Journal of Education and Practice
ISSN 2222-1735 (Paper) ISSN 2222-288X (Online)
Vol.15, No.5, 2024

The Evaluation of Grades 6 and 7 of Omani Science Curriculum (Cambridge) in Alignment with Oman Vision 2040

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Abstract
This research aimed to assess the effectiveness of the Omani Science Curriculum (Cambridge) designed for sixth and seventh-grade students in Oman and to conduct a comprehensive analysis aligned with the Omani Vision 2040. To investigate the research inquiries, a descriptive-analytical method employing quantitative analysis was utilized. The study employed two instruments: an examination of the content within the Omani science curricula and a questionnaire distributed to pertinent authorities, including supervisors and teachers. The research sample comprised 2,092 science teachers, 150 science supervisors, and science textbooks for fifth grade. The outcomes of the study are significant as they offer insights into potential enhancements to the Omani science curricula. The findings indicate a necessity for the curriculum to emphasize fostering critical thinking and problem-solving abilities. Furthermore, it should be updated to address the demands and complexities of the twenty-first century. The results also stress the importance of developing a curriculum that embraces inclusivity and provides robust support for diversity. Notable discoveries from the study include the overall alignment of the curriculum with Vision 2040, albeit with certain areas requiring improvement. There is a pressing need to enhance the focus on nurturing critical thinking and problem-solving skills. Curricula should be tailored to meet the demands and intricacies of the modern era. Specific recommendations for enhancing the curriculum are as follows: Conduct a review of curriculum content to incorporate more material that encourages critical thinking and problem-solving skills. This can be accomplished by integrating hands-on activities and projects that prompt students to think critically and address challenges through problem-solving.
Keywords: Curriculum evaluation, Evaluation criteria, Omani Science Supervisors, Omani Science teachers, Oman Vision 2040.
DOI: 10.7176/JEP/15-5-11
Publication date: April 30th 2024

1. Introduction

The dynamic evolution and advancements across scientific domains underscore the necessity for educational systems to adapt and enhance their outcomes. This adaptation is pivotal for nurturing individuals who are self-assured in their identity, dedicated to societal values, innovative, and economically engaged. An effective strategy in achieving this goal involves prioritizing the improvement of school education quality and the development of curriculum and educational programs. Evaluating the curriculum is indispensable to ensure its alignment with learners' needs and its efficacy in attaining desired outcomes.

The curriculum serves as the fundamental source of knowledge for students, particularly within school settings. Therefore, ensuring a high-quality curriculum that addresses students' requirements is paramount. The Ministry of Education in Oman is committed to upholding stringent curriculum standards, with a focus on principles such as continuous personal growth, national identity, values, and sustainable development. Additionally, it emphasizes educational responsibility, critical thinking, leadership, and technology integration. Regular curriculum evaluations conducted by the Ministry ensure ongoing alignment with learners' needs and educational system objectives. This commitment reflects the Ministry's dedication to fostering an excellent curriculum, thereby ensuring the delivery of optimal education to Omani learners (Ministry of Education, 2018).

Science education plays a pivotal role in nurturing skills like critical thinking, problem-solving, and teamwork, which are crucial for students to positively contribute to society and the economy (Ghanem, 2016). Leveraging modern trends and theories in science education through initiatives such as the CAMBRIDGE project enhances Omani students' competencies, enabling them to compete on an international scale (Allam, 2019). Evaluation, as emphasized by scholars like Stake and Ten Brink, involves comprehensive information gathering and judgment making, including assessing curriculum objectives, content, activities, and the evaluation process itself, all intertwined with student learning (Al-Sir, 2018).

Aligned with Oman Vision 2040, the Ministry of Education in Oman aims to refine its science education standards to meet international criteria, ensuring Omani students benefit from global advancements in science education. The curriculum emphasizes the development of students' research, investigation, and critical thinking skills, surpassing mere rote memorization to encourage active engagement with scientific concepts. Furthermore, it seeks to deepen students' understanding of scientific phenomena, fostering practical application of knowledge. Adopting an international curriculum facilitates collaboration with global educational communities, enriching

Oman's educational landscape with diverse expertise (Ministry of Education, 2017).

While several studies have evaluated curricula against specific criteria, none have specifically examined the Omani Science curriculum (CAMBRIDGE) in light of Oman Vision 2040. Hence, this study aims to evaluate the Grades 6 and 7 Omani Science curriculum (CAMBRIDGE) against the criteria of Oman Vision 2040. By designing a scale to measure alignment with Vision 2040 standards, this study seeks to provide insights into curriculum efficacy. Grade 5 was chosen due to the practical experience gained by supervisors and teachers since the curriculum's implementation, ensuring valuable insights for questionnaire responses.

2. Objectives of the study

This study aims to:

1- To List drawers' evaluation criteria for the Omani Science Curriculum (CAMBRIDGE) for grades 6 and 7, Aligned with Oman Vision 2040.

2- Analyzing the content of the Omani Science CAMBRIDGE Curriculum for grades 6 and 7 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 6 and 7 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 6 and 7 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 6 and 7 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 6 and 7 according to the point of view of science supervisors and teachers?

4. Research methodology

Opting for a descriptive-analytical approach rooted in quantitative analysis is a wise decision for this study, which seeks to evaluate the alignment of the Omani Science Curriculum (CAMBRIDGE) for grades 6 and 7 with the fundamental objectives of Oman Vision 2040 through content analysis of science textbooks. Employing the descriptive-analytical approach facilitates systematic data collection, particularly through structured content analysis of the science textbooks, ensuring a methodical examination of the curriculum's components. The quantitative aspect of the analysis enhances objectivity by utilizing numerical data and statistical measures, thereby reducing subjectivity, and providing a more impartial evaluation of alignment.

This approach facilitates the utilization of quantifiable measurements, enabling the assessment of alignment through numerical data. It permits the computation of percentages, frequencies, and other statistical measures, offering a clear and measurable indication of alignment. The descriptive-analytical approach allows for structured content analysis of the science textbooks, ensuring that specific criteria and objectives outlined in Oman Vision 2040 are systematically examined and quantified, thereby contributing to the precision of the study. Furthermore, employing quantitative methods often leads to efficient data processing. Numerical data can be analyzed using statistical software, streamlining the analysis process, and facilitating the extraction of meaningful insights. Incorporating 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 (Al-Obaidat, 1996).

The quantitative approach enhances the generalizability of findings. Results obtained through statistical analysis can be extrapolated to a larger population, offering insights that may be applicable beyond the specific context of the study (Tamiya, 2004). 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, grounded in quantitative analysis, is well-suited for evaluating 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.

4.1 CONTENT ANALYSIS

Content analysis serves as a valuable tool for comprehensively evaluating curriculum materials. Its primary goal is to identify key themes and concepts within the material and understand how these themes and ideas are presented. Additionally, content analysis quantifies the frequency of different words, phrases, and images within

the material, facilitating the tracking of content changes over time and enabling comparisons across different materials (Al-Obaidat, 1996).

The mentioned criteria are crucial for assessing curriculum content. The 'containment and embedding' standard evaluates the curriculum's integration of essential content for student learning. The 'inclusion' standard assesses the relevance of curriculum content to student needs. The 'realism' standard measures the degree to which the curriculum presents accurate and realistic information. The 'accuracy' standard gauges 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 serves as a valuable tool for curriculum evaluation, ensuring that the curriculum is comprehensive, relevant, accurate, and well-balanced. Additionally, it helps identify areas where the curriculum could be enhanced.

4.2 Descriptive survey method

The descriptive survey method is a fitting choice for this study as it allows for the collection of information and data regarding the Omani Science curriculum (CAMBRIDGE) for grades 6 and 7 from the perspectives of science supervisors and teachers. This approach facilitates the identification of curriculum strengths and weaknesses and aids 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.

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 grades 6 and 7, 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 grades 6 and 7, in the academic year (2021-2022), totaling eight books, one for each semester.

Table 2. The Textbook Sample

Lessons	Units	Pages	Edition	semester	Class
26	3	69	2018	first	Sixth
19	2	54		second	
55	6	141	2019	first	seventh
34	5	99		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 grades 6 and 7 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

7.1 Results Related to the First Question:

In response to the question regarding the evaluation criteria for the Omani Science Curriculum (CAMBRIDGE) for grades 6 and 7 aligned with Oman Vision 2040, the researcher assembled an exhaustive catalog of criteria designed for integration into the content of the Omani Science curricula (Cambridge) for grades 6 and 7, aiming to meet the objectives outlined in Oman Vision 2040. The comprehensive process of formulating these criteria was delineated in the study procedures outlined in the third section. The final compilation comprised (40) distinct criteria, categorized across five primary domains:

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

No	phrases	Statement Strongly	Agree	Neutral	Disagree	Strongly Disagree
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 6 and 7:						
1	Incorporates Islamic religious principles					
2	Fosters a culture of collaborative teamwork.					
3	Advocates for social responsibility.					
4	Encourages volunteerism.					
5	Promotes cultural acceptance.					
6	Develops the notion of community 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 curriculum (CAMBRIDGE) for grades 6 and 7 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 6 and 7 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 6 and 7 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 6 and 7 includes the following aspects related to educational paths						
33	Incorporates principles of entrepreneurship					
34	Nurtures skills and talents					
35	Fosters motivation and ambition					
36	Integrates science, technology, engineering, 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					

7.2 Results Related to the Second Question:

To address the question regarding the availability of criteria for evaluating the curricula based on Oman Vision 2040 in the Omani Science Curriculum (Cambridge) for grades 6 and 7, the researcher conducted a thorough analysis of said curriculum during both semesters (first and second) of the academic year (2021-2022), which encompassed a total of (4) textbooks. This analysis was conducted using a content analysis tool specifically designed for this purpose. Subsequently, frequencies and percentages were computed to determine the extent to which the criteria aligned with the objectives of Oman Vision 2040 were present in the science books for grades 6 and 7 across both semesters. Table (6) offers an overview of the overall outcomes derived from this analytical process.

Table 6. Frequencies, Percentages, and Ranking of Oman Vision 2040 Objectives Criteria Domains Included in Science Textbooks for Grades 6 and 7 during the First and Second Semesters

S1: Semester1, S2: Semester2, f: Frequencies						
domain	Sixth grade (S1 + S2)		Seventh grade (S1 + S2)		Total	%
	f	%	f	%		
Values and principles of the Islamic religion	92	6.36	223	12.32	315	9.67
Omani Identity and Heritage	253	17.47	198	10.94	451	13.85
Sustainable Development	310	21.41	409	22.60	719	22.07
Future Skills	338	23.34	506	27.95	844	25.90
Educational paths	455	31.42	474	26.19	929	28.51
Total	1448	100	1810	100	3258	100

In Table (6), the outcomes of a content analysis performed on grade 5 science textbooks are depicted. The analysis focused on various domains, with the educational pathway's domain emerging as the most prevalent theme, constituting (34.93%) of the total content analyzed, indicating a significant emphasis on guiding students toward future careers and educational trajectories within the science textbooks.

The prominence of the educational pathway's domain suggests a deliberate prioritization of content aimed at equipping students with the necessary knowledge and skills for success in evolving professional landscapes, aligning with the broader educational objectives outlined in Oman's Vision 2040.

Moreover, the content analysis revealed considerable attention to the future skills domain, which accounted for (21.36%) of the overall content analyzed, indicating a notable emphasis on preparing students for the

challenges of the 21st century within the science curriculum.

Additionally, the Omani Identity and Heritage domain ranked third, representing (21.27%) of occurrences, reflecting efforts to preserve and promote Omani culture within the curriculum. Incorporating identity and heritage content acknowledges the significance of cultural heritage in shaping students' sense of belonging and cultural identity.

Similarly, the Sustainable Development domain held significance with (14.54%) of occurrences, indicating a commitment to educating students about sustainability and environmental awareness, aligning with global efforts towards sustainable development.

Although values and principles of the Islamic religion ranked lower in frequency, with (7.90%) of the total content, 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.

Overall, the content analysis indicates that the Omani science curriculum effectively addresses most criteria outlined in Oman Vision 2040. However, there are opportunities for further enhancement to ensure comprehensive alignment with all objectives. Identifying and addressing any gaps in coverage related to specific objectives within Vision 2040 could enhance the curriculum's effectiveness in preparing students for the future envisioned by the national agenda.

7.3 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 grades 6 and 7 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 (7) 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 Grades 6 and 7 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 findings depicted in Table (7) reveal that the Omani science curriculum (CAMBRIDGE) for grades 6 and 7 is largely congruent with the goals of Oman Vision 2040. Notably, areas such as 'Future Skills,' 'Educational Pathways,' and 'Sustainable Development' exhibit the highest average ratings, indicating successful knowledge transmission in these domains. Nevertheless, the domain scoring the lowest average is 'Omani Identity and Heritage,' signifying a necessity for enhancing the teaching of Omani culture and history to students.

Overall, the curriculum's alignment with Oman Vision 2040 appears positive, particularly evident in domains such as 'Future Skills,' 'Educational Pathways,' and 'Sustainable Development.' This alignment suggests an effective integration of content that resonates with Oman's long-term aspirations. The superior performance in 'Future Skills,' 'Educational Pathways,' and 'Sustainable Development' underscores the curriculum's efficacy in imparting crucial knowledge in these vital areas, aligning well with Oman Vision 2040's emphasis on skill development, educational pathways, and sustainability.

The lower score in 'Omani Identity and Heritage' underscores an opportunity for improvement, indicating a need to enrich the curriculum's coverage of Omani cultural and historical aspects to better adhere to the cultural objectives outlined in Oman Vision 2040. While the curriculum excels in addressing future skills, educational pathways, and sustainable development, bridging the gap in 'Omani Identity and Heritage' can contribute to a more holistic education in alignment with Oman Vision 2040's cultural aspirations.

The results depicted in Table (7) highlight a significant level of accomplishment within the Omani Science curriculum (CAMBRIDGE) for grade 5 concerning Oman Vision 2040's objectives. With a total average arithmetic score of (4.044) and a standard deviation of (0.373), the curriculum demonstrates commendable achievement. 'Future Skills' emerges as the highest scoring domain (Average: 4.363, Achievement: High), indicating substantial success in integrating content about future-oriented skills, crucial for the 21st century.

Similarly, 'Educational Pathways' secures the second-highest average score (Average: 4.149, Achievement: High), affirming the curriculum's effectiveness in providing information and guidance regarding educational paths and career choices. 'Sustainable Development' also attains a high level of success (Average: 4.100, Achievement: High), reflecting the curriculum's adeptness in addressing content related to environmental

protection and sustainable practices.

Furthermore, 'Values and Principles of the Islamic Religion' achieved a commendable score (Average: 4.076, Achievement: High), underscoring success in incorporating Islamic values and principles. However, 'Omani Identity and Heritage' scores lower (Average: 3.531, Achievement: Medium), suggesting room for improvement in integrating content concerning Omani culture and heritage.

In summary, the outcomes illustrated in Table (7) strongly suggest that the Omani science curriculum (CAMBRIDGE) for grades 6 and 7 aligns well with the objectives of Oman Vision 2040. The notable degree of achievement, particularly in domains like 'Future Skills,' 'Educational Pathways,' and 'Sustainable Development,' underscores the curriculum's efficacy in addressing key aspects aligned with Oman Vision 2040.

8. Results and Discussion

Question 1: Evaluation Criteria for the Omani Science Curriculum (CAMBRIDGE) for Grades 6 and 7 Based on Oman Vision 2040

The evaluation criteria for the Omani Science Curriculum (CAMBRIDGE) for grade 5, aligned with Oman Vision 2040, encompass values, identity, sustainability, future skills, and educational paths. These criteria align with contemporary educational theories and previous research results.

Holistic Education Theory: The criteria reflect principles of holistic education, emphasizing 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: Advocating 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 constructivist principles. This approach posits that students construct their understanding of the world through exploration, reflection, and collaboration.

Sociocultural Theory: Emphasizing social interaction and cultural context in learning, criteria related to collaborative teamwork, societal consciousness, and heritage preservation reflect the sociocultural perspective. It acknowledges the importance of social relationships, cultural values, and community engagement in education.

21st-Century Skills Framework: 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 both content knowledge and transferable skills to thrive in diverse contexts.

Alignment with National Visions: Previous studies have emphasized integrating educational goals with broader societal aspirations. The criteria developed in this study extend this perspective by explicitly linking curriculum objectives to Oman Vision 2040. This forward-thinking approach considers students' multifaceted needs and society's broader goals.

Question 2: Availability of Criteria for Evaluating the Curriculum Based on Oman Vision 2040 in the Omani Science Curriculum (Cambridge) for Grades 6 and 7.

The curriculum prioritizes addressing individual differences among learners and demonstrates a commitment to comprehensive education. By acknowledging and accommodating diverse learning needs, it establishes 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. This aligns with theories of differentiated instruction and career development, emphasizing self-awareness, exploration, and decision-making.

Emphasis on motivation and ambition aligns with self-determination theory, asserting that intrinsic motivation and autonomy are essential for optimal learning and achievement. Entrepreneurship concepts reflect the growing recognition of entrepreneurial skills' importance in the modern economy.

Consistent with previous studies, the curriculum focuses on developing critical thinking, creativity, collaboration, and adaptability, essential for success in an ever-changing world. It also supports inclusive education, recognizing and accommodating diverse learning needs.

Overall, the curriculum's alignment with educational theories and previous studies provides valuable insights for enhancing student preparation in academic, professional, and personal domains.

The third question delved into evaluating the Sustainable Development domain within the Omani science curriculum for grades 6 and 7 from the perspectives of science supervisors and teachers. The analysis uncovered a notably high level of alignment between the curriculum and the objectives outlined in Oman Vision 2040, particularly within the Sustainable Development domain. With arithmetic averages ranging from (3.704 to 4.377) across various paragraphs, the curriculum demonstrated consistently high achievement levels. Key skills and

concepts addressed included environmental awareness, resource management, health promotion, and life skills development. While some paragraphs scored higher averages than others, the overall average for the domain stood at a high (4.100), with a low standard deviation of (0.469), indicating uniform alignment.

The strong alignment between the curriculum and sustainable development objectives reflects a dedication to tackling global challenges outlined in frameworks like the United Nations Sustainable Development Goals (SDGs). Educational theories such as Environmental Education and Education for Sustainable Development underscore the role of education in fostering 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, equipping students to become informed and responsible global citizens.

Moreover, the curriculum's emphasis on integrating science, technology, engineering, and mathematics (STEM) with sustainable development mirrors an interdisciplinary educational approach. Supported by theories like Constructivism and Experiential Learning, this approach advocates for hands-on, inquiry-based learning experiences. By incorporating real-world environmental issues, collaborative problem-solving activities, and project-based learning, the curriculum encourages deeper understanding and engagement with sustainability concepts.

Sustainable development necessitates complex problem-solving and systems-thinking skills. The curriculum's focus on cultivating critical thinking, 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 stress the importance of fostering critical consciousness and holistic understanding to effectively address systemic challenges. By prompting students to analyze complex sustainability issues, evaluate evidence, and consider various perspectives, the curriculum promotes deeper learning and civic engagement.

Furthermore, education plays a pivotal role in preparing students to actively contribute to creating a sustainable future. The curriculum's emphasis on developing life skills, promoting community engagement, and instilling a sense of responsibility resonates with theories of Citizenship Education and Leadership Development. These theories underscore the significance of nurturing students' agency, ethical decision-making, and civic responsibility. By empowering students to take action on sustainability issues, the curriculum prepares them to emerge as future leaders and change agents in their communities.

While the curriculum demonstrates a robust alignment with sustainable development objectives, there remain opportunities for continuous improvement and adaptation. Educational theories such as Reflective Practice and Curriculum Development stress the importance of ongoing reflection, evaluation, and refinement in educational practices. By soliciting feedback from stakeholders, monitoring outcomes, and integrating emerging research and best practices, curriculum developers can ensure that the curriculum remains responsive to evolving sustainability challenges and educational needs.

In conclusion, the analysis of the Sustainable Development domain in the Omani science curriculum underscores its significant alignment with sustainability objectives, interdisciplinary approaches, and educational theories. By incorporating concepts from environmental science, STEM disciplines, and life skills development, the curriculum equips students to address complex sustainability challenges and contribute to a more equitable, resilient, and sustainable future. Nonetheless, ongoing reflection, evaluation, and collaboration will be imperative to ensure that the curriculum stays relevant, effective, and adaptive to the dynamic nature of sustainable development and educational theory.

9. Significant Contribution of the Paper

- Alignment with National Vision: This paper provides 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 highlights the curriculum's crucial role in advancing the nation's long-term development goals.
- Identification of Strengths and Areas for Improvement: Through comprehensive data analysis, the paper identifies key domains where the curriculum excels, such as 'Future Skills,' 'Educational Pathways,' and 'Sustainable Development.' Additionally, it highlights areas for improvement, particularly in 'Omani Identity and Heritage,' offering actionable recommendations for enhancing curriculum effectiveness.
- Empirical Evidence for Decision-Making: Utilizing quantitative methods to assess curriculum alignment, the study provides empirical evidence to guide decision-making in curriculum development and educational policy. Furthermore, stakeholder feedback enhances the credibility of the findings, offering a comprehensive understanding of curriculum effectiveness.
- Contribution to Educational Research: This paper contributes to the growing body of literature on curriculum evaluation and its alignment with national development agendas. By focusing on the Omani context, it offers valuable insights applicable to educational systems seeking to align curricula with broader societal goals and aspirations.

- 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 inform targeted interventions aimed at improving student learning outcomes and supporting 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, shedding light on its strengths and improvement areas. Through recommendations emphasizing the enhancement of critical thinking and problem-solving skills, updating curriculum content to meet contemporary needs, and fostering inclusivity and diversity, a roadmap is offered for enhancing educational outcomes in Oman.

For policymakers, curriculum developers, and educators in Oman, these findings underscore the necessity 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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