into sub-groups, and then randomly selecting a sample from each group (Ta'ima, 2004). The sample consists of 30 supervisors who oversee science teachers for grade 5 in the Ministry of Education's educational directorates during the second semester of the academic year (2021-2022), representing 20% of the study population. Distribution across educational governorates is displayed in the table.

Table 3: The Supervisor's Sample

Governorate	The number of supervisors
Muscat	4
Al Batinah North	6
Al Batinah South	5
Al Dhakhiliyah	2
North Sharqia	2
South Sharqia	2
Al Dhahirah	3
Al Buraimi	1
Musandam	1
Al Wusta	1
Dhofar	3
Total	30

Sample of Science Teachers: Similar to the science supervisors, the selection of science teachers' samples will utilize the stratified random method. This method is employed when the society can be naturally

divided into distinct, non-overlapping groups, which in this case are the educational directorates (governorates).

The process of sample selection follows these steps (Ta'ima, 2004): determining the sample size, defining the groups, categorizing society members into sub-groups, and randomly selecting a sample from each group.

The teachers' sample comprises (209) male and female teachers instructing science to grade 5 in the educational directorates of the Ministry of Education during the second semester of the academic year (2021-2022), constituting 10% of the study population.

Table 4: The Teacher's Sample

Governorate	Number of Teachers
Muscat	49
Al Batinah North	44
Al Batinah South	25
Al Dhakhiliyah	26
North Sharqia	12
South Sharqia	12
Al Dhahirah	8
Al Buraimi	5
Musandam	1
Al Wusta	13
Dhofar	14
Total	209

An optimal percentage for research relying on a descriptive approach is typically 20% of the research population. Nevertheless, the overall percentage of all members may vary from a few hundred to 10% for an average-sized society. Conversely, the total percentage of all members could range from a few thousand to 5% of the research population. For very large research populations, the total percentage might extend to the tens of thousands (Khader, 2013).

For example: For an average-sized society with a population ranging from a few hundred to a few thousand individuals, including around 10% to 20% of the population in the research sample would be feasible and can provide reliable results.

Conversely, for larger populations, such as those ranging from several thousand to tens of thousands or more, the total percentage of individuals included in the research may decrease proportionally. In such cases, including around 5% to 10% of the population in the study sample could still yield valid findings while managing the logistical challenges associated with data collection and analysis.

It's essential to consider factors such as the heterogeneity of the population, the research objectives, available resources, and the desired level of precision in the study findings when determining the appropriate sample size. Additionally, employing rigorous sampling techniques and ensuring representative sampling can enhance the generalizability of the study results to the broader population.

7. FINDING

Results Related to the First Question:

To address the query, what are the evaluation criteria for the Omani Science Curriculum (CAMBRIDGE) for grades (5-8) based on Oman Vision 2040? The researcher compiled a comprehensive list of criteria intended for incorporation into the Omani Science curricula (Cambridge) content for grades (5-8) to fulfill the objectives outlined in Oman Vision 2040. The detailed process of developing these criteria was outlined in the study procedures in the third section. The final list consisted of (40) distinct criteria, distributed across five primary domains:

Table 5: The final list of criteria for evaluating the Omani science curriculum.

No	phrases	State-ment Strongly	Agree	Neu-tral	Disa-gree	Strongly Disa-gree
The First Domain: Values and Principles of the Islamic Religion: Based on your scientific and practical experience, you observe that the science curriculum for Omani Science curriculum (CAMBRIDGE) for grades (5-8):"						
1	Incorporates Islamic religious principles					
2	Fosters a culture of collaborative teamwork.					
3	Advocates for social responsibil-ity.					
4	Encourages volunteerism.					
5	Promotes cultural acceptance.					
6	Develops the notion of commu-nity partnership.					
7	Advocates for Arabic language proficiency.					
8	Fosters appreciation and respect for scholars.					
The Second Domain: Omani Identity and Heritage Based on your scientific and practical experience, you find that the Omani Science curric-ulum (CAMBRIDGE) for grades (5-8) includes the following aspects related to Omani identity and heritage:						
9	Addresses local concerns.					
10	Encourages admiration for Omani scholars.					
11	Strengthens national identity.					
12	Incorporates national values.					
13	Fosters societal consciousness.					
14	Preserves Omani customs and traditions.					
15	Addresses environmental issues in Oman.					

16	Promotes pride in Omani accomplishments.					

The Third Domain: Sustainable Development Based on your scientific and practical experience, you observe that the Omani Science curriculum (CAMBRIDGE) for grades (5-8) includes the following aspects related to sustainable development:						
17	Incorporates principles related to natural resources.					
18	Incorporates principles related to industrial resources.					
19	Addresses environmental concerns.					
20	Develops the concept of preserving national wealth.					
21	Emphasizes the importance of conserving natural resources.					
22	Upholds the principle of universal healthcare.					
23	Promotes the development of life skills.					
24	Enhances human capacities.					

The Fourth Domain: Future Skills Based on your scientific and practical experience, you find that the Omani Science curriculum (CAMBRIDGE) for grades (5-8) includes the following aspects related to future skills:						
25	Fostering scientific research skills					
26	Enhancing critical thinking abilities					
27	Refining data handling competencies					
28	Nurturing creativity and innovation aptitude					
29	Promoting inquiry-driven learning capabilities					
30	Developing effective time management proficiency					
31	Cultivating problem-solving skills					
32	Encouraging self-directed learning abilities					

The Fifth Domain: Educational Paths Based on your scientific and practical experience, you observe that the Omani Science curriculum (CAMBRIDGE) for grades (5-8) includes the following aspects related to educational paths						
33	Incorporates principles of entrepreneur-ship					
34	Nurtures skills and talents					
35	Fosters motivation and ambition					
36	Integrates science, technology, engineer-ing, and mathematics.					
37	Develops students' interests in various specializations					
38	Acknowledges individual differences among learners					
39	Adapts to the demands of the job market					
40	Explores emerging professions in the job market					

Results Related to the Second Question:

To address the query, what is the availability of criteria for evaluating the curricula based on the Oman Vision 2040 in the Omani Science Curriculum (Cambridge) for grade 5 according to the results of the content analyze of these curricula?

The researcher conducted an in-depth analysis of the Omani Science curriculum (CAMBRIDGE) for grade 5 during the two semesters (first and second) of the academic year (2021-2022), which encompassed a total of (2) textbooks. The analysis was executed utilizing the content analysis tool specifically devised for this purpose. Subsequently, frequencies and percentages were computed to ascertain the extent to which the criteria for Oman Vision 2040 objectives were present in the science books for grade 5 across both semesters. Table (2) provides an overview of the overall outcomes of this analysis process.

Table 6: Frequencies, Percentages, and Ranking of Oman Vision 2040 Objectives Criteria Domains Included in Science Textbooks for Grade 5 during the First and Second Semesters

domain	Fifth grade (S1 + S2)	
	f	%
Values and principles of the Islamic religion	81	7.90
Omani Identity and Heritage	218	21.27
Sustainable Development	149	14.54
Future Skills	219	21.36
Educational paths	358	43.93
Total	1025	17.42

S1: Semester1, S2: Semester2, f: Frequencies

In Table (2), the results of a content analysis conducted on science textbooks for grade 5 are displayed.

The analysis focused on different domains, and the domain of educational pathways emerged as the most frequently occurring theme, accounting for (358) instances, equivalent to (43.93%) of the total content analyzed. This substantial prevalence suggests a noteworthy emphasis on educational pathways within the context of the analyzed science textbooks.

The prominence of the educational pathways domain implies a deliberate prioritization of content related to guiding students toward future careers and educational trajectories. This aligns with the broader educational goals outlined in Oman's Vision 2040, which emphasizes the importance of equipping students with the knowledge and skills necessary for success in evolving professional landscapes.

in addition to the educational pathways domain, the content analysis also revealed significant insights into the emphasis placed on future skills within the science curriculum. The future skills domain exhibited the second-highest frequency, totaling (219) instances, accounting for (21.36%) of the overall content analysed. The noteworthy prevalence of the future skills domain indicates a considerable emphasis on preparing students for the challenges of the 21st century within the context of the science curriculum.

The Omani Identity and Heritage domain, focusing on Omani culture, ranked third with 21.27% of occurrences. It reflects an effort to preserve and promote Omani identity and heritage within the curriculum. The incorporation of Omani identity and heritage content acknowledges the significance of cultural heritage in shaping students' sense of belonging and cultural identity.

The Sustainable Development domain, focused on imparting knowledge about environmental protection and resource conservation, held significance with 14.54% of occurrences. It indicates a commitment to educating students about sustainability and environmental awareness, aligning with global efforts towards sustainable development. The inclusion of sustainable development principles reflects the curriculum's recognition of the importance of environmental stewardship and responsible citizenship.

Values and principles of the Islamic religion were the fifth-ranked domain, with (81) occurrences, representing (7.90%) of the total content. While these domains rank lower in frequency compared to others, their substantial representation suggests a deliberate effort to integrate cultural and religious aspects into the educational content, contributing to a holistic understanding of Omani identity and values.

The content analysis identified frequent occurrences of themes related to Omani culture within the Omani identity and heritage domain, and Islamic values within the values and principles of the Islamic religion domain. This suggests a deliberate effort to foster cultural awareness and an understanding of Islamic principles among students. The presence of Omani identity and heritage, as well as Islamic values, in science textbooks, implies a recognition of the importance of integrating culture and religion.

Overall, the content analysis highlights that the Omani science curriculum effectively addresses most criteria for achieving Oman Vision 2040 objectives. The strong foundation provided by the curriculum suggests that it is well-positioned to support the goals outlined in Oman Vision 2040. The curriculum's emphasis on educational paths, future skills, sustainable development, Omani identity and heritage, and Islamic values demonstrates a concerted effort to align with the broader objectives of Vision 2040.

However, there may still be opportunities for further enhancement and refinement to ensure comprehensive alignment with all objectives. While the curriculum demonstrates a strong alignment with several key domains outlined in Vision 2040, there may be areas where additional emphasis or content integration could strengthen alignment further. For instance, identifying and addressing any gaps in coverage related to specific objectives or domains within Vision 2040 could enhance the curriculum's effectiveness in preparing students for the future envisioned by the national agenda.

Results Related to the Third Question.

What is the availability of criteria for evaluating the curricula based on the Oman Vision 2040 in the Omani Science Curriculum (Cambridge) for grade 5 according to the point of view of science supervisors and teachers? The averages and standard deviations of the responses from the study sample members were calculated across the five domains of the questionnaire. The extent of alignment was described using the quadruple judgment criteria. Table (3) presents these findings.

Table 7: Average Scores, Standard Deviations, and Rankings were used to Assess the Degree of Alignment Between the Science Curriculum Criteria for the Omani Science Curriculum in Grade 5 and the Objectives of Oman Vision 2040. This Assessment was Conducted from the Perspectives of both science supervisors and teachers.

	domain	Arithmetic	Standard	Rank	Investigation
1	Values and principles of	4.076	0.492	4	High
2	Omani Identity and	3.431	0.499	5	Medium
3	Sustainable Development	4.100	0.469	3	High
4	Future Skills	4.363	0.494	1	High
5	Educational Pathways	4.149	0.513	2	High
Overall average		4.044	0.373	High	

The results presented in Table (7) indicate that the Omani science curriculum (CAMBRIDGE) for grade 5 is generally well-aligned with the objectives of Oman Vision 2040. The domains with the highest average scores are 'Future Skills,' 'Educational Pathways,' and 'Sustainable Development,' suggesting effective knowledge impartation in these areas. However, the domain with the lowest average score is 'Omani Identity and Heritage,' indicating a need to improve teaching students about Omani culture and history.

The overall alignment of the curriculum with Oman Vision 2040 is positive, especially in domains like 'Future Skills,' 'Educational Pathways,' and 'Sustainable Development.' This indicates that the curriculum effectively incorporates content aligning with the long-term goals and vision of Oman. The higher average scores in 'Future Skills,' 'Educational Pathways,' and 'Sustainable Development' suggest that the curriculum is successful in imparting knowledge in these crucial subjects. This is particularly promising as it aligns with the objectives of Oman Vision 2040, emphasizing the importance of skills development, educational preparedness, and sustainability.

The lower average score in 'Omani Identity and Heritage' indicates a potential area for improvement, suggesting a need to enhance the curriculum's coverage of Omani culture and history to better align with the cultural objectives outlined in Oman Vision 2040. The curriculum's strength lies in its effective coverage of subjects related to future skills, educational pathways, and sustainable development. These areas are critical for preparing students for the challenges of the 21st century. The identified lower score in 'Omani Identity and Heritage' presents an opportunity for curriculum enhancement. Strengthening the

coverage of Omani culture and history can contribute to a more comprehensive education that aligns with the cultural objectives of Oman Vision 2040

The results presented in the observation of Table (2) showcase a high overall degree of achievement within the Omani Science curriculum (CAMBRIDGE) for grade 5 concerning the objectives of Oman Vision 2040. The total average arithmetic score reached (4.044), with a standard deviation of (0.373). 'Future Skills' (Average: 4.363, Achievement: High): The domain of 'Future Skills' achieved the highest average score, indicating a high level of success in incorporating content related to future-oriented skills. This suggests that the curriculum effectively addresses skills crucial for the 21st century.

'Educational Pathways' (Average: 4.149, Achievement: High): 'Educational Pathways' secured the second-highest average score, reflecting a high degree of achievement. This implies that the curriculum is successful in providing information and guidance related to educational paths and career choices. 'Sustainable Development' (Average: 4.100, Achievement: High): The domain of 'Sustainable Development' achieved a high level of success, ranking third. This suggests that the curriculum effectively addresses content related to environmental protection and sustainable practices.

'Values and Principles of the Islamic Religion' (Average: 4.076, Achievement: High): This domain ranked fourth in achievement, still within the high category. The curriculum demonstrates success in incorporating content related to Islamic values and principles. 'Omani Identity and Heritage' (Average: 3.531, Achievement: Medium): 'Omani Identity and Heritage' ranked fifth and last, achieving a medium level of success. This indicates there might be room for improvement in incorporating content related to Omani culture and heritage.

In conclusion, the outcomes presented in Table (2) strongly indicate that the Omani science curriculum (CAMBRIDGE) for grade 5 generally aligns with the objectives of Oman Vision 2040. The high overall degree of achievement, particularly in domains like 'Future Skills,' 'Educational Pathways,' and 'Sustainable Development,' suggests that the curriculum effectively addresses key aspects aligned with Oman Vision 2040.

8. RESULTS AND DISCUSSION

The first question: What are the evaluation criteria for the Omani Science Curriculum (CAMBRIDGE) for grade 5 based on Oman Vision 2040?

Based on the findings of the first question, it is evident that the criteria developed to evaluate the Omani Science Curriculum (Cambridge) for grade 5, aligned with Oman Vision 2040, encompassing values, identity, sustainability, future skills, and educational paths, are consistent with contemporary educational theories and previous research results

Holistic Education Theory The criteria reflect the principles of holistic education, which emphasizes the development of the whole individual—mind, body, and spirit. By incorporating Islamic religious principles, fostering social responsibility, and promoting cultural acceptance, the curriculum aims to nurture students' moral, social, and emotional growth, and academic achievement. Constructivist theories advocate for active learning and student-centered approaches. The emphasis on fostering critical thinking abilities, promoting inquiry-driven learning, and encouraging self-directed learning aligns with the constructivist approach, which posits that students construct their understanding of the world through exploration, reflection, and collaboration (Al-Harusi 2021).

Sociocultural theory emphasizes the role of social interaction and cultural context in learning. The criteria related to collaborative teamwork, societal consciousness, and heritage preservation reflect the

sociocultural perspective, acknowledging the importance of social relationships, cultural values, and community engagement in education. The criteria related to future skills, such as scientific research, critical thinking, creativity, problem-solving, and adaptability, resonate with the 21st-century skills framework. In today's rapidly changing world, students need not only content knowledge but also transferable skills to thrive in diverse personal, professional, and societal contexts (Alsubaie 2021).

Previous studies evaluating curriculum alignment with national visions or standards, such as Al-Ahmadi (2018) and Alhomairi (2018), have emphasized the importance of integrating educational goals with broader societal aspirations. The criteria developed in this study extend this perspective by explicitly linking curriculum objectives to the overarching vision of Oman Vision 2040. Overall, the evaluation criteria for the Omani Science Curriculum (CAMBRIDGE) reflect a forward-thinking approach to education that considers the multifaceted needs of students and the broader goals of society. By grounding curriculum development in educational theories and aligning with national visions, educators can better prepare students for success in an increasingly complex and interconnected world.

The second question: What is the availability of criteria for evaluating the curricula based on the Oman Vision 2040 in the Omani Science Curriculum (Cambridge) for grade 5 according to the results of the content analyze of these curricula?

It is evident from the findings of the second question that the curriculum prioritizes addressing individual differences among learners and demonstrates a commitment to comprehensive education. By acknowledging and accommodating diverse learning needs, the curriculum strives to establish an equitable and supportive learning environment. Furthermore, the emphasis on fostering students' orientations towards various specializations and aligning with labor market requirements signifies a proactive approach to preparing students for future academic and professional pursuits.

The curriculum aims to instill motivation, ambition, and entrepreneurial thinking among students, recognizing the significance of mindset and initiative in attaining academic and career success. Students are encouraged to explore new professions in the labor market and cultivate a diverse range of skills and talents, underscoring a dedication to equipping students with the skills needed to navigate the evolving demands of the workforce. This approach aligns with theories of differentiated instruction, which advocate for adapting teaching methods to cater to the diverse needs of students, thereby creating inclusive learning environments where all students can excel. Moreover, the focus on exploring specializations and understanding labor market requirements resonates with career development theories, such as Holland's theory of vocational choice and Super's theory of career development, emphasizing the importance of self-awareness, exploration, and decision-making in career development (Rayed 2020).

The curriculum's emphasis on motivation and ambition also aligns with self-determination theory, which asserts that intrinsic motivation and a sense of autonomy are essential for optimal learning and achievement. By nurturing students' motivation and ambition, educators can foster greater engagement and persistence in learning. Additionally, the inclusion of entrepreneurship concepts reflects the growing recognition of the importance of entrepreneurial skills in the modern economy. Entrepreneurship education theories emphasize the development of skills such as creativity, innovation, and risk-taking, which are crucial for success in entrepreneurship and intrapreneurship. These results also demonstrate consistency with previous studies, which have emphasized the importance of preparing students for the demands of the 21st-century workforce. Research has highlighted the need for curricula that foster critical thinking, creativity, collaboration, and adaptability. The findings of this analysis align with these recommendations by highlighting the curriculum's focus on developing skills and mindsets essential for

success in an ever-changing world (Alhomairi, 2018; Otifi, 2017).

Additionally, studies on inclusive education have underscored the importance of recognizing and accommodating diverse learning needs. By addressing individual differences and promoting inclusive teaching practices, educators can create learning environments that support the academic and social-emotional development of all students (Al-Bahri, 2011; Saeed, 2011). Studies on career development have emphasized the role of education in helping students explore their interests, values, and skills and make informed decisions about their future paths. The findings of this analysis support these recommendations by highlighting the curriculum's emphasis on guiding students in exploring various specializations and understanding the requirements of the labor market (Al-Badri and Al-Kindari study, 2013). Overall, the results of this analysis provide valuable insights into the curriculum's alignment with educational theories and previous studies. By recognizing the strengths and areas for improvement identified in the analysis, educators can work towards enhancing the curriculum to better prepare students for success in academic, professional, and personal domains.

The third question: What is the availability of criteria for evaluating the curricula based on the Oman Vision 2040 in the Omani Science Curriculum (Cambridge) for grade 5 according to the point of view of science supervisors and teachers?

The third question focused on the Sustainable Development domain within the Omani science curriculum for grade 5. The analysis revealed a high level of alignment between the curriculum and the objectives outlined in Oman Vision 2040, particularly within the Sustainable Development domain. The arithmetic averages ranged from 3.704 to 4.377 across various paragraphs, indicating consistently high achievement levels. Key skills and concepts addressed in the curriculum included environmental awareness, resource management, health promotion, and life skills development. While some paragraphs achieved higher average scores than others, the overall average for the domain was high (4.100), with a low standard deviation (0.469), indicating a uniform alignment.

The high level of alignment between the curriculum and sustainable development objectives reflects a commitment to addressing global challenges outlined in frameworks like the United Nations Sustainable Development Goals (SDGs). Educational theories such as Environmental Education and Education for Sustainable Development emphasize the role of education in promoting environmental stewardship, social equity, and economic prosperity. The curriculum's focus on concepts like resource conservation, health promotion, and community engagement aligns with these theories, preparing students to become informed and responsible global citizens.

The curriculum's emphasis on connecting science, technology, engineering, and mathematics (STEM) with sustainable development reflects an interdisciplinary approach to education. This approach is supported by educational theories like Constructivism and Experiential Learning, which advocate for hands-on, inquiry-based approaches to learning. By incorporating real-world environmental issues, collaborative problem-solving activities, and project-based learning experiences, the curriculum promotes deeper understanding and engagement with sustainability concepts. Previous studies have also proven this (Shahat and Alkamshki, 2021; Al-Badri, 2020).

Sustainable development requires complex problem-solving and systems thinking skills. The curriculum's focus on developing critical thinking skills, problem-solving abilities, and awareness of interconnected environmental, social, and economic systems aligns with educational theories such as Critical Pedagogy and Systems Theory. These theories emphasize the importance of fostering critical consciousness and

holistic understanding to address systemic challenges effectively. By encouraging students to analyze complex sustainability issues, evaluate evidence, and consider multiple perspectives, the curriculum promotes deeper learning and civic engagement. Previous studies have also proven this (El-mogy, 2016; Al-Zawahera, 2014).

Education plays a vital role in preparing students to become active participants in creating a sustainable future. The curriculum's emphasis on developing life skills, promoting community engagement, and fostering a sense of responsibility aligns with theories of Citizenship Education and Leadership Development. These theories emphasize the importance of nurturing students' sense of agency, ethical decision-making, and civic responsibility. By empowering students to take action on sustainability issues, the curriculum prepares them to become future leaders and change agents in their communities. While the curriculum demonstrates a high level of alignment with sustainable development objectives, there may be opportunities for continuous improvement and adaptation. Educational theories like Reflective Practice and Curriculum Development emphasize the importance of ongoing reflection, evaluation, and refinement in educational practices. By soliciting feedback from stakeholders, monitoring outcomes, and incorporating emerging research and best practices, curriculum developers can ensure that the curriculum remains responsive to evolving sustainability challenges and educational needs. Previous studies have also proven this (Al-Ayasra 2017؛ Al-Badawi 2017).

In conclusion, the analysis of the Sustainable Development domain in the Omani science curriculum highlights its strong alignment with sustainability objectives, interdisciplinary approaches, and theories of education. By integrating concepts from environmental science, STEM disciplines, and life skills development, the curriculum prepares students to address complex sustainability challenges and contribute to a more equitable, resilient, and sustainable future. However, ongoing reflection, evaluation, and collaboration will be essential to ensure that the curriculum remains relevant, effective, and responsive to the dynamic nature of sustainable development and educational theory.

9. SIGNIFICANT CONTRIBUTION OF THE PAPER

1. **Alignment with National Vision:** The paper offers valuable insights into the alignment between the Omani science curriculum for grade 5 and the objectives outlined in Oman Vision 2040. Through systematic analysis of curriculum content and stakeholder perspectives, the study underscores the curriculum's pivotal role in advancing the nation's long-term development goals.
2. **Identification of Strengths and Areas for Improvement:** Through detailed data analysis, the paper identifies key domains where the curriculum excels, such as 'Future Skills,' 'Educational Pathways,' and 'Sustainable Development.' Additionally, it underscores areas for improvement, particularly in 'Omani Identity and Heritage,' offering actionable recommendations for enhancing curriculum effectiveness.
3. **Empirical Evidence for Decision-Making:** The study utilizes quantitative methods to assess curriculum alignment, offering empirical evidence to inform decision-making in curriculum development and educational policy. Additionally, stakeholder feedback enhances the credibility of the findings, providing a comprehensive understanding of curriculum effectiveness.
4. **Contribution to Educational Research:** This paper adds to the expanding body of literature on curriculum evaluation and its alignment with national development agendas. Through its focus on the Omani context, it provides valuable insights applicable to educational systems aiming to align curricula with broader societal goals and aspirations.

5. **Implications for Practice:** The findings of this paper hold practical implications for curriculum designers, educators, and policymakers not only in Oman but also in other contexts. Recommendations for enhancing curriculum content and delivery can guide targeted interventions aimed at improving student learning outcomes and fostering national development agendas.

Overall, this paper makes a significant contribution through its systematic analysis of curriculum alignment with Oman Vision 2040. By providing actionable recommendations to enhance curriculum effectiveness, it contributes to the realization of national development goals through education.

10. CONCLUSION

The study provides valuable insights into the alignment of the Omani science curriculum with Oman Vision 2040, highlighting both strengths and areas for improvement. By emphasizing the importance of enhancing critical thinking and problem-solving skills, updating curriculum content to meet contemporary needs, and fostering inclusivity and diversity, the recommendations offer a roadmap for enhancing educational outcomes in Oman.

For policymakers, curriculum developers, and educators in Oman, these findings underscore the need for concerted efforts to enact meaningful reforms in science education. By implementing the recommended changes, stakeholders can better equip students with the skills and knowledge necessary to thrive in the 21st century. Moreover, aligning educational initiatives with Oman Vision 2040 will contribute to the nation's broader development goals, ensuring that the workforce of the future is well-prepared to contribute to Oman's sustainable growth and prosperity.

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