Teachers' Perceptions of the Integration of Environmental Awareness and Knowledge in High School Curricula in Morocco

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ABSTRACT: This paper aims to unveil the way teachers perceive the presence and efficiency of environmental education in Moroccan high school curricula. It mainly intends to investigate high school teachers' perceptions of the curriculum integration of environmental education content related to awareness and knowledge. This study used a descriptive quantitative method and the research sample consisted of 132 teachers of 11 different school subjects working in 8 high schools in Agadir city and the suburbs. Data was collected through a questionnaire and was analyzed by descriptive statistics techniques. The results revealed that most teachers agree that the level of integration of content relating to environmental awareness and knowledge in the curricula is moderately low and insufficient to meet the learners' needs. Finally, this study suggests that an organized construct of environmental awareness and knowledge elements should be gradually and systematically introduced throughout the school levels and courses by improving future curricula.

KEYWORDS: Environmental education, awareness, knowledge, teachers, perceptions, Morocco, curriculum analysis

INTRODUCTION

Teachers represent a pivotal element in the educational system in general and more particularly in the process of teaching and learning environmental education (EE). The centrality of teachers' roles in promoting EE in schools has always been emphasized in international conferences and documents (Stockholm Declaration, 1972; the Belgrade Charter, 1975; the Tbilisi Declaration, 1977; Moscow, 1987; *Agenda 21*, 1992). Previous studies in different contexts in the world have suggested that teachers generally lack adequate environmental knowledge and pedagogical training to teach EE (Amirshokoohi, 2010; Groves & Pugh, 1999; McKeown-Ice, 2000; Plevyak et al., 2001; Surmeli, 2013; Teksoz et al., 2010; Yates et al., 2019). Teachers are the agents who are in direct charge of implementing the curricula through the different instructional materials and techniques. They are the ones who have direct contact with students, who epitomize the final goal of all educational procedures. Nothing can replace the teachers' degree of influence on the learning and teaching outcomes and, thus, on students' lives in general.

In the Moroccan context, investigating teachers' views of the curriculum integration of environmental awareness and knowledge is an urgent need to understand the status of EE in schools. According to the world's first intergovernmental conference on EE, which was organized by the United Nations Education, Scientific, and Cultural Organization (UNESCO) in cooperation with the U.N. Environment Program (UNEP) in Tbilisi in 1977, *awareness* is to help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems while *knowledge* is to help social groups and individuals gain experience and understanding of the environment and its associated problems (UNESCO & UNEP, 1978). In Moroccan high schools, there are no teachers specialized in EE per se. EE elements are usually integrated into the textbooks of various school subjects through separate units about environmental issues. The importance of teachers' roles makes them real agents of educational change that should not be overlooked in any study of the status of EE in the curriculum and elsewhere.

This study is driven by the hope that future school curricula would grant more space to content and activities which promote the learners' EE awareness and knowledge. Research in this area can also contribute to the development of insights that would improve the quality of future educational reforms. It is evident that changing the learners' environmental attitudes and behaviors is the most important part of the process of EE, but the elements of awareness and knowledge remain fundamental in this process. Previous research suggests that students' EE awareness and knowledge levels might influence their attitudes and behaviors towards the environment (Hausbeck et al., 1992; Loubser et al., 1998; Swanepoel et al., 2001; Toili 2007). Accordingly, curriculum integration of elements and contents that promote students' EE awareness and knowledge is a pathway to raising their positive attitudes and concern towards the environmental issues in their communities and the world.

In this respect, this study seeks to investigate the teachers' perceptions of the level of integration of EE components related to students' environmental knowledge and awareness in the high school curricula in Morocco. It aims to seek three main objectives. First, it aims to identify the degree to which these curricula provide contents that promote students' EE knowledge and awareness

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through definitions of the environment and other related concepts. Second, this study also seeks to examine the extent to which the curricula include materials that enhance students' awareness and knowledge about the human relationship with the environment and how it affects the environmental balance. The third objective of this study is to explore teachers' perception of the extent to which high school curricula present activities that boost students' EE awareness and knowledge about different types of pollution. Eventually, this paper is set out to answer three basic research questions:

1. According to teachers, to what extent do high school curricula integrate EE contents related to definitions of environmental concepts?

2. According to teachers, to what extent do high school curricula integrate EE contents related to human relationships to the environment and its effect on the environmental balance?

3. According to teachers, to what extent do high school curricula integrate EE contents related to types of pollution and their effects on the environment?

Like any change that we seek to make in the field of education, the improvement of the place of EE in the curriculum necessitates scrupulous planning without ignoring the importance of the pre-service and in-service training of the teachers – the most decisive agents of change. Almeida (2015) discusses the issue of the curriculum in relation to the reforms and new policies in the field of EE in India. She investigates the teacher trainers' views and perceptions of the significance of the official guidelines as well as sources and their impact on the teachers' professional development as far as the implementation of EE is concerned. The study pinpoints the challenges and obstacles that teachers face while putting the new changes into action and the techniques and strategies they utilize to overcome these difficulties. The participants in Almeida's study also enumerate the different areas where they need more professional development to be efficient practitioners of EE in their contexts. Reading the results of this multi-dimensional study shows that most teacher trainers blame the misfunction of EE in the school curriculum principally on time pressure, insufficient educational expertise, inadequate resources, and issues associated with the bureaucracy (Almeida, 2015, p. 162). As a result, Almeida concludes that the teacher trainers' practices in EE have slightly changed or remained the same even after the adoption of the new official state policies.

The discrepancy between theory and practice in the field of EE persists in being a prevalent problem in almost all contexts around the world. Edwards (2016) resonates with Almeida's (2015) findings which advocate the idea that change is not always easy to implement. Edwards (2016) claims that teaching practices are very slow to change and are usually reluctant to cope with the ongoing evolution of theories that emanate primarily from outside schools and educational institutions. This resistance to change finds its substance in the way teachers are trained and how they perceive their roles, in addition, naturally, to the complexity of the educational administrative structures and the prevailing bureaucracy in the domain. Edwards (2016) holds that the gap between EE theory and reality persist in Australian schools since the beginning of EE during the 1970s (p.33). It is evident, then, that the phenomenon of rhetoric/reality gap is limited neither in time nor in space. This prevailing situation and the persistence of the 'rhetoric/reality gap' call for environmental educators and educational institutions to adjust and reconstruct their pedagogical practices that have become an obstacle to achieving EE goals for sustainable development.

METHODOLOGY

This study adopts a descriptive quantitative research design. To collect data, this study used a questionnaire to check whether the curriculum includes elements of environmental awareness and knowledge that high school students are supposed to know. The questionnaire comprises thirty-three 5-Likert scale items that target the development of students' conceptual and factual environmental knowledge and awareness. The aim is to test how far the Moroccan high school curricula provide students with ample opportunities to know and be aware of EE issues, problems, and challenges in their country and the world. The questionnaire's items were grouped thematically to facilitate the data analysis task.

To avoid linguistic difficulties for the participants, this questionnaire was translated into Arabic by the researcher himself. It was distributed electronically via Google forms and the results were processed in SPSS data analysis software. The teachers were asked to answer the items by rating the intensity of the existence of EE awareness and knowledge contents in the school curricula as either 'very poor', 'poor', 'fair', 'good', or 'excellent'. The questionnaire was test-piloted by twelve teachers of different school subjects. Their most relevant suggestions were taken into consideration while constructing the final version of the questionnaire. For the content, the researcher worked on editing the wording and structure of some items to avoid ambiguity and misinterpretation. Moreover, other items were completely replaced by more useful ones. The questionnaire was, hence, tested valid in terms of face, content, and construct. The questionnaire's reliability level was tested using Cronbach's alpha coefficient in SPSS statistics software. The test score of 0.989 confirms that the questionnaire is highly reliable and can yield sound and trustworthy results.

The research sample consists of 132 teachers of 11 different school subjects working in 8 high schools in Agadir city and the suburbs. This number was relatively representative of the high school teachers' community in Agadir. The participants work in both public and private schools and teach different school subjects. Both genders were represented in the chosen sample. The fact that the male teachers constitute ¾ of the research sample is random and can essentially be attributed to the structure of the human resources in

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the chosen high schools. The participants' academic training varies from Baccalaureate, BA, MA to Ph.D. holders, but the research sample is mostly dominated by BA and MA graduates.

RESULTS
This study aims to detail the teachers' perceptions of the level of integration of EE components related to students' environmental knowledge and awareness in the high school curricula in Morocco. For a meaningful interpretation, the questionnaire's items are analyzed separately and sometimes together in groups of 3 or 4 items when they happen to tackle the same topic. This analysis provides insights into the way teachers evaluate and perceive the official curricula they are implementing in their classes, especially in terms of EE promotion among the learners.

It is obvious from the three tables (Table 1,

Table , &

Table) that 46,2% of the participants think that Moroccan high school curricula fairly include definitions of the environment while 32,6% rate this item as 'poor' or 'very poor' and 21,2% rate it as good or excellent. As for the existence of the definitions of renewable natural resources, such as air, water, solar energy in the high school curricula, 45,5% of the participants believe that it is 'poor' or 'very poor' and 37,1% rate it as being 'fair' while only 17,4% think it is 'good' or 'excellent'. Concerning the presence of the definitions of non-renewable natural resources such as petroleum, natural gas, coal, minerals in the curricula, most of the participants (57,6%) rank it as being either 'poor' or 'very poor' and 31,1% rank it as 'fair' while merely 11,4% think it is 'good' or 'excellent'.

From other statistics, the teachers' perceptions have a high level of agreement that Moroccan high school curricula include fair amounts of information related to the definitions of the environment (Mean = 2,82; Mode = 3; SD= 0,995) and the definitions of renewable natural resources, such as air, water, and solar energy (Mean = 2,55; Mode= 3; SD= 1,066). As for the definitions of non-renewable natural resources such as petroleum, natural gas, coal, and minerals, most participants' perceptions tend to lean towards viewing this item as being lower than 'fair' with a total Mean of 2,27 and a Standard Deviation of 1,049. A general reading of these results indicates that the participants think that the programs they oversee implementing provide just fair (and sometimes insufficient) coverage of these definitions. In other words, the participants judge the curriculum content related to these definitions as being moderately present in the curricula.

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Table 1. The Definitions of Environment

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	15	11,4			
Poor	28	21,2			
Fair	61	46,2	3	2,82	0,995
Good	22	16,7			
Excellent	6	4,5			
Total	132	100,0			

Table 2. The Definitions of Renewable Natural Resources Like Air, Water, Solar Energy

	Frequency	Percent	Mode	Mean	Standard Deviation
Very Poor	27	20,5			
Poor	33	25,0			
Fair	49	37,1	3	2,55	1,066
Good	19	14,4			
Excellent	4	3,0			
Total	132	100,0			

Table 3. The Definitions of Non-renewable Natural Resources Like Petroleum, Natural Gas, Coal, and Minerals

	Frequency	Percent	Mode	Mean	Standard Deviation
Very Poor	38	28,8			
Poor	38	28,8			
Fair	41	31,1	3	2,27	1,049
Good	12	9,1			
Excellent	3	2,3			
Total	132	100,0			

The results in Table show the teachers' perceptions of the curriculum's efficiency in linking the course content with the principles and values that call for environmental protection. In this regard, 36,4% of the participants think that the connection between the course they teach and the values that advocate environment protection is 'fair' while 18,2% think it is 'good' and 10,6 see it as 'excellent'. In the meanwhile, the percentages of those who think that this connection is 'poor' and 'very poor' range from 21,2% to 13,6%. The most frequent response for this questionnaire's item is 'fair' as demonstrated in the Mode 3. The mean 2,91 (SD= 1,169) clearly shows that most of the participants believe that the degree of connection between the course content and environmental protection principles and values is fairly moderate in the curricula.

Table 4. Linking the Course Content with the Principles and Values that Call for Environmental Protection

	Frequency	Percent	Mode	Mean	Standard Deviation
Very Poor	18	13,6			
Poor	28	21,2			
Fair	48	36,4	3	2,91	1,169
Good	24	18,2			
Excellent	14	10,6			
Total	132	100,0			

Table demonstrates the statistical results of the teachers' perceptions of the extent to which the high school curricula provide students with opportunities of studying the role played by the cycle of some materials such as water and carbon in establishing the physiochemical balance in the natural environment. Most of the participants think that this issue is treated in a 'poor' (22%) or 'very poor' way (33,3%) which makes a total of 55,3%. However, 31,1% of the participants think that the way the curriculum tackles this issue is 'fair' while 11,4% think it is 'good' and only 2,3% think it is 'excellent' (a total of 13,7% of the participants). The Mode 1 indicates that the tendency of the participants' perceptions is seemingly bound to rate this issue of the questionnaire's item using the lowest negative value. The Mean 2,27 confirms that most participants do not think that the high school curriculum provides students with opportunities of studying the role played by the cycle of some materials such as water and carbon in establishing the physiochemical balance in the natural environment.

Table 5. Studying the Role Played by the Cycle of Water and Carbon in Establishing the Physiochemical Balance in the Natural Environment

	Frequency	Percent	Mode	Mean	Standard Deviation
Very Poor	44	33,3			
Poor	29	22,0			
Fair	41	31,1	1	2,27	1,113
Good	15	11,4			
Excellent	3	2,3			
Total	132	100,0			

The statistical results in Table reveal the teachers' perceptions of the capacity of the curricula they oversee implementing to study the human activities that disturb the balance of the environment, such as overgrazing, excessive fertilization, and logging. In this respect, 34,1% of the participants believe that the state of this element is 'fair' while 12,9% think it is 'good' and 4,5% deem it 'excellent'. Meanwhile, 30,3% judge it as 'poor' and 18,2% 'very poor'. That is to say, the tendency of the participants' perceptions oscillates towards evaluating the integration of this issue in Moroccan high school curricula as being between insufficient (48,5%) to fair (34,1%). The mean 2,55 confirms this interpretation with a noticed mode of 3 and a SD of 1,072.

Table 6. Studying the Human Activities that Disturb the Balance of the Environment

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	24	18,2			
Poor	40	30,3			
Fair	45	34,1	3	2,55	1,072
Good	17	12,9			
Excellent	6	4,5			
Total	132	100,0			

These statistics in Table disclose the teachers' perceptions of the degree to which the curriculum allows learning/teaching activities relating to the positive and negative effects of technology on the environment. On the one hand, the general tendency of the participants' answers fluctuates from 'poor' (28,8%) to 'very poor' (17,4%) making a negative total of 46,2% of the participants' perceptions regarding this questionnaire's item. On the other hand, only a total of 18,1% of the participants hold positive perceptions towards this item as just 13,6% rate this situation as being 'good' and 4,5% rate it as being 'excellent'. The remaining portion of the participants rank the item as being 'fair' with a percentage of 35,6%. The noticed Mean 2,59 (Mode= 3; SD= 1,070) obviously indicates a modest level of integration of the positive and negative effects of technology on the environment in the high school curricula from the teachers' viewpoint.

Table 7. The Positive and Negative Effects of Technology on the Environment

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	23	17,4			
Poor	38	28,8			
Fair	47	35,6	3	2,59	1,070
Good	18	13,6			
Excellent	6	4,5			
Total	132	100,0			

These statistics in Table demonstrate the teachers' perceptions of the degree of presence of the major environmental issues in Morocco in the high school curricula. In this regard, 58,3% of the participants rate the presence of these issues as 'poor' or 'very poor'. However, 32,6% of the participants think it is 'fair' while only 9,1% view it as being 'good' or 'excellent'. Although the noticed Mode is 3, the Mean 2,24 (SD= 0,997) reveals that the participants' perceptions tend to be generally negative and lower than the average. In other words, the major environmental issues are not adequately represented in the high school curricula as the teachers aspire.

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Table 8. The Major Environmental Issues in Morocco

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	37	28,0			
Poor	40	30,3			
Fair	43	32,6	3	2,24	0,997
Good	10	7,6			
Excellent	2	1,5			
Total	132	100,0			

Table displays the statistical results relating to the teachers' perceptions of the degree of presence of the topic of future anticipated problems and their effects in the high school curricula. 34,8% of the participants think that this presence is 'fair' and solely 11,4% rate it as either 'good' or 'excellent'. Conversely, a total of 53,8% of the participants rank the existence of the anticipation of future environmental problems and their effects as being 'poor' (25%) and 'very poor' (28,8%). These results confirm that the participants consider the existence of the issue of this questionnaire's item as being lower than the average with a total mean of 2,31 and SD= 1,057.

Table 9. Future Anticipated Environmental Problems and their Effects

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	38	28,8			
Poor	33	25,0			
Fair	46	34,8	3	2,31	1,057
Good	12	9,1			
Excellent	3	2,3			
Total	132	100,0			

Table indicates the teachers' perceptions of the degree of existence of the theme of people's misconceptions about the environment in Moroccan high school curricula. It is obvious that most of the participants tend to think that the existence of this topic is 'very poor' (31,1%) or 'poor' (28%) with a total negative percentage of 59,1%. The rest of the participants' perceptions are apportioned from 29,5% who rate it 'fair' and only 11,3% who rate it either 'good' (6,8%) or 'excellent' (4,5%). It is crystal clear from the figures that most of the participants tend to view the existence of the topic of people's misconceptions about the environment in the high school curricula as being very limited and lower than expected. The noticed Mode 1 and relatively low Mean 2,26 (SD= 1,109) strongly assert this conclusion.

Table 10 People's Misconceptions about the Environment

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	41	31,1			
Poor	37	28,0			
Fair	39	29,5	1	2,26	1,109
Good	9	6,8			
Excellent	6	4,5			
Total	132	100,0			

Table shows the statistical results of the teachers' perceptions of the level of presence of the rules determining the individual's relationship with the environment in the Qur'an and Sunnah in high school curricula in Morocco. The participants' answers to this question appear to evaluate this presence as being 'very poor' (38,6%) and 'poor' (19,7%) which make 58,3% of the participants' perceptions appear negative to a great extent. In the meantime, 30,3% of the teachers think that the presence of this theme is 'fair' while 19,0% think it is 'good' (7,6%) or 'excellent' (11,4%). These figures clearly demonstrate the negative tendency teachers hold regarding the existence of the rules determining the individual's relationship with the environment in the Qur'an and Sunnah in Moroccan high school curricula. The statistical results of this item confirm our first reading since the noticed Mode is 1 and the Mean does not exceed 2,33 (SD= 1,357) which is below the average.

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Table 11. The Rules Determining the Individual's Relationship with the Environment in the Qur'an and Sunnah

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	51	38,6			
Poor	26	19,7			
Fair	30	22,7	1	2,33	1,357
Good	10	7,6			
Excellent	15	11,4			
Total	132	100,0			

The three tables (

 Table , Table , &

Table) demonstrate the statistical results of the teachers' perceptions of the degree to which Moroccan high school curricula incorporate the water as an ecosystem in addition to the causes and effects of water pollution. The first table shows that most participants (51,5%) believe that presence of the topic of water as an ecosystem is 'poor' to 'very poor' compared to 28% who rank it as 'fair' or 10,6 who rank it 'good' to 'excellent'. The noticed Mean 2,19 (Mode= 1; SD= 1,120) assures the negative perceptions of the participants regarding the topic of studying water as an ecosystem in the high school curricula. The second and third tables demonstrate that most of the participants tend to hold negative views regarding the inclusion of the causes of water pollution (53,8%) and the consequences of water pollution (51,5%) in the high school curricula. Obviously, the means noticed in these tables confirm that content related to the causes of water pollution (M= 2,55; Mode= 2; SD= 1,155) and consequences of water pollution (M= 2,48; Mode= 3; SD= 1,201) is generally modest or almost moderate from the teachers' viewpoints.

Table 12 Studying Water as an Ecosystem

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	48	36,4			
Poor	30	22,7			
Fair	40	30,3	1	2,19	1,120
Good	9	6,8			
Excellent	5	3,8			
Total	132	100,0			

Table 13. Causes of Water Pollution

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	26	19,7			
Poor	45	34,1			
Fair	32	24,2	2	2,55	1,155
Good	21	15,9			
Excellent	8	6,1			
Total	132	100,0			

Table 14. Consequences of Water Pollution

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	35	26,5			
Poor	33	25,0			
Fair	37	28,0	3	2,48	1,201
Good	19	14,4			
Excellent	8	6,1			
Total	132	100,0			

The statistical results displayed in the tables (

Table , Table , & Table) indicate the teachers' perceptions of the extent to which the high school curricula include elements relating to the causes and consequences of air pollution as well as to the best way to protect the air from pollution. Concerning the presence

of the causes of air pollution in the curricula, 27,3% of the participants rate it 'fair', 48,5% view it as being 'poor' or 'very poor', whereas only 24,3% rated it 'good' or 'excellent'. The noticed Mean of 2,61 (Mode= 3; SD= 1,215) sounds to represent a relatively moderate ranking of the inclusion of this item in the curricula according to the teachers' views. Regarding the existence of the consequences of air pollution in the curricula, the teachers' tendency seems to be like the one they hold towards the previous element (causes of air pollution) since the noticed Mean does not exceed the moderate average of 2,64 (Mode= 3; SD= 1,225). The descriptive figures in Table entail that a significant proportion of the participants (46,2%) rate this item as being 'poor' or 'very poor'. In the same way, 28,8% of the participants regard the item as 'fair' while only 25% hold positive views of the inclusion of this element in the curricula.

Table displays the degree to which the participants see the topic of "the best way to protect the air from pollution" is integrated into the curricula. In this regard, 56,9% of the participants consider the existence of this issue as being 'poor' or 'very poor'. 27,3% regard it as 'fair' and only 15,9% rated it 'good' or 'excellent'. The general propensity of the teachers' perceptions appears to lean towards viewing content related to the best way to protect the air from pollution as being timidly implemented in the curricula's components as the noticed Mode is 2 and the Mean 2,38 (SD= 1,122) is below the average.

Table 15. Causes of Air Pollution

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	29	22,0			
Poor	35	26,5			
Fair	36	27,3	3	2,61	1,215
Good	22	16,7			
Excellent	10	7,6			
Total	132	100,0			

Table 16. Consequences of Air Pollution

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	30	22,7			
Poor	31	23,5			
Fair	38	28,8	3	2,64	1,225
Good	23	17,4			
Excellent	10	7,6			
Total	132	100,0			

Table 17. The Best Way to Protect the Air from Pollution

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	34	25,8			
Poor	41	31,1			
Fair	36	27,3	2	2,38	1,122
Good	15	11,4			
Excellent	6	4,5			
Total	132	100,0			

The two tables (
Table &
Table) show the statistical results related to the teachers' perceptions of the extent to which the high school curricula incorporate educational content concerned with the study of the causes and consequences of food contamination. As the tables demonstrate, a high majority of the participants consider the inclusion of elements related to the causes of food contamination (64,4%) and its consequences (65,2%) 'poor' or 'very poor'. Only 28% and 27,3% consecutively regard the presence of both topics 'fair' while merely 7,6% rate them 'good' or 'excellent' in both tables. So, these figures obviously show that the participants deny the sufficiency of content tackling these issues in the curricula. This fact is consolidated by the noticed Mode 1 and Means which rest at 2,09 (SD= 1,030) and 2,05 (SD= 1,025) respectively for both the causes and consequences of food contamination in the curricula from the teachers' standpoints.

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Table 18. Causes of Food Contamination

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	48	36,4			
Poor	37	28,0			
Fair	37	28,0	1	2,09	1,030
Good	7	5,3			
Excellent	3	2,3			
Total	132	100,0			

Table 19. Consequences of Food Contamination

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	52	39,4			
Poor	34	25,8			
Fair	36	27,3	1	2,05	1,025
Good	8	6,1			
Excellent	2	1,5			
Total	132	100,0			

The statistical results in Table are related to the teachers' perceptions of the inclusion of studying the desert as an ecosystem in the high school curricula in Morocco. It is evident that the great majority of the participants (73,5%) believe that this issue is poorly incorporated in the curricula. Table also shows that only 22% think it is fairly represented while merely 4,5% rate it 'good' or 'excellent'. That is to say, the teachers are not at all satisfied with the way the desert as an ecosystem is represented in the high school curricula. The noticed Mode 1 and Mean 1,87 (SD= 1,007) statistically confirm this conclusion.

Table 20 Studying The Desert as an Ecosystem

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	62	47,0			
Poor	35	26,5			
Fair	29	22,0	1	1,87	1,007
Good	2	1,5			
Excellent	4	3,0			
Total	132	100,0			

The three tables (Table ,
Table , &
Table) demonstrate the statistical results of the teachers' perceptions of the existence of the issue of soil pollution including its causes, consequences and the best way to avoid it. The three tables show that the participants' answers to the questionnaire's items are similar and almost identical. Most of the participants (62,1%; 59,8% and 62,9%) hold negative perceptions regarding the implementation of the causes and consequences of soil pollution as well as the best ways to protect the soil from pollution in the curricula. Moreover, a small proportion of participants reacted to the items by rating them 'fair' in close percentages ranging from 22,7% to 28%. Otherwise, only 12,1% for both the causes and consequences of soil pollution and 14,4% for the best way to protect the soil rank the items 'good' or 'excellent'. Meanwhile, the noticed Mode 1 in all tables, and Means which slightly vary from 2,21 to 2,24 (SD between 1,185 and 1,205) reveal that the general tendency of the participants' perceptions leans towards affirming a weak presence of educational content related to the causes and consequences of soil pollution as well as the best way to protect the soil in the Moroccan high school curricula.

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Table 21. Causes of Soil Pollution

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	47	35,6			
Poor	35	26,5			
Fair	34	25,8	1	2,21	1,185
Good	7	5,3			
Excellent	9	6,8			
Total	132	100,0			

Table 22. Consequences of Soil Pollution

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	47	35,6			
Poor	32	24,2			
Fair	37	28,0	1	2,24	1,205
Good	6	4,5			
Excellent	10	7,6			
Total	132	100,0			

Table 23. The Best Way to Protect the Soil from Pollution

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	45	34,1			
Poor	38	28,8			
Fair	30	22,7	1	2,24	1,199
Good	10	7,6			
Excellent	9	6,8			
Total	132	100,0			

The three tables (Table ,
Table , &
Table) demonstrate the statistical results of the teachers' perceptions of the extent to which content relating to the topics of the negative factors affecting the plants, the consequences of the negative impacts on the plants and the best way to protect the plants is integrated in Moroccan high school curricula. As shown in the statistics presented in these tables, many of the participants (65,9%; 62,1% and 62,9%) respond negatively by either 'poor' or 'very poor' to the questionnaires' items concerned here. Other participants rate the same items as 'fair' with close percentages that range from 24,2% to 26,5% while fewer participants opt for 'good' or 'excellent' to rate the three items with total percentages that go from 9,8% to 12,1%. These results reveal that the teachers are totally dissatisfied with the quantity of curricula components related to these three topics of soil pollution. That said, the statistics also confirm the same conclusion since the noticed Mode go from 1 to 2 with low Means which vary from 2,16 to 2,23 at best (SD between 1,104 and 1,126).

Table 24. Negative Factors Affecting the Plants

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	44	33,3			
Poor	43	32,6			
Fair	32	24,2	1	2,16	1,104
Good	6	4,5			
Excellent	7	5,3			
Total	132	100,0			

Table 25.Consequences of Negative Impacts on the Plants

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	44	33,3			
Poor	38	28,8			
Fair	34	25,8	1	2,21	1,126
Good	10	7,6			
Excellent	6	4,5			
Total	132	100,0			

Table 26. The Best Way to Protect the Plants

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	40	30,3			
Poor	43	32,6			
Fair	35	26,5	2	2,23	1,118
Good	6	4,5			
Excellent	8	6,1			
Total	132	100,0			

The three tables (

 Table, **Error! Reference source not found.**, and
Table) present the statistical results of the teachers' perceptions of the degree to which the high school curricula in Morocco include educational contents relating to the topics of the causes and consequences of the fauna decrease and the best way to protect fauna from extinction. Obviously, most participants (65,9%, 66% and 65,9% respectively) rate the curricula inclusion of these three topics as 'poor' or 'very poor'. Other participants rate the same items as 'fair' with similar percentages ranging from 24,2% to 27,3% while only few participants (9,1%, 9,9% and 6,8% respectively) rate them as being 'good' or 'excellent'. These results are reassured with the reoccurring Mode 1 throughout all the three tables and the low Means which vary from 2,03 to 2,09 at best (SD between 1,077 and 1,109). Therefore, we can conclude that most of the teachers perceive the inclusion of content related to the causes and consequences of fauna decrease as well as the best way to protect it from extinction in the high school curricula remain below their expectations.

Table 27. Causes of the Fauna Decrease

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	50	37,9			
Poor	37	28,0			
Fair	33	25,0	1	2,09	1,087
Good	7	5,3			
Excellent	5	3,8			
Total	132	100,0			

Table 28. Consequences of the Fauna Decrease

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	53	40,2			
Poor	34	25,8			
Fair	32	24,2	1	2,08	1,109
Good	8	6,1			
Excellent	5	3,8			
Total	132	100,0			

Table 29. The Best Way to Protect Fauna from Extinction

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	55	41,7			
Poor	32	24,2			
Fair	36	27,3	1	2,03	1,077
Good	4	3,0			
Excellent	5	3,8			
Total	132	100,0			

The perceptions of teachers regarding the implementation of educational content related to natural resources in general are presented in the four tables below.

Table shows that most of the participants (52,2%) regard the inclusion of causes of depletion of natural resources as being 'poor' or 'very poor'. Also, 31,8% of the participants rate this item as 'fair' while merely 15,9% consider it 'good' or 'excellent'. In a similar manner, the noticed Mode 3 and Mean 2,44 (SD= 1,114) imply an almost moderate level of integration of this issue in the curricula from the teachers' perspective.

As far as the educational content related to the impact of human consumption habits on natural resources and the effect of using technology on natural resources are concerned (see Table &

Table), the majority of the participants (54,5% and 55,3% respectively) rate the two items as 'poor' or 'very poor'. Besides, the percentages of the participants who rate the items 'fair' reach 29,5% and 32,6% respectively; whereas only 15,9% and 12,3% of the participants judge the topics represented as 'good' or 'excellent'. Likewise, the noticed Mode rests at 1 in both items and the Means are 2,36 (SD= 1,180) and 2,27 (SD= 1,132) respectively. All these figures suggest that the teachers' ratings of the presence of content related to the impact of human consumption habits on natural resources and the effect of using technology on natural resources in Moroccan high school curricula are indicative of a huge lack and shortage of these elements in the curricula.

Table reveals the teachers' perceptions of the degree to which the high school curricula in Morocco provide the learners with elements related to the best way to use natural resources. The results indicate that most of the participants (53%) rate this item as being 'poor' or 'very poor'. A considerable proportion (31,1%) of the remaining participants view the presence of this topic in the curricula as 'fair' whilst just 15,9% rank that this presence as 'good' or 'excellent'. The noticed Mode 3 and the Mean 2,44 (SD= 1,148) is yet suggestive of an almost moderate level of the teachers' satisfaction regarding the integration of the topic of 'the best way to use natural resources' in the curricula.

Table 30.Causes of Depletion of Natural Resources

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	32	24,2			
Poor	37	28,0			
Fair	42	31,8	3	2,44	1,114
Good	15	11,4			
Excellent	6	4,5			
Total	132	100,0			

Teachers' Perceptions of the Integration of Environmental Awareness and Knowledge in High School Curricula in Morocco

Table 31. The Impact of Human Consumption Habits on Natural Resources

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	41	31,1			
Poor	31	23,5			
Fair	39	29,5	1	2,36	1,180
Good	14	10,6			
Excellent	7	5,3			
Total	132	100,0			

Table 32.The Effect of Using Technology on Natural Resources

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	45	34,1			
Poor	28	21,2			
Fair	43	32,6	1	2,27	1,132
Good	11	8,3			
Excellent	5	3,8			
Total	132	100,0			

Table 33. The Best Way to Use Natural Resources

	Frequency	Percent	Mode	Mean	Standard deviation
Very Poor	33	25,0			
Poor	37	28,0			
Fair	41	31,1	3	2,44	1,148
Good	13	9,8			
Excellent	8	6,1			
Total	132	100,0			

To conclude, this study aims to uncover the teachers' perceptions of the inclusion or integration of EE components related to the promotion of the learners' environmental awareness and knowledge in high school curricula in Morocco. The general examination of the statistical results detailed earlier allows us to claim that a considerable proportion of the participants seem to agree that the level of incorporation of content relating to environmental knowledge in the curricula most of the time fluctuates between 'fair' and 'poor'. The following table sums up the results by providing the general statistics of the 33 items constituting the questionnaire:

Table 34. General Statistics of Teachers' Perceptions of the Inclusion of Knowledge Components in the High School Curricula (Section 1 of the Teachers' Questionnaire

N	Valid		132
			0
Mean			2.33
Median			2.29
Mode			1
Std. Deviation			.908

DISCUSSION

The main aim of this study is concerned with examining teachers' evaluation of the extent to which elements of environmental knowledge and awareness are integrated into Moroccan high school curricula. These elements represent basic tenets in the process of EE (Otto et al. 2016) because, at the end of the day, students' environmental attitudes and behaviors could not be improved without knowledge and awareness. Therefore, the questionnaire sought to assess the existence of definitions of environment and other EE concepts like renewable and non-renewable natural resources. The statistical results indicated that teachers think that the curricula provide only fair or insufficient integration of these definitions. Since definitions are essential for concept formation and comprehension, their shortage and scarcity at this stage of instruction may represent a real handicap for the development of the students' EE knowledge and, hence, their awareness. Furthermore, Agenda 21, a UN seminal document issued after the Rio conference in 1992, prioritized the integration of EE in the curriculum of primary and secondary schools to increase public awareness and knowledge concerning the alarming environmental issues (Agenda 21, p. 117). In this regard, more consideration should be

given to the definitions of EE concepts while designing Moroccan high school textbooks and other instructional materials in the future.

In the same way, the growing threat of environmental problems and human activities that disturb the balance of the environment (e.g., overgrazing, excessive fertilization, and logging) necessitates massive and well-structured curricular activities. Integrating these activities can enrich the learners' EE knowledge and enable them to recognize present environmental challenges and contribute to solving them. However, teachers in this study evaluate the level of presence of content related to environmental protection in the curricula as being moderate and cannot respond to the exigent knowledge needs of the learners at this stage. Meanwhile, teachers think that the curricula provide students with relatively sufficient opportunities to study the cycle of some materials (e.g., water and carbon) and how these materials contribute to establishing the physiochemical balance in the natural environment. This type of information, albeit specific, is essential for equipping the learners with the necessary details to be at grips with the real invisible causes of environmental imbalance. Technology is another factor with a direct or indirect effect on the environment. According to the research results, teachers seem to be split in their evaluation of the degree of curriculum integration of technology's positive and negative effects on the environment. However, the general tendency indicates a modest level of integration of this EE element. This tendency implies the curriculum designers' and textbook writers' inaccurate estimation of the dangers that technology can cause to environmental degradation and the use of natural resources.

The same pitfall is also noticed in the way major environmental issues in Morocco are represented in the curricula. Teachers' perceptions reveal that these issues are not allotted sufficient consideration in high school. In this respect, all official documents, including the National Charter for Education and Training (1999), the Emergency Plan (2009), and the Strategic Vision of Reform 2015-2030 (2015), called for fostering the learners' EE knowledge, attitudes, and skills but the curricula are still reticent to apply these recommendations with the required vigor and continuity. When the curricula fail to adequately represent local environmental issues and enable the students with the necessary skills to deal with them, it is evident that the global issues receive even less attention. If the teachers perceive the deficiency of Moroccan environmental issues in the school programs, as is the case here, they will most likely shift their interest and effort to other more abundantly represented issues. For example, the Sahara, a geographical space for living and an important ecosystem, represents a considerable proportion of the Moroccan territory. Nevertheless, the teachers expressed their dissatisfaction with the way the desert as an ecosystem is represented in high school curricula (this questionnaire item scored Mode 1, Mean 1,87, and SD= 1,007).
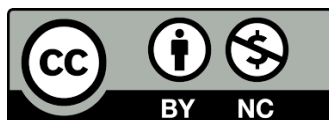
This study also targeted the assessment of teachers' perceptions of the high school curriculum of other EE topics such as pollution, cycles and ecosystems, biodiversity, and the use of natural resources. A set of items in the teachers' questionnaire were destined to gauge the degree of presence of such EE knowledge topics in the curricula, and the quantitative results (Mode 1, Mean 2,33, and SD= 0,908) demonstrated that the majority of teachers/participants agree on rating these items either 'fair' or 'poor.' EE components of knowledge are, hence, not adequately included in Moroccan high school curricula. As an initial step in the process of EE, the centrality of knowledge necessitates thoughtful planning and careful selection of contents relevant to each school subject and level/grade. EE knowledge is fundamental to raising students' awareness, fostering attitudes, and enhancing their skills and behaviors. EE goals could not be achieved unless an organized construct of environmental knowledge elements is gradually and systematically introduced throughout the school levels and courses.

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