

A study of the vocabulary and topics of the environment and pollution subject in school curricula and the College of Pharmacy in Iraq

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Abstract. Iraq is one of the countries affected by climate change, which can be combated by enhancing environmental awareness among citizens and school students. On the other hand, since expired and unused medicines have a negative impact on the environment, raising awareness among pharmacy professionals and including environmental curricula in Pharmacy colleges is very important. Therefore, this study aimed to examine the curricula of the primary and secondary levels in terms of whether they include the subject of environment and pollution, and the curricula of the College of Pharmacy, University of Babylon in terms of whether they include the



subject of environment. Science and social studies (for primary stages, from year 1 to 6), chemistry, physics, biology and social studies (for intermediate stages from year 7 to 9), and chemistry, physics and biology (for preparatory stages from year 10 to 12) were chosen, in addition to the Islamic subject, since some Islamic legislations urge the preservation of natural resources and not to waste them. Also, only scientific specialization was relied upon in the preparatory stage (year 11). Pharmacists for Bachelor stages from years 1 to 5 were chosen. The results indicate that the second grade of primary school does not include any curricula related to the environment. As for the first, third and fourth years, there are some topics in the science subject and the science and social studies subject. As for the Islamic subject, there may be a concept related to agriculture and one of the goals of sustainable development in the year 6 of primary school. As for the intermediate stage, year 9 does not have any topics related to the environment and pollution. The first intermediate (year 7) has concepts in biology and social studies, while the second intermediate (year 8) has more extensive or in-depth topics in this field. As for chemistry and physics, there is nothing related to that. The years 11 and 12 do not have topics related to that, while the year 10 is biology only and includes those topics in detail. As for chemistry, physics and Islamic studies, they do not include any of these concepts in the preparatory stage. In terms of College of Pharmacy, Bachelor's stages do not contain the subject of the environment/ecology. In conclusion, an appropriate curriculum will contribute to building students' more sustainable performance and a complete sympathy for the sustainable development in their regions.

Keywords: Curricula, Environment, Pharmacy, Intermediate stages, Vocabulary.

المخلص. يُعد العراق من الدول المتأثرة بتغير المناخ، والذي يمكن مواجهته من خلال تعزيز الوعي البيئي لدى المواطنين وطلاب المدارس ومن جانب آخر لما للادوية المطروحة و المنتهية الصلاحية تأثير سلبي على البيئة، فإن توعية مختصي الصيدلة وتضمين مناهج تخص البيئة في كليات الصيدلة مهم جدا. لذلك، هدفت هذه الدراسة إلى دراسة مناهج المرحلتين الابتدائية والثانوية من حيث هل تضم مادة البيئة والتلوث و مناهج كلية الصيدلة، جامعة بابل من حيث هل تضم مادة البيئة. وقد تم اختيار مواد العلوم والدراسات الاجتماعية



(للمرحلة الابتدائية من الصف الأول إلى الصف السادس)، والكيمياء والفيزياء والأحياء والدراسات الاجتماعية (المرحلة المتوسطة من الصف السابع إلى الصف التاسع)، والكيمياء والفيزياء والأحياء (المرحلة الإعدادية من الصف العاشر إلى الصف الثاني عشر)، بالإضافة إلى مادة التربية الإسلامية، نظراً لحث بعض التشريعات الإسلامية على الحفاظ على الموارد الطبيعية وعدم إهدارها. كما تم الاعتماد على التخصص العلمي فقط في المرحلة الإعدادية (الصف الحادي عشر). تم اختيار الصيادلة لمرحلة البكالوريوس من السنة الأولى إلى السنة الخامسة. وتشير النتائج إلى أن الصف الثاني الابتدائي لا يتضمن أي مناهج تتعلق بالبيئة. أما بالنسبة للسنوات الأولى والثالثة والرابعة، فهناك بعض المواضيع في مادة العلوم ومادة العلوم والدراسات الاجتماعية. أما بالنسبة للمادة الإسلامية، فقد يكون هناك مفهوم يتعلق بالزراعة وأحد أهداف التنمية المستدامة في الصف السادس الابتدائي. أما بالنسبة للمرحلة المتوسطة، فلا تتضمن الصف التاسع أي مواضيع تتعلق بالبيئة والتلوث. تتضمن المرحلة المتوسطة الأولى (الصف السابع) مفاهيم في علم الأحياء والدراسات الاجتماعية، بينما تتضمن المرحلة المتوسطة الثانية (الصف الثامن) مواضيع أكثر شمولاً أو تعمقاً في هذا المجال. أما الكيمياء والفيزياء، فلا يوجد أي شيء يتعلق بذلك. لا تتضمن الصفين الحادي عشر والثاني عشر مواضيع تتعلق بذلك، بينما تقتصر مادة الأحياء في الصف العاشر على هذه المواضيع وتناولها بالتفصيل. أما الكيمياء والفيزياء والدراسات الإسلامية، فلا تتضمن أيًا من هذه المفاهيم في المرحلة الإعدادية. في كلية الصيدلة، لا تتضمن مراحل البكالوريوس مادة البيئة/علم البيئة. ختاماً، سيساهم المنهج الدراسي المناسب في بناء أداء أكثر استدامة لدى الطلاب، وفهمهم الكامل للتنمية المستدامة في مناطقهم.

الكلمات المفتاحية: المناهج، البيئة، المراحل المتوسطة، الصيدلة، المفردات.

Introduction

The problem of pollution and the environment in the world is an important crisis to address. The impact of the environment and pollution on the planet (plant, animal, human, economy, politics) is wide included (Husamah et al., 2024, Hadi et al., 2024). Therefore, the World Health Organization and other studies as well as the United Nations aimed to reduce environmental pollution and promote the concepts of the environment and pollution. As environmental issues increasingly top the global agenda, doubts about people's attitudes and



awareness toward their environment have grown, contributing to these problems (Mumpuni et al., 2025). Recognizing the importance of developing environmental awareness in solving and mitigating environmental problems, the role of environmental education within the framework of sustainability has gained increasing importance (Özdemir, 2022). The most important strategies are to hold workshops, educate citizens, establish research centres that care about the environment and its concepts and address problems (Şeker, 2024). Establish laws that control and prevent environmental pollution. Include environmental and pollution concepts and topics in school and university curricula. Iraq is one of the countries affected by the climate and is part of the United Nations agreement to address environmental pollution and climate change. On the other hand, the expiration and waste of medicines negatively impact the environment, making it important to achieve the fourth goal of the Sustainable Development Goals (SDGs) in the College of Pharmacy. In addition to helping students acquire knowledge and skills related to healthcare, the fourth goal also provides them with awareness of the role and behavior of medicines in the environment (Figure 1). Pharmacists not only perform their role as medication stewards; they can also contribute to environmental protection, as some medicines contain elements that are toxic to humans and are under investigation to prevent their global marketing, such as Zantac (Jebril, 2024). On the other hand, the contribution of throwing drugs that contain antibiotics to the environment may affect the resistance of the flora in the ecosystem and it is recommended to combat that (Mohammed et al., 2025). Therefore, this study aimed to investigate the extent of Iraqi strategies to raise awareness and investigate environmental pollution among primary, intermediate, and preparatory school students for the 2024-2025 academic year, and to examine more relevant content within the College of Pharmacy.



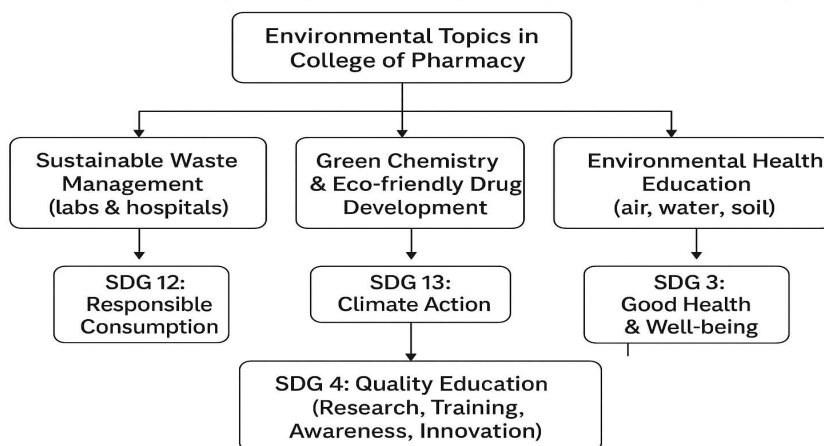


Figure 1. The contributions of environmental topics in College of Pharmacy to SDGs

Methodology

The topics and keywords related to the environment and pollution in the curricula of the primary, intermediate and preparatory stages and in the following textbooks were edited: Science and Social Studies (for primary stages), Chemistry, Physics, Biology and Social Studies (for intermediate stages), Chemistry, Physics and Biology (for preparatory stages) were chosen in addition to the Islamic subject, as some Islamic legislations urge the preservation of natural resources and not to waste them. Also, only the scientific specialization was relied upon in the preparatory stage (from year 11 to 12). These topics are searched for by examining the contents of the book to see if they contain environmental terms, and if they are not found in the list of contents, the pages of the book are searched in its chapters. A table was created to enhance this information. Pharmacists for Bachelor stages from years 1 to 5 were chosen.

Results and Discussion

Environmental and pollution concepts in the primary stage

As we notice from Table 1, we notice that the year 2 of primary school does not include any curricula related to the environment. As for the years 1,3 and 4, there are some topics in the science subject. Environmental concepts are found in the science and social studies subjects. This finding was similar to a recent study, investigated in other countries (Özdemir, 2022). As for the



Islamic subject, there may be a concept related to agriculture and one of the sustainable development goals in the year 6 of primary school.

Table 1. Keywords related to the Environment and Pollution subject for the primary stage

Year	Science	Social	Islam
	Chapter Five Types of Natural Environment		
1	Chapter Six Life in the Natural Environment	Not included	Not included
2	Chapter Eleven Components of the Earth (Land and Water) (Changes in Land)		
	Not included	Not included	Not included
3	Environmental Resources and Problems		
	Conserving Environmental Resources (Rationalizing Consumption, Environmental Pollution, Recycling)	Not included	Not included
4	Environmental Pollution		
	Pollution and its Types		
	Soil Pollution, Water Pollution, Air Pollution, Noise Pollution		
	The Effect of Pollution on Living Organisms	Not included	Not included
	The Role of Plants in Eliminating Pollutants		
5	The Earth and its resources, including two subjects: seas and oceans and the renewable energy	Climate Availability (Climate Elements and Rainfall) Water Resources (Rainwater, Snow, Surface Water, and Groundwater) The Most Important Surface Water Resources in Iraq (Water Problems in Iraq and Water Solutions) Environmental Preservation	Not included
6	The Changing Earth: The Effect of Plate Movement (Continents and Oceans Formed) (Earthquakes, Volcanoes, and Earth's Ring of Fire)	Environmental conservation and protection	Encouragement to cultivate



As for the intermediate level (Table 2), the third intermediate does not contain any topics related to the environment and pollution. The first intermediate contains concepts in biology and sociology, while the second intermediate contains topics that are more elaborate or in-depth in this field. As for chemistry and physics, there is nothing related to that.

Table 2. Keywords related to the Environment and Pollution subject for the intermediate stage.

Year	Science	Social	Islam
1	Chapter Five Types of Natural Environment Chapter Six Life in the Natural Environment Chapter Eleven Components of the Earth (Land and Water) (Changes in Land)	Not included	Not included
2	Not included	Not included	Not included
3	Environmental Resources and Problems Conserving Environmental Resources (Rationalizing Consumption, Environmental Pollution, Recycling)	Not included	Not included
4	Environmental Pollution Pollution and its Types Soil Pollution, Water Pollution, Air Pollution, Noise Pollution The Effect of Pollution on Living Organisms The Role of Plants in Eliminating Pollutants	Not included	Not included
5	The Earth and its resources, including two subjects: seas and oceans and the renewable energy	Climate Availability (Climate Elements and Rainfall) Water Resources (Rainwater, Snow, Surface Water, and Groundwater)	Not included





		The Most Important Surface Water Resources in Iraq (Water Problems in Iraq and Water Solutions)(Environmental Preservation	
6	The Changing Earth: The Effect of Plate Movement (Continents and Oceans Formed) (Earthquakes, Volcanoes, and Earth's Ring of Fire)	Environmental conservation and protection	Encouragement to cultivate

As for the intermediate level (Table 2), the third intermediate does not contain any topics related to the environment and pollution. The first intermediate contains concepts in biology and sociology, while the second intermediate contains topics that are more elaborate or in-depth in this field. As for chemistry and physics, there is nothing related to that.

Table 2. Keywords related to the Environment and Pollution subject for the intermediate stage.

Year	Chemistry	Physics	Biology	Social Studies	Islamic
7	Not included	Not included	War Remnants Biology and Society.	Natural elements that influence the emergence of civilizations (topography, climate, water, fertile soil, trees, rocks, and minerals). Availability of climate and natural resources (water, fertile soil, and building materials).	Not included
8	Not included	Not included	Environmental Problems: Pollution Natural, Human, Global	Not included	Not included



			Warming, Ozone Hole, War Remnants, Acid Rain Conserving. Natural Environmental Resources: Rationalizing Consumption, Reu sing and Recycling, Protecting Biodiversity		
9	Not included	Not included	Not included	Not included	Not included

Therefore, including these standards in textbooks is a legal obligation, and they must be prepared to ensure the quality of students' learning process. However, it has been stated that the function of textbooks is not only to convey information but also to attract students' attention. According to these sources, it has also been stated that the visual dimension precedes the text in textbooks. This indicates the presence of certain visual functions in textbooks, such as decorative, informative, motivational, reflective, and representative functions. Through a study of the literature, it is observed that the decorative and informative aspects of textbooks are more prevalent, and this aspect is prominent in the preparation of textbooks. Therefore, textbooks were examined within the framework of these standards. Accordingly, decorative elements have a purely decorative purpose, not limited to providing information about problem solving. According to some studies (Clark and Lyons, 2010), which highlight the importance of using visual materials as a tool for achieving learning objectives, decorative visual materials are considered aesthetically pleasing and aim to ensure greater motivation. However, the informational function of visualization is that it provides the information necessary to solve a problem. According to studies that have addressed this topic (Elia and Philippou, 2004), the problem-solving process depends on the necessary visual element.





Informational visual materials convey information about a concept or topic by highlighting similarities between them. These types of visual materials help students integrate new information with existing information. One of the most important aspects of informational visuals is making the necessary evaluations, taking into account the explanatory aspect of the text (Araz, 2010). Therefore, the textbooks in our research were examined according to the criteria and standards specified here. The years 11 and 12 do not include any topics related to this, while the year 10 only include the biology subject, which includes these topics in detail. As for the chemistry, physics, and Islamic studies subjects, they do not include any of these concepts in the preparatory stage.

Table 3. Keywords related to the Environment and Pollution subject for the preparatory stage.

Year	Chemistry	Physics	Biology	Islamic
10	Not included	Not included	Environmental Pollution: soil Pollution (chemicals used in agriculture, household and industrial waste, acid rain, heavy metals, air Pollution (combustion of various fuels, gaseous waste, dust, volatile particles, radioactive materials, etc)., water Pollution. Impacts of Industry on the Environment Impacts of Fires on the Environment	Not included
11	Not included	Not included	Not included	Not included
12	Not included	Not included	Not included	Not included

Environmental and ecology subject in the curricula of College of Pharmacy in Bachelor degree

As we notice from Table 4, all stages of College of Pharmacy in Bachelor stages do not contain subjects of environmental and ecology.





Table 4. Environmental and ecology subject in the curricula of College of Pharmacy in Bachelor degree.

Year	Environmental and ecology subject
1	Not included
2	Not included
3	Not included
4	Not included
5	Not included

Successes in this subject can also contribute to developing students' understanding of the environment. Therefore, a good, high-quality conceptual teaching process should be pursued, consistent with students' developmental levels. Appropriate teaching strategies, methods, and techniques should be employed, and attention should be paid to the use of effective materials. Furthermore, students' levels of cognitive development should be taken into account in teaching and learning processes (Balbin et al., 2024). Textbooks should be published in line with concepts related to this subject, and a strategy should be adopted that is consistent with students' developmental levels in terms of teachers' competencies.

The developed curriculum should highlight the biodiversity found in each region of the world. It is best to study the diverse biodiversity through an environmental education curriculum at various levels of education, from primary and secondary school to higher education. An appropriate curriculum will contribute to building students' more environmentally conscious behavior and a comprehensive understanding of the biodiversity in their regions. An appropriate curriculum also plays a vital role in providing environmental education content that aligns with students' needs to develop their thinking and behavior of Pharmacists.

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