




## The Role of Music Skills Education in Sustainable Development of Education, Learning and Innovation


Asmaa Abdel Sabour Mohamed <sup>1</sup>, Sherif Mohamed Mahmoud <sup>2\*</sup>, Helmi Ben Nsir <sup>3</sup>, Foued Belghouthi <sup>4</sup>, Yassine Mohamed Khalladi <sup>5</sup>, Mohamed Dridi <sup>6</sup>, Nassib Samir Radwan <sup>7</sup>, Mervat Abdel-Moniem Mohammed Ghonaimy <sup>8</sup>


<sup>1</sup> Assistant Professor, Dpt. of Curriculum and Instruction, Sultan Qaboos University, Muscat, Sultanate of Oman,  0000-0002-1410-6610


<sup>2</sup> Assistant Professor, Faculty of Education and Arts, Sohar University, Sohar, Sultanate of Oman,  0000-0001-8638-7194


<sup>3</sup> Assistant Professor, Faculty of Education and Arts, Sohar University, Sohar, Sultanate of Oman,  0000-0002-3118-8363

<sup>4</sup> Assistant Professor, Faculty of Education and Arts, Sohar University, Sohar, Sultanate of Oman,  0009-0007-1508-4541

<sup>5</sup> Assistant Professor, Faculty of Education and Arts, Sohar University, Sohar, Sultanate of Oman,  0009-0008-3532-3594

<sup>6</sup> Assistant Professor, Faculty of Education and Arts, Sohar University, Sohar, Sultanate of Oman,  0009-0008-7831-644X

<sup>7</sup> Assistant Professor, Faculty of Education and Arts, Sohar University, Sohar, Sultanate of Oman,  0000-0003-3282-8542

<sup>8</sup> Assistant Professor, Faculty of Education and Arts, Sohar University, Sohar, Sultanate of Oman,  0009-0000-4069-1238

\* Corresponding author: Sherif Mohamed Mahmoud (SMahmoud@squ.edu.om)

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### Abstract

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This study aims to develop a comprehensive theoretical framework that explains the relationship between music skills education and sustainable development in the fields of education, learning, and innovation. It also seeks to analyze current practices of music education in the Sultanate of Oman in light of Oman Vision 2040, identify the major challenges hindering its effective implementation, and propose mechanisms to enhance its role. The study adopted a descriptive quantitative approach. A questionnaire was used as the main data collection tool and was administered to a sample of 309 music skills teachers from the Ministry of Education in the Sultanate of Oman. Data were analyzed using statistical methods, including means and standard deviations, through SPSS, with validity and reliability of the instrument confirmed. The findings revealed that music skills education plays a highly significant role in supporting education, learning, and innovation. It contributes to developing memory, attention, communication skills, creative thinking, and problem-solving abilities. The results also indicated a strong alignment between music education objectives and the goals of Oman Vision 2040. However, several challenges were identified, including limited supportive learning environments, insufficient resources, and the need for curriculum development and stronger institutional integration. The study concludes that music skills education is an effective tool for achieving sustainable development goals and enhancing the quality of education. It supports the development of a knowledge-based and innovative society in line with Oman Vision 2040. Strengthening this role requires improving infrastructure, providing adequate resources, developing curricula, offering professional training for teachers, and promoting institutional and community support.

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## Introduction

Sustainable development is a strategic goal that nations strive to achieve in order to ensure the preservation of human capital and natural resources for future generations. Oman Vision 2040 has placed considerable emphasis on the "People and Society" pillar, which underscores the importance of education as the primary foundation for achieving this goal by fostering innovation, developing skills, and consolidating national values and cultural identity (Oman Vision 2040 Implementation Follow-up Unit, 2024). Within this context, the significance of music education emerges as an effective and impactful pedagogical tool. Research indicates that musical activities enable children to acquire competencies across the three dimensions of sustainable development: environmental, social, and economic, through raising awareness, promoting positive behavioral patterns, and developing critical thinking and collaborative skills. Furthermore, integrating music skills into educational curricula serves as a catalyst for innovation, contributing to the improvement of educational quality, enriching the learning experience, and enhancing the skills required for the future workforce. This aligns with the Sultanate of Oman's aspirations to advance its standing in global innovation and competitiveness indicators. Accordingly, examining the role of music education in achieving sustainable development represents a meaningful and significant academic contribution toward supporting national educational policies, providing practical insights that inform curriculum development, and activating the role of the arts in building a comprehensive and integrated knowledge-based society (Fostera & Sutelab, 2024).

Despite the growing recognition of the arts' vital role in fostering the holistic development of individuals and society, the contribution of music skills education to advancing the pillars of sustainable development, particularly in the domains of education, learning, and innovation, remains insufficiently examined and requires in-depth study and analysis. This is especially pertinent within the context of development strategies, most notably Oman Vision 2040.

## Research Questions

This study seeks to address the following questions:

1. What is the theoretical and conceptual framework that connects music education to sustainable development across the domains of education, learning, and innovation?
2. What are the prevailing practices in music education within the Sultanate of Oman, and to what extent do they align with the objectives of Oman Vision 2040 in the domains of education, learning, and innovation?
3. What are the key challenges that impede the effective integration of music education in achieving the Sustainable Development Goals and the aspirations of Oman Vision 2040?
4. What mechanisms and contributions can music skills education offer to strengthen and advance education, learning, and innovation in support of the goals set forth by Oman Vision 2040?

## Study Objectives

This study aims to:

1. Develop a comprehensive theoretical framework that elucidates the relationship between music education and the three dimensions of sustainable development: education, learning, and innovation.
2. Analyze the prevailing practices of music education in the Sultanate of Oman and evaluate their contribution to achieving the objectives of Oman Vision 2040 pertaining to education, learning, and innovation, drawing on empirical fieldwork.
3. Identify the most significant challenges impeding the effective role of music education in fulfilling the Sustainable Development Goals and the aspirations of Oman Vision 2040, as revealed through fieldwork findings.
4. Propose a set of evidence-based recommendations to strengthen the contribution of music education toward building a knowledge-based and innovative society in the Sultanate of Oman, in alignment with the overarching goals of Oman Vision 2040.

### **Study Importance**

1. Enhancing the learning of human skills in line with the priorities of Oman Vision 2040.
2. Fostering the development of cognitive, creative, and innovative abilities.
3. Contributing to human development and cultural identity.

### **Study Scope**

1. Subject Matter Scope: The role of music skills education in sustainable development in the fields of education, learning, and innovation.
2. Geographical Scope: Ministry of Education – Sultanate of Oman.
3. Temporal Scope: First semester of the 2025/2026 academic year.
4. Human Scope: Music skills teachers in the Sultanate of Oman.

### **Study Terminology**

#### **Education**

In educational terms, education refers to the coordinated methodology employed by the teacher to impart knowledge and skills to the learner. The operational definition is a set of organized activities that focus on helping learners achieve specific goals within a school or formal environment. (Shehata & Al-Najjar – 2003 – 92)

#### **Learning**

It is defined in educational psychology as the diversity that occurs in an individual's cognitive or behavioral structure. It encompasses everything an individual acquires through practice and experience in developing attitudes, perceptions, inclinations, social and intellectual skills..etc. in addition, it is a component of behavior or experience resulting from what happens in the world or from what is observed or done (Abu Allam, 2010).

The operational definition is a process of modifying or changing behavior characterized by relative stability as a result of experience and practice. This change is not due to natural maturation processes or temporary factors such as fatigue (Saleh, Ahmed Zaki – 1995 – 184). The concept of education is closely related to the concept of learning, but the two terms differ in their essence and function within the educational process. Education is considered a structured educational activity carried out by the teacher, while learning is a self-directed effort exerted by the learner to acquire, understand, and master knowledge and skills, reflecting the extent of their comprehension and interaction.

### **Innovation**

In the educational context, innovation is the ability to integrate existing elements into new forms or to offer unconventional solutions to educational problems. Operationally, it is defined as "a mental process aimed at finding new and original solutions to problems, characterized by fluency of thought, flexibility, originality, and the ability to elaborate and detail" (Zaitoun, Hassan – 2003 – 142). Furthermore, the concept of educational innovation encompasses any radical change within educational programs, including content, curricula, values, institutional processes, pedagogical methods, and student activities that may represent a break with all previous practices (Brahimi, 2019).

In another source, the term innovation refers to the emergence of a new idea or ideas, or a significant development of an existing idea, product, or service, which may contribute to a clear addition, in addition to employing technology to advance scientific knowledge (Al-Shall, 2023).

### **Teaching Musical Skills**

Teaching musical skills is defined as an educational process aimed at developing the learner's auditory, motor, and creative abilities through organized musical activities that contribute to character building and enhance emotional and social intelligence (Mujahid, 2025). Furthermore, from a cultural and anthropological perspective, musical learning is one of the most important means of supporting the transmission of musical heritage and understanding cultural identity through the study of musical arts that express society and its values. It is also a tool for preserving and developing cultural heritage across generations. This was emphasized by the anthropologist Alan Merriam in the eighth part of his book "Anthropology of Music," where he states that "the transmission of musical knowledge from one generation to the next, within or outside the formal educational system, is not limited to teaching the production of sounds or the practice of rhythms, but extends to transmitting the cultural meanings and social symbols rooted in various musical practices." From this perspective, musical learning becomes an important process of cultural socialization, enabling members of society to learn how to use music and singing to express their identities and their religious, cultural, and class affiliations (Merriam, 1964). From a technological standpoint, it represents an interactive educational system that leverages modern digital technologies and artificial intelligence applications to facilitate the learner's acquisition of musical fundamentals and advanced skills within a smart learning environment that respects the individuality of each learner, while simultaneously supporting collaborative learning methods and the development of shared practices (Xu, 2023).

## **Sustainable Development**

The term sustainable development consists of two terms that must be defined, along with their relationship to the field of education.

### ***Development***

It is a multidimensional process aimed at improving the standard of living of individuals and societies through economic, social, cultural, and political progress.

### ***Sustainability***

According to the Brundtland Report, it is a project that aims to meet the needs of the present without compromising the ability of future generations to meet their own resource needs, while achieving a balance between the economic, social, and environmental dimensions of development (World Commission on Environment and Development (WCED), 1987).

### ***Sustainable Development***

According to the various regulations of the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the United Nations Development Programme (UNDP), sustainable development is a comprehensive and continuous process aimed at achieving the holistic progress of humanity and society in various economic, social, cultural, and environmental fields, ensuring justice, equality, respect for cultural diversity, and the protection of natural resources for present and future generations (UNESCO, 2015).

## **Sustainable Development in Education**

Sustainable development in education is an educational approach that aims to empower learners to understand environmental, social, and economic challenges and equip them with the skills necessary to make responsible decisions that ensure resource sustainability and achieve equity (Oman Vision 2040, Human and Society Pillar).

### **Oman Vision 2040**

Oman Vision 2040 is a long-term strategic roadmap developed by the Sultanate of Oman to achieve comprehensive and sustainable development across various sectors until 2040. It was officially announced in December 2020 following the issuance of Royal Decree No. 100 of 2020, dated August 18, 2020, which established the Oman Vision 2040 Implementation Follow-up Unit. The vision came into effect on January 1, 2021. It comprises twelve national priorities encompassing four main pillars: "People and Society: A society with creative individuals," "Economy and Development: A competitive economy," "Sustainable Environment: An environment with sustainable components," and "Governance and Institutional Performance: A state with

accountable institutions" (Vision Document, 2020).

The study comprises two parts:

First: Theoretical Framework and Previous Studies Related to the Study Topic.

Second: Applied Framework, which consists of study methodology and tools.

## **Theoretical Framework and Previous Studies Related to the Study Topic**

### **Theoretical Framework**

Education, learning, and innovation are the fundamental pillars and constants upon which both Arab and Western countries rely to develop their various capabilities. Given the rapid pace of development in these fields globally, it has become essential to delve deeper into these terms and concepts, and to explore their integration and synergy in achieving sustainable development. This part of the research focuses on the terms education, learning, and innovation, examining their current state and level of application in the Sultanate of Oman, a country striving to achieve a future vision aimed at improving the education system, enhancing learning, and supporting innovation, considering them effective and influential tools for achieving comprehensive development.

#### ***Education in the Sultanate of Oman***

The education system in the Sultanate of Oman has undergone numerous significant developments since its official inception in 1970, coinciding with the dawn of the Renaissance era and the beginning of the reign of His Majesty Sultan Qaboos bin Said, may God have mercy on him, (1970–2020). This, however, does not imply the absence of prior educational efforts in the region. The true launch of the organized educational movement in the Sultanate is widely regarded as having occurred at the start of the Renaissance, specifically in July 1970, when the first Ministry of Education was formally established (Al-Hadi, Al-Abri, & Al-Kiyumi, 2021).

Following its establishment, the education sector in Oman experienced rapid and remarkable growth. At the time of the Ministry's founding, the total number of students stood at approximately 900; this figure rose substantially in subsequent years to around 55,752 students distributed across 207 schools. Growth continued steadily thereafter, ultimately reaching 565,184 students enrolled across 1,091 schools offering both basic and post-basic education programs, including grades 11 and 12 (Ministry of Education, Sultanate of Oman, 2017).

#### ***Learning in the Sultanate of Oman***

Oman has witnessed considerable transformations in its learning systems through the adoption of e-learning platforms, most notably Moodle, which has been widely utilized for distance learning. These platforms provided students with valuable opportunities to continue their studies and ensured educational continuity during the exceptional circumstances imposed by the COVID-19 pandemic. The foundation of this digital shift can be traced back to 2001, when eight online courses were initially launched, attracting 981 users. This trend expanded significantly by 2010, growing to encompass 1,400 courses and benefiting approximately 17,000 students (Al

Musawi & Abdelrahim, 2004). In parallel, the Ministry of Education integrated various learning management systems across numerous educational institutions, enabling students to engage with and benefit from digital learning tools effectively. These systems included several open-source platforms, such as ATutor, Claroline, Dokeos, Moodle, and OLAT (Amer, 2013).

### ***Innovation in the Omani Education System***

The Omani education system has witnessed remarkable development, particularly since the implementation of Oman Vision 2040. This progress aligns with a strong political will to prioritize knowledge-based education by integrating technology, developing and enhancing essential skills, motivating teachers, streamlining and digitizing curricula, and improving technological infrastructure, all within a school environment designed to foster innovation and talent discovery.

Building on this foundation, Oman has placed considerable emphasis on promoting scientific innovation and artificial intelligence within school education as a key component of realizing its national vision. This focus stems from the recognized importance of equipping students with critical competencies, including problem-solving, adaptability, and creative thinking, while simultaneously enhancing institutional competitiveness at the global level and contributing to addressing broader international challenges (Baawain, 2024). In support of these goals, comprehensive training and development programs have been provided for teachers, enabling them to effectively utilize modern teaching methods and digital technologies, while also encouraging students to innovate and engage in learning through interactive platforms.

At a broader policy level, Oman Vision 2040 has underscored the Sultanate's commitment to transitioning toward a knowledge- and innovation-driven society. This encompasses establishing a culture of scientific inquiry, encouraging and sponsoring research and development, and supporting creators and innovators through a structured national framework. As articulated in the vision, Oman aims to build "an effective national system for scientific research, creativity and innovation that contributes to building a knowledge economy and society" (Oman News Agency, 2022).

### **Previous Studies**

***A study entitled: "Creativity and Education for Sustainable Development: An Analytical Reading of the Concept and Requirements" (Sanqrat, 2024)***

This study aims to explore the relationship between "creative education" and "sustainable development," and to identify the requirements necessary for activating educational programs that contribute to preparing learners become capable of contributing to the achievement of the Sustainable Development Goals. The researcher adopted a descriptive approach to clarify the concept of creative education, highlighting its pillars, as well as the role of education in sustainable development and its relationship to fostering creativity. The study also addressed appropriate strategies for sustainable development and the essential functions performed by education, indicating that creative education is not an additional element, but rather a central and fundamental component of the

sustainable development process. The research findings concluded that creative education contributes significantly to developing learners' skills and enhancing their ability to think creatively and arrive at innovative solutions to contemporary environmental, social, and economic challenges, thereby enabling individuals to contribute effectively to achieving a sustainable society.

***A study entitled: "The Effectiveness of Digitalization and Artificial Intelligence Applications in Developing Art Education Curricula" (Zakaria, 2023)***

This study aims to highlight the transformative role of digitalization strategies and artificial intelligence (AI) applications as innovative and creative breakthroughs in enriching and advancing the field of art education. The study adopted an experimental approach, employing a survey questionnaire as the primary data collection instrument to gather and evaluate the perspectives of a sample of 42 art education teachers and supervisors in Assiut Governorate. The questionnaire addressed key themes concerning the significance of digitalization and artificial intelligence in curriculum development and the enhancement of art education quality. The statistical analysis revealed that more than 68% of respondents emphasized the importance of digitalization, while 70% affirmed the significance of artificial intelligence in fostering creativity.

The consensus among the sample confirmed that these technologies play a pivotal and effective role in developing art education curricula, elevating the quality of instruction, and strengthening students' creative and critical thinking capacities. These findings reflect a growing imperative to integrate AI-driven tools such as three-dimensional drawing and design software and virtual reality applications to cultivate artistic awareness and connect students with contemporary digital culture. The study further addressed the challenges associated with implementing such technologies, including financial costs, limited material and human resources, and institutional resistance to change. In response, the research emphasized the necessity of providing teachers with adequate support and professional training to successfully adopt AI tools and develop curricula that are responsive to the demands of the digital age.

***A study entitled: "Developing E-Learning in School Education in the Sultanate of Oman in Light of Oman Vision 2040 and Sustainable Development from the Perspective of School Principals (A Case Study of Muscat Governorate)" (Al-Ghaithiya, Hammad, and Al-Abri, 2022)***

This study aims to analyze the dimensions of enhancing e-learning in government schools in the Sultanate of Oman from the perspective of school principals, in light of Oman Vision 2040 and the Sustainable Development Goals, utilizing the Khan Framework as a guiding reference for e-learning design and implementation. The study adopted a qualitative approach, specifically a case study methodology, with semi-structured individual interviews serving as the primary data collection instrument. The interviews were conducted with a purposive sample of six middle school principals from Muscat Governorate. The findings indicated that the Ministry of Education has exerted considerable efforts to implement e-learning, efforts that became particularly pronounced during the COVID-19 pandemic. The results further highlighted an urgent need to develop digital infrastructure and to update relevant regulations, legislation, and assessment frameworks for both students and teachers, in order to align with

the demands of a digital learning environment. The recommendations put forward by the study participants emphasized the importance of strategically planning for the integration of blended learning alongside face-to-face instruction, developing digital content that accommodates individual differences among students, activating community digital partnerships, and empowering teachers and school principals to assume technical leadership roles, which are all in pursuit of the strategic objectives of Vision 2040.

***A study entitled: "The Extent to Which Music Teachers in the Sultanate of Oman Practice Teaching Skills According to the Requirements of Implementing the School Curriculum" (Mohammed, Mahmoud, and Al-Ghafri, 2022)***

This study aims to assess the level of application of fundamental teaching skills among music teachers in the Sultanate of Oman, in alignment with the requirements of the school curriculum, with the ultimate goal of enhancing their professional competence. To achieve this, the study adopted a descriptive-analytical approach, utilizing a structured questionnaire to gather the perspectives of music teachers employed by the Ministry of Education regarding their application of teaching skills in curriculum delivery. The findings revealed that song teaching ranked first among all measured skills in terms of practical application, recording a "very high" level, which indicate that it is the most widely practiced teaching skill among music teachers in the study sample. With respect to the remaining dimensions, the statistical data showed that the arithmetic means for the skills of music history, music appreciation, vocal solfège instruction, and the explanation of musical rules and theories ranged between (4.51–4.53) on a five-point scale, with relative averages between 90.2% and 90.7%. This notably high average positioned the aforementioned skills in the second, third, and fourth ranks, respectively.

***A study entitled: "Challenges of Using Virtual Classrooms from the Perspective of Music Skills Teachers in the Sultanate of Oman" (Mohammed, 2021)***

This study aims to examine the challenges of adapting to technological advancement, particularly in the context of the COVID-19 pandemic and the subsequent shift toward digital educational platforms, namely virtual classrooms, to ensure the continuity of music education. The field research targeted a sample of music skills teachers across the Sultanate of Oman. Statistical analysis revealed significant differences at the (0.01) level in teachers' attitudes toward the use of virtual classrooms, attributable to the gender variable (male/female). In contrast, no statistically significant differences were found in relation to years of experience. With respect to the educational level variable, no statistically significant differences were detected at the (0.05) level across any of the measured dimensions; however, the results consistently favored teachers holding a university degree. These findings collectively underscore the significance of teacher-related personal and professional background factors in shaping their engagement with and adoption of educational technology.

***A study entitled: "The Effectiveness of a Guided Visualization-Based Program in Developing Some Music Education Skills Among Secondary School Students" (Zaitoun, 2018)***

This study aimed to investigate the effectiveness of a guided visualization-based program in enhancing select

music education skills among secondary school students. A quasi-experimental design was employed, with a sample of 60 female students drawn from a secondary school during the 2017–2018 academic year. The findings revealed statistically significant differences in favor of the experimental group, affirming the program's effectiveness in developing students' musical competencies.

***A study titled: "Vision 2040 Sets Goals and Priorities Regarding the Strategic Direction of Education, Learning, Scientific Research, and Capabilities" (Al-Saidi, 2019)***

This study seeks to shed light on the strategic directions of Oman Vision 2040, particularly its goals pertaining to education, learning, and scientific research, an emphasis that opens new avenues for the arts, including music, as an active and integral component of the educational system. The study further examines the Vision's overarching objectives of achieving comprehensive and sustainable development by balancing economic growth, social welfare, and environmental stewardship, while positioning human capital as the primary driver of this development. The study ultimately underscores the Vision's commitment to fostering culture and the arts, not merely as a means of preserving national identity, but as civilizational cornerstones that nurture creativity, innovation, and social progress. In this light, the teaching of musical skills emerges as a multifaceted and strategically significant tool, capable of reinforcing the foundational pillars of Oman Vision 2040 and advancing the sustainable development goals.

## **The Applied Framework**

### ***Study Methodology***

The study followed a descriptive quantitative approach, aiming to collect data by answering the research questions, which included "The Role of Music Skills Education in Sustainable Development in the Fields of Education, Learning, and Innovation," and then formulating recommendations and proposals.

### ***Study Variables***

The study included one dependent variable, which is the role of music skills education in promoting sustainable development in the fields of education, learning, and innovation from the perspective of music skills teachers in the Ministry of Education in the Sultanate of Oman during the first semester of the 2025-2026 academic year. The independent variables are:

- 1. Gender:** Male and Female.
- 2. Teaching Experience:** 1-4 years, 5-9 years, 10-14 years, and more than 15 years.
- 3. Educational Qualification:** Diploma in Education, Bachelor's Degree in Music or Music Education, Master's Degree or higher.
- 4. Educational Governorates:** Muscat, Dhofar, Musandam, Al Wusta, Ad Dhahirah, Ad Dakhiliyah, Al Buraimi, North and South Al Batinah, and North and South Ash Sharqiyah.

### ***Study Population and Sample***

The research population consists of music skills teachers in the Ministry of Education in the Sultanate of Oman. The study was conducted on all members of this population, as it comprises teachers, through an electronic questionnaire. A total of 309 responses were received. Table 1 and 2 illustrate the distribution of the sample. Table 1 shows that the total number of males and females was (309) where 109 were males (35.3%) and 200 were females (64.7%).

Table 1. Distribution of Sample Members According to the Two Gender Variables

<b>Type</b>	<b>Number</b>	<b>Percentage</b>
Male	109	35.3%
Female	200	64.7%
Total	309	100%

Table 2 shows that the total number of individuals in the sample with a Master's degree or higher was 22, representing 7.1%, while the sample with a Bachelor's degree was 280, representing 65%, and the sample with a Diploma was 7, representing 2.3%.

Table 2. Distribution of the Sample According to the Two Variables of Educational Qualification

<b>Type</b>	<b>Number</b>	<b>Percentage</b>
Master's degree or higher	22	7.1%
Bachelor's degree	280	90.6%
Educational qualification diploma	7	2.3%
Total	309	100%

Table 3 shows that the total number of sample members with experience ranging from 1 to 4 years was (46), representing (14.9%), the sample members with experience ranging from 5 to 9 years numbered 65, representing 21%, while the sample members with experience ranging from 10 to 14 years numbered (74), representing 23.9%, and the sample members with experience exceeding 15 years numbered 124, representing 40.1%.

Table 3. Distribution of Sample According to the Two Variables of Years of Experience

<b>Type</b>	<b>Number</b>	<b>Percentage</b>
1-4 years	46	14.9%
5-9 years	65	21%
10-14 years	74	23.9%
15 years or more	124	40.1%
Total	309	%100

It is noted from Table 4 that the total number of individuals in the educational governorate sample is distributed with the number of teachers in their governorates.

Table 4. Distribution of Sample Members According to the Two Educational Governorate Variables

<b>Educational governorate</b>	<b>Number</b>	<b>Percentage</b>
South Al Batinah	1	.3%
North Al Batinah	6	1.9%
Al Buraimi	49	15.9%
Al Dakhiliyah	89	28.8%
Al Wusta	18	5.8%
South Al Sharqiyah	3	1%
North Al Sharqiyah	34	11%
Dhofar	53	17.2%
Muscat	56	18.1%
Total	309	100%

### ***Study Instruments***

A questionnaire was prepared as the primary instrument for collecting data related to the research topic: "The Role of Music Skills Education in Sustainable Development in the Fields of Education, Learning, and Innovation from the Perspective of Music Skills Teachers in the Ministry of Education in the Sultanate of Oman."

The following procedures were followed in preparing the instrument:

- Using previous studies in preparing the questionnaire.
- Reviewing educational literature.
- Creating a list of questionnaire sections.
- Assigning weight to responses for each item, as follows: Strongly Agree (5 points), Agree (4 points), Somewhat Agree (3 points), Disagree (2 points), and Strongly Disagree (1 point).

### ***Validity of the Study Instrument***

The questionnaire, consisting of (22) items, was presented to (9) reviewers: (4) educational supervisors for music skills at the Ministry of Education, (3) music skills curriculum specialists at the Directorate General for Curriculum Development, and (2) faculty members from Sultan Qaboos University. The reviewers provided some feedback, including the need to rephrase and delete some items, resulting in a final questionnaire of 20 items after the amendments.

### ***Reliability of the Study Instrument***

The reliability of the instrument was confirmed using Cronbach's alpha coefficient for each statement, with the overall reliability coefficient reaching (0.818), which is considered very high. The reliability coefficients for individual statements ranged from (0.803) to (0.830). Table 5 presents the reliability coefficients of the research

instrument.

Table 5. Reliability Coefficients using "Cronbach's Alpha" for the Themes of the Research Instrument

Theme	The Role of Music Skills Education in Sustainable Development in the Fields of Education, Learning, and Innovation	Cronbach's Alpha
First theme	Education and Learning	.816
Second theme	Innovation and Creativity	.823
Third theme	The Compatibility of Music Skills Education with Oman Vision 2040	.809
Fourth theme	Challenges	.811

### *Statistical Processing of the Data*

Frequency, percentages, arithmetic means, and standard deviations were computed using the Statistical Package for the Social Sciences (SPSS). Table 6 presents the scale adopted for evaluating the role of music skills education in sustainable development across the fields of education, learning, and innovation, from the perspective of music skills teachers in the Ministry of Education in the Sultanate of Oman, based on the arithmetic mean and relative arithmetic mean for each statement of the instrument.

Table 6. Scale for Judging the Role of Music Skills Education ( In sustainable development in the fields of education, learning and innovation from the perspective of music skills teachers in the Ministry of Education in the Sultanate of Oman)

Agreement Degree	Degree	Arithmetic Means	Practice Level
Strongly agree	5	From 4.3 to 5	Very high
Agree	4	From 3.3 to 4.2	High
Neutral	3	From 2.3 to 3.2	Moderate
Disagree	2	From 1.3 to 2.2	Low
Strongly disagree	1	From 1 to 2.1	Very low

### **Analysis and Interpretation of Results**

**Answer to the First Question: What is the theoretical and conceptual framework that links music education to sustainable development in the fields of education, learning, and innovation?**

This question was answered within the theoretical framework of the study by emphasizing that teaching musical skills is one of the effective educational approaches for achieving sustainable development in the fields of education, learning, and innovation. It contributes to developing critical and creative thinking, enhancing communication and teamwork skills, and aligns with global trends toward holistic education that integrates knowledge, skills, and values.

By linking music learning to sustainable development in the fields of education, learning, and innovation, the

three research areas concluded the following points:

*In the field of education:* Studying musical skills contributes to improving the quality of the educational process by integrating innovative teaching methods that achieve a balance between the cognitive and affective aspects, thus reinforcing the values of discipline and cooperation and enhancing learners' motivation.

*In the field of learning:* Musical activities provide significant opportunities for active and interactive learning, supporting self-directed and continuous learning, as well as contributing to the development of life skills such as problem-solving and adaptability.

*In the field of innovation:* music serves as a fertile ground for creativity and imagination, opening up diverse and innovative avenues for integrating digital technology and artificial intelligence in education, in line with the modern directions of Oman Vision 2040. Figure No. (1) illustrates the role of musical learning as a strategic tool for developing the educational system in the Sultanate of Oman, by enhancing the integration of education, learning, and innovation, and as a means of achieving sustainable development. This, in turn, ensures the preparation of a generation capable of creativity and competition amidst rapid global transformations, in accordance with the goals of Oman Vision 2040 to build a renewed and knowledge-based innovative society.

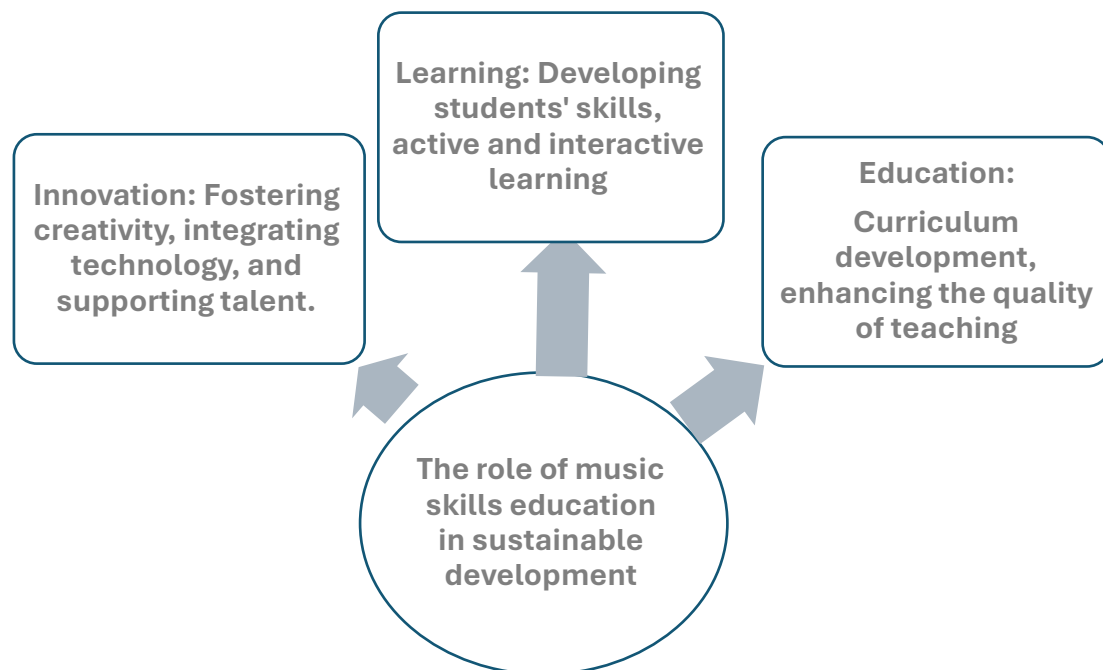


Figure 1. Conceptual Framework: The Role of Learning Musical Skills in Sustainable Development (Education – Learning – Innovation)

**Answer to the Second Question: What are the current practices of music education in Oman? And how do these practices align with the goals of Oman Vision 2040 in education, learning, and innovation?**

The answer to the above question is divided into two parts:

*First:* Current practices of music education in the Sultanate of Oman through teaching, learning, and innovation.

*Second:* Through calculating the arithmetic means and standard deviations for the two themes of teaching and learning, and innovation. This is illustrated in Table 7.

**First: Current Practices of Music Education in the Sultanate of Oman for Teaching and Learning**

Table 7. Arithmetic Means and Standard Deviations of Current Practices of Music Education in Oman through Teaching and Learning

	<b>Statement</b>	<b>Arithmetic Mean</b>	<b>Standard Deviation</b>	<b>Practice Level</b>	<b>Rank</b>
2	Teaching musical skills helps develop auditory and visual memory.	4.87	.367	Very high	1
1	Teaching musical skills contributes to improving students' focus and attention.	4.70	.567	Very high	2
3	Teaching musical skills enhances students' communication skills	4.69	.511	Very high	3
4	Teaching musical skills promotes social values and classroom discipline	4.64	.601	Very high	4
5	I observe an improvement in students' language abilities due to learning musical skills	4.44	.730	Very high	5
	Current practices of music education in Oman through teaching and learning	4.67	.423	Very high	

**Note:** The statements were arranged according to their arithmetic mean percentage, from the highest to the lowest, as shown in Table 7.

The results indicate the following:

- Current music education practices in the Sultanate of Oman, within the framework of teaching and learning, are classified as "very high," reflecting an advanced understanding of the importance of this type of education in the school environment. The overall arithmetic mean for these practices was 4.67, with a relatively low standard deviation of 0.423, indicating a high degree of consensus among the sample (309 participants) regarding the effectiveness of music education in supporting the educational process.
- The highest-rated statement shows that teaching musical skills contributes significantly to the development of students' auditory and visual memory, with an average of 4.87 and a standard deviation of 0.367, reflecting a strong emphasis on this cognitive benefit.
- The impact of music education on improving focus and attention and on enhancing communication received Arithmetic means of 4.70 and 4.69 respectively, which are indicators that confirm that music serves as an educational tool that contributes to the development of cognitive and social skills.

The interpretation of these results is as follows:

- Musical skills education enhances social values and classroom discipline (4.64) and contributes to the development of language skills (4.44). Although these represent the lowest-ranked items within the instrument, they are still classified as "very high," reflecting a comprehensive and consistent impact of music education across various aspects of student development.
- These results reinforce the importance of integrating music education into school curricula as a strategic

tool to support inclusive education and achieve the Sustainable Development Goals in the education sector, in line with Oman Vision 2040, which emphasizes innovation in education and the holistic development of students' skills.

It is clear that the results of the current study as shown in Table 7 align with the literature of previous studies on the following points:

- The study by Mohammed, Mahmoud, and Al-Ghafri (2022) demonstrated that music teachers in the Sultanate of Oman practice their teaching skills at a high level, particularly in the teaching of hymns.
- The study on the impact of music on improving focus, attention, and communication yielded findings that differ somewhat from Al-Dairi and Al-Busaidi (2022), which addressed the green economy in education. The latter reported that practices were at a "general" level rather than a "very high" level, reflecting that music education in the Omani context enjoys a comparatively higher degree of activation relative to some other areas associated with sustainable development.
- The study by Mohammed (2021) on the challenges of virtual classrooms indicated differences related to gender and qualifications. In contrast, the results of the present study revealed a high degree of overall agreement among the sample, suggesting a distinction in the level of challenges between traditional music education and its digital counterpart.
- The study by Zaitoun (2018) confirmed the effectiveness of modern instructional programs, such as guided imagery, in enhancing music education skills among female students.

### ***Second: Current Practices in Music Education in the Sultanate of Oman: Innovation and Creativity***

Table 8. Arithmetic Means and Standard Deviations of Current Practices in Music Education in Oman through Innovation and Creativity

Statement	Arithmetic Mean	Standard Deviation	Practice Level	Rank
1 Musical skills activities stimulate students' creative thinking.	4.77	.472	Very high	1
3 Musical skills improve the ability of self expression.	4.75	.455	Very high	2
5 Musical skills promote students' participation in musical initiatives both inside and outside the school.	4.75	.483	Very high	3
4 Musical skills education fosters 21st century skills.	4.59	.572	Very high	4
2 Musical skills education contributes to the development of students' problem-solving skills.	4.54	.605	Very high	5
Current practices in music education in Oman are characterized by innovation and creativity.	4.68	.395	Very high	

**Note:** The statements were ranked according to their arithmetic mean percentage, from the highest to the lowest, as shown in Table 8.

The results indicate the following:

- The level of current music education practices in the Sultanate of Oman, within the Innovation and Creativity theme, is classified as "very high," with an overall arithmetic mean of 4.68 and a relatively low standard deviation of 0.395. This indicates a high degree of agreement among the sample (309 participants) regarding the creative role that music education plays in the educational environment.
- The highest-rated statement in this theme affirmed that musical skills activities stimulate students' creative thinking, with an arithmetic mean of 4.77 and a standard deviation of 0.472, reflecting a deep understanding of the importance of music in developing unconventional mental abilities. This was followed by the items "Developing the Ability of Self-Expression" and "Enhancing Participation in Musical Initiatives," both of which received arithmetic mean of 4.75. These results highlight the role of music in empowering students to express themselves freely and engage actively within the community, both inside and outside the school.
- The interpretation of the results indicates that music education contributes to enhancing 21<sup>st</sup>-century skills (4.59), such as critical thinking, collaboration, and innovation, which are essential skills for building a generation capable of engaging with the challenges of the digital era. The item related to developing problem-solving skills ranked last (4.54), but it remains within the "very high" level, demonstrating that music education also contributes to building students' analytical thinking.

A review of previous studies and their correlation with the results of the current study, as presented in Table 8, reveals agreement in the following aspects:

- Music education contributes to a "very high" degree to fostering innovation and creativity.
- Musical skills contribute to preparing learners capable of creative thinking and problem-solving.
- Music contributes to developing 21<sup>st</sup> century skills in line with Oman Vision 2040.
- There are challenges related to infrastructure and regulations.
- The importance of integrating music education into educational policies focusing on building an educational system that stimulates creativity and is geared towards future skills.

### **Answer to the Third Question: What challenges hinder the effective integration of music education to achieve the Sustainable Development Goals and Oman Vision 2040?**

To answer Question 3, calculation was made of the means and standard deviations of the challenges hindering the effective integration of music education to achieve the Sustainable Development Goals and Oman Vision 2040, as shown in Table 9.

Table 9. Arithmetic Means and Standard Deviations of the Challenges Facing the Effective Integration of Music Education to Achieve the Sustainable Development Goals and Oman Vision 2040

	<b>Statement</b>	<b>Arithmetic Mean</b>	<b>Standard Deviation</b>	<b>Practice Level</b>	<b>Rank</b>
2	The objectives of music skills education align with the goals of Oman Vision 2040.	4.61	.556	Very high	1
1	Teaching music skills contributes to building a	4.56	.571	Very high	2

	<b>Statement</b>	<b>Arithmetic Mean</b>	<b>Standard Deviation</b>	<b>Practice Level</b>	<b>Rank</b>
	knowledge-based society among students.				
4	Educational institutions strive to highlight the role of music skills.	4.42	.682	Very high	3
3	The current music skills curriculum promotes critical and creative thinking.	4.33	.757	Very high	4
5	A stimulating environment is available to support music skills education.	4.18	.855	High	5
	Challenges to effectively integrate music education to achieve the Sustainable Development Goals and Oman Vision 2040.	4.42	.510	Very high	

**Note:** The statements were arranged according to their arithmetic mean percentage, from the highest to the lowest, as shown in Table 9.

The results indicate the following:

- The sample (309 participants) agreed to a "very high" degree on the importance of music education in supporting the Sustainable Development Goals and Oman Vision 2040.
- The overall arithmetic mean was 4.42 with a standard deviation of 0.510. The highest-rated statement confirmed that the objectives of teaching musical skills align with the directions of Oman Vision 2040, with a mean of 4.61 and a standard deviation of 0.556. Therefore, it reflects a growing awareness among those working in the education sector of the importance of linking music education to national policies.
- The statement "Teaching musical skills contributes to building a knowledge society" (4.56) emphasizes the cognitive role of music in promoting systematic and research thinking among students.
- The statement concerning educational institutions' efforts to highlight the role of musical skills received an arithmetic mean of 4.42, indicating the existence of institutional efforts, but suggesting a need for further activation and integration within educational plans.
- The curriculum's assessment of musical skills in promoting critical and creative thinking was fairly low (4.33), possibly indicating a need to develop educational content that aligns with the demands of the 21<sup>st</sup> century.
- The final statement, regarding the availability of a stimulating environment for teaching musical skills, ranked lowest (4.18). It was the only statement classified as "high" rather than "very high," highlighting a significant challenge in providing a supportive learning environment, whether in terms of resources, infrastructure, or administrative support.

Based on these findings, it can be concluded that the challenges facing the integration of music education in the Sultanate of Oman extend beyond awareness and policy considerations to encompass implementation and environmental dimensions. This necessitates strategic intervention aimed at developing curricula, providing a stimulating learning environment, and strengthening the integration of music education with the Sustainable Development Goals, in line with Oman Vision 2040, which prioritizes innovation, equity, and equal opportunities in education.

Table 9 confirms that the sample group agrees to a "very high degree" on the importance of music education in supporting the Sustainable Development Goals and Oman Vision 2040, which aligns with previous studies in the following points:

- The necessity of focusing on arts and music as cultural pillars that contributes to stimulating creativity and innovation.
- The alignment of music skills education objectives with the directions of the national vision, which is consistent with the study by Sanqrat (2024), who clarified that creative education, is not a supplementary element but rather an essential component of sustainable development.
- Music contributes to preparing learners who are capable of creative thinking and arriving at innovative solutions to contemporary challenges.

**Answer to the Fourth Question: What are the possible strategies and proposals to enhance the role of music education in supporting education, learning, and innovation to achieve Oman Vision 2040?**

To answer Question 4, Table 10 illustrates the calculation of arithmetic means and standard deviations for the possible strategies and proposals to enhance the role of music education in supporting education, learning, and innovation to achieve Oman Vision 2040.

Table 10. Arithmetic Means and Standard Deviations of Possible Strategies and Proposals to Enhance the Role of Music Education in Supporting Education, Learning, and Innovation to Achieve Oman Vision 2040

Statement	Arithmetic Mean	Standard Deviation	Practice Level	Rank
1 Availability of musical resources supports music education	4.32	.709	Very high	1
5 I am interested in pursuing specialized vocational training	3.84	.687	High	2
2 The distribution of the music skills curriculum and the number of allocated class periods are appropriate	3.81	.596	High	3
3 There is interest and guidance from educational institutions regarding music skills	3.66	.871	High	4
4 Musical skills can be integrated into comprehensive education	3.62	.811	High	5
Possible strategies and proposals to enhance the role of music education in supporting teaching, learning, and innovation to achieve Oman Vision 2040	3.85	.835	High	

**Note:** The statements were arranged according to their arithmetic mean percentage, from the highest to the lowest, as shown in Table 10.

The results indicate the following:

- The sample (309 participants) rated the proposed strategies and suggestions for enhancing music education as "high," reflecting a growing positive awareness of the importance of developing this field. However, there was some relative variation in the degree of agreement on certain items, as follows:
- The highest-rated statement affirmed that the availability of musical resources to support education is the most influential factor in enhancing music education, indicating that infrastructure and technical equipment form the foundation upon which the success of this type of education is built.
- The statements "I am interested in pursuing specialized vocational training" and "appropriateness of the curriculum distribution with the number of classes" indicate a professional readiness among teachers, coupled with an awareness of the importance of time balance in teaching the subject.
- The statement related to the interest of educational institutions' administrations in musical skills reflects a positive administrative approach, but it still needs further activation and integration within school policies.
- The last statement, regarding the possibility of integrating musical skills into integrated education, ranked lowest at 3.62, despite being classified as "high." This highlights the challenge of incorporating music into a comprehensive educational system and indicates the need to develop flexible and integrated educational models. These results demonstrate that enhancing music education in the Sultanate of Oman requires multi-level intervention encompassing the improvement of resources and technical equipment, the development of curricula, the provision of clear and systematic administrative support, the establishment of specialized training programs, and the adoption of integrated educational models.

By reviewing the results of previous studies and comparing them to the results in Table No. (10), it is clear that the current study has an agreement with the previous literature on the following points:

- The study by Mohammed, Mahmoud, and Al-Ghafri (2022) recommended strengthening the application of teaching skills for music teachers in the Sultanate of Oman, highlighting that the success of music education requires appropriate resources and equipment.
- The study by Zaitoun (2018) confirmed the effectiveness of modern training programs in developing music education skills, which aligns with the section indicating teachers' desire to participate in professional training.
- The study by Sanqrat (2024) emphasized the need to develop training programs for teachers to familiarize them with innovative teaching methods that support the achievement of the Sustainable Development Goals, reflecting the significance of the professional and formative dimension in enhancing music education. Accordingly, the results of Table (10) largely confirm their consistency with previous studies that highlighted the importance of resources, vocational training, and administrative support in promoting music and arts education. A relative distinction, however, lies in the weakness of institutional integration and policy frameworks, which calls for multi-level intervention encompassing the improvement of resources and facilities, the development of curricula, the establishment of specialized training programs, and the adoption of integrated educational models.

**A Qualitative Analysis was also conducted of the Open-ended Question in the Questionnaire, "What are your suggestions for enhancing the role of musical skills in supporting sustainable development, education,**

### and innovation in the Sultanate of Oman?"

The responses of the sample members were analyzed, and the results of the qualitative and frequency analysis are shown in Table No. (11). this analysis reflects the diverse challenges and opportunities related to developing music education in the Sultanate of Oman. The qualitative suggestions submitted by the sample (309 participants) were categorized into six main themes, reflecting the areas of intervention required to achieve effective integration between music education, the Sustainable Development Goals, and Oman Vision 2040. These themes are:

1. The Education theme ranked first in terms of frequency (26), indicating that practitioners consider developing curricula and musical activities, allocating time for talent identification, and training female students in instrumental performance as essential approaches to enhancing the quality of music education.
2. The Educational Policies theme received (21 frequencies) highlights the need to consider music as a core subject, provide institutional support in low-income schools, and establish academic tracks for musical arts in the upper grades. This reflects the importance of legislative and administrative empowerment for this field.
3. The School Environment theme received 17 frequencies, highlighting the importance of providing suitable infrastructure, from well-equipped classrooms and appropriate musical instruments to reducing the teaching load on teachers to create a more creative environment.
4. The Community theme ranked fourth with (14 frequencies), emphasizing the need to raise awareness among parents, utilize music for social inclusion and mental health, and instill values of citizenship through songs, reflecting the cultural and social dimensions of music education.
5. The Innovation theme received (9 frequencies) and highlights the importance of using artificial intelligence in musical composition, encouraging scientific research, and dramatizing curricula, aligning with future educational trends.
6. The Modern Technologies theme came in the last rank with (3 frequencies), but it points to promising trends toward introducing digital tools such as augmented reality and music composition software, enhancing opportunities for self-directed and interactive learning.

These results demonstrate that developing music education in the Sultanate of Oman requires a multidimensional intervention encompassing policies, curricula, infrastructure, community, technology, and innovation. This ensures the integration of this type of education with the goals of Oman Vision 2040, which focuses on building a flexible, innovative, and inclusive education system as illustrated in Table 11.

Table 11. Qualitative and Iterative Analysis: Suggestions to Enhance the Role of Musical Skills in Supporting Sustainable Development, Education, and Innovation in the Sultanate of Oman

Theme	Suggestions	Number of frequencies
1 Education	<ul style="list-style-type: none"> <li>➤ Integrating music into curricula and activities.</li> <li>➤ Allocating more class time to discovering talented students.</li> <li>➤ Developing the music activity booklet.</li> <li>➤ Training students to play different instruments.</li> </ul>	26

Theme	Suggestions	Number of frequencies
2 Educational Policies	<ul style="list-style-type: none"> <li>➤ Considering music a core subject.</li> <li>➤ Provide Ministerial support for music subject in schools with low student density.</li> <li>➤ Establishing a music arts section in grades 11 and 12.</li> </ul>	21
3 School Environment	<ul style="list-style-type: none"> <li>➤ Providing well-equipped rooms and halls for music.</li> <li>➤ Providing musical instruments suitable for different age groups.</li> <li>➤ Reducing teachers' workloads to foster a more creative environment.</li> </ul>	17
4 Society	<ul style="list-style-type: none"> <li>➤ Raising parents' awareness of the importance of music.</li> <li>➤ Utilizing music for social inclusion and mental health.</li> <li>➤ Instilling values of citizenship through songs.</li> </ul>	14
5 Innovation	<ul style="list-style-type: none"> <li>➤ Using artificial intelligence in musical composition.</li> <li>➤ Encouraging research projects on the impact of music.</li> <li>➤ Dramatizing the curriculum and linking it to creativity.</li> </ul>	9
6 Modern technologies	<ul style="list-style-type: none"> <li>➤ Developing digital platforms for music education.</li> <li>➤ Utilizing augmented and virtual reality.</li> <li>➤ Introducing software such as GarageBand and FL Studio.</li> </ul>	3

Furthermore, Table 12 shows the most prominent points mentioned in the responses of the sample members regarding "Your suggestions for enhancing the role of musical skills in supporting sustainable development, education, and innovation in the Sultanate of Oman".

Table 12. Qualitative Analysis Responses of the Sample Members Regarding their Suggestions for Enhancing the Role of Musical Skills in Supporting Sustainable Development, Education, and Innovation in the Sultanate of Oman”

Theme	Suggestions
1	Activating the role of music classes and integrating them into all celebrations and events.
2	Reducing teachers' workloads to allow them to focus on student training and talent development.
3	Developing curricula and teaching methods.
4	Placing greater emphasis on practical application and providing dedicated music rooms.
5	Integrating traditional Omani music into the educational curriculum.
6	Providing all necessary materials, such as books and instruments, to facilitate its implementation in schools.

	<b>Theme</b>	<b>Suggestions</b>
1	Educational	including music skills, a mandatory elective subject
2	Policies	Highlighting the importance of music in practical life
1	Innovation	Launching competitions for musical innovation (composition, applications, sound technology)
2		Utilizing modern methods and advanced technology
3		Creating new anthems that foster a sense of belonging and love for the homeland
4		Musical skills are not just an art, but an educational and developmental tool
1	School Environment	Conducting more training workshops to enhance musical skills
2		Providing musical instruments and teaching aids
3		Providing learning process enhancement resources
4		Providing suitable rooms for performing music
1	Society	Continuous encouragement of students by parents regarding the importance of the subject
2		Promoting visits between school music groups
3		Conducting training and community awareness programs highlighting the importance of the subject
4		Promoting music as a cultural bridge between schools and countries
1	Modern technologies	Training and qualifying teachers using digital technologies
2		Employing artificial intelligence and augmented reality applications
3		Conducting courses for teachers using modern music technology

## Recommendations

1. Integrate music skills into the school curriculum to promote holistic education and align it with the Sustainable Development Goals and Oman Vision 2040.
2. Develop school infrastructure by providing well-equipped halls and musical instruments suitable for different grade levels.
3. Develop specialized training programs for teachers to enhance their music teaching skills, while reducing their teaching load to allow more time for talent development.
4. Strengthen institutional and administrative support by making music a required core or elective subject and establishing academic tracks for musical arts in the upper grades.
5. Raise awareness among the community and parents about the importance of music education in supporting students' cognitive, social, and psychological development.

## Suggestions

1. Launch national competitions for musical innovation (composition, research projects, and audio technology applications) to support student creativity.

2. Utilize modern technologies such as artificial intelligence (Mazzone & Elgammal, 2019; Weaver, 2026), Learning analytics (Al-Hafdi & Alhalafawy, 2026; Jia, 2024), augmented reality (Alhalafawy & Zaki, 2024; Cui, 2023; Najmi et al., 2023), gamification (Alsuhami et al., 2026; Alzahrani & Alhalafawy, 2023; Wang, 2023), platforms (Alshammary & Alhalafawy, 2023; Xia et al., 2025), and specialized software in music education.
3. Integrate traditional Omani music into the curriculum to strengthen national identity and connect heritage with modernity.
4. Expand extracurricular activities and school celebrations to include greater musical participation, thereby fostering values of citizenship and belonging.
5. Encourage community and cultural collaboration by organizing joint visits between school music groups and linking them to international initiatives.

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