

Article

# Environmental Citizenship Questionnaire (ECQ): The Development and Validation of an Evaluation Instrument for Secondary School Students

Andreas Ch. Hadjichambis <sup>1,2,\*</sup> and Demetra Paraskeva-Hadjichambi <sup>1,2</sup>

<sup>1</sup> Cyprus Centre for Environmental Research and Education, CYCERE, 3304 Lemesos, Cyprus

<sup>2</sup> Cyprus Ministry of Education and Culture, 1434 Nicosia, Cyprus; demhad@ucy.ac.cy

\* Correspondence: a.chadjichambi@cytanet.com.cy; Tel.: +357-99477309

Received: 23 December 2019; Accepted: 20 January 2020; Published: 22 January 2020

**Abstract:** Environmental citizenship is very important in sustainability research. The criticality of the observed environmental crisis requires capable and competent environmental citizens who can act as agents of change to achieve sustainability. This research presents the validation of the Environmental Citizenship Questionnaire (ECQ) for assessing the environmental citizenship of secondary school students. To this end, Principal Component Analysis has been performed through the use of a Confirmatory Factor Analysis. In addition, there has been a verification of sphericity and a measure of sampling adequacy using the Bartlett's and Kaiser–Meyer–Olkin (KMO) tests, respectively. Cronbach's Alpha, eigenvalues and percentage of variance as well as Pearson's correlation were also estimated. Using the data of 520 students in 10<sup>th</sup> grade, the ECQ showed very good results in all measurements performed, demonstrating high internal consistency, reliability and discriminant validity. From the factor analysis were derived nine factors with 76 items in total. Cronbach's Alpha was greater than 0.702, indicating high reliability in all factors. The possible contribution of the ECQ in different contexts and educational frames and in sustainability education is discussed.

**Keywords:** environmental citizenship; education for environmental citizenship; pro-environmental behaviour; sustainability citizenship; environmental education; education for sustainability

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## 1. Introduction

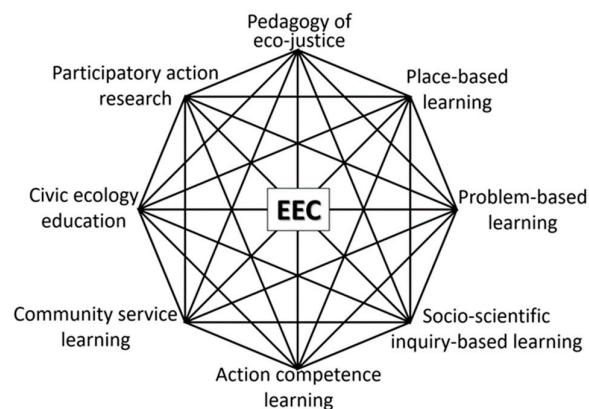
The current global environmental crisis with a range of global environmental problems such as climate change, biodiversity loss and pollution makes environmental citizenship a necessity. Empowering people to become environmental citizens is crucial for addressing current environmental issues and a necessary condition of sustainability, which is identified as one of the European and global priorities [1]. Citizenship in general and, more specifically, environmental citizenship in its various forms (and terminology) have a long tradition in educational literature. Citizenship, originally derived from the political arena, is a political concept that determines the relationship of the individual to the state in which the individual is a member and draws the framework of these relationships. Citizenship education curricula in many societies came to include environmental protection in citizenship education. According to Cheah and Huang [2], out of the 42 national and local education systems in Europe, environmental protection is included in citizenship education curricula in 24 education systems at the primary school level, 21 education systems at the lower secondary school level, 20 education systems at the upper secondary school level and 19 secondary vocational education systems. However, environmental citizenship has never been at the heart of our education systems, and thus there is a need for explicit focus on environmental citizenship and for building a citizenry equipped and motivated to work toward better

environmental outcomes [3]. According to Dimick [4] (p. 390), environmental citizenship should be an important educational aim according to which 'students' civic capacities and dispositions to engage as participatory citizens in relation to environmental issues and concerns' have to be developed.

In addition, to date, a set of similar environmental terms relevant to environmental citizenship have been developed and described in the educational literature, which are used each time with their own operational definition. Accordingly, concepts such as environmental citizenship (e.g., Dobson [5–6]), green citizenship (e.g., Barry [7]), ecological citizenship (e.g., Jagers and Matti [8]) and sustainability citizenship (e.g., Barry [7]) have not been clearly distinguished. Environmental Evidence Australia's review [9] concluded that agreement on what constitutes environmental citizenship, and the most effective tools and approaches for implementing environmental citizenship, are still emerging. Hadjichambis and Reis [10] have suggested that environmental citizenship has to be conceptualized for 21st century education. According to the ongoing European project, European Network for Environmental Citizenship (ENEC), in which more than 120 experts from 38 countries are participating, environmental citizenship can be defined as:

*“the responsible pro-environmental behaviour of citizens who act and participate in society as agents of change in the private and public spheres on a local, national and global scale, through individual and collective actions in the direction of solving contemporary environmental problems, preventing the creation of new environmental problems, achieving sustainability and developing a healthy relationship with nature. ‘Environmental Citizenship’ includes the practice of environmental rights and duties, as well as the identification of the underlying structural causes of environmental degradation and environmental problems, the development of the willingness and the competences for critical and active engagement and civic participation to address those structural causes, and to act individually and collectively within democratic means, taking into account inter- and intra-generational justice” [11].*

Education for Environmental Citizenship (EEC) is the type of education that has environmental citizenship as its prime concern and ultimate aim. Although EEC is an emerging educational field [12], it is shaped in a pre-existing pedagogical landscape. Figure 1 presents the most relevant pedagogical approaches which form the pedagogical landscape of EEC. These include the following eight pedagogical approaches: a) pedagogy of eco-justice, b) place-based learning, c) problem-based learning, d) socio-scientific inquiry-based learning, e) action competence learning, f) community service learning, g) civic ecology education and h) participatory action research. Each of these approaches can contribute to the achievement of environmental citizenship; however, none of them alone can lead to the holistic and comprehensive attainment of the outputs of the education for environmental citizenship as these outputs are defined by ENEC [13].



**Figure 1.** The pedagogical landscape of EEC (Source: Hadjichambis and Paraskeva-Hadjichambi, [14]).

According to the definition of EEC, there are eight outcomes (Figure 2, orange arrows) which can be achieved through actions in two dimensions (individual and collective), implemented in two

different spheres (private and public) and at different scales (local, national and global). The constitutional elements of the EEC (outputs, actions' dimensions, spheres and scales) form the EEC model which is integrated and illustrated in Figure 2. It should be clarified that the exact position of each output in the EEC model does not illustrate its relationship with actions' dimensions, spheres and scales.

The EEC model presents the structure of the concept of Education for Environmental Citizenship based on which the Environmental Citizenship Questionnaire (ECQ) was developed. In the core of the EEC model is situated the green cycle which includes the necessary knowledge, values, attitudes, skills, competences and behaviours that an environmental citizen (ECn) should be equipped with.

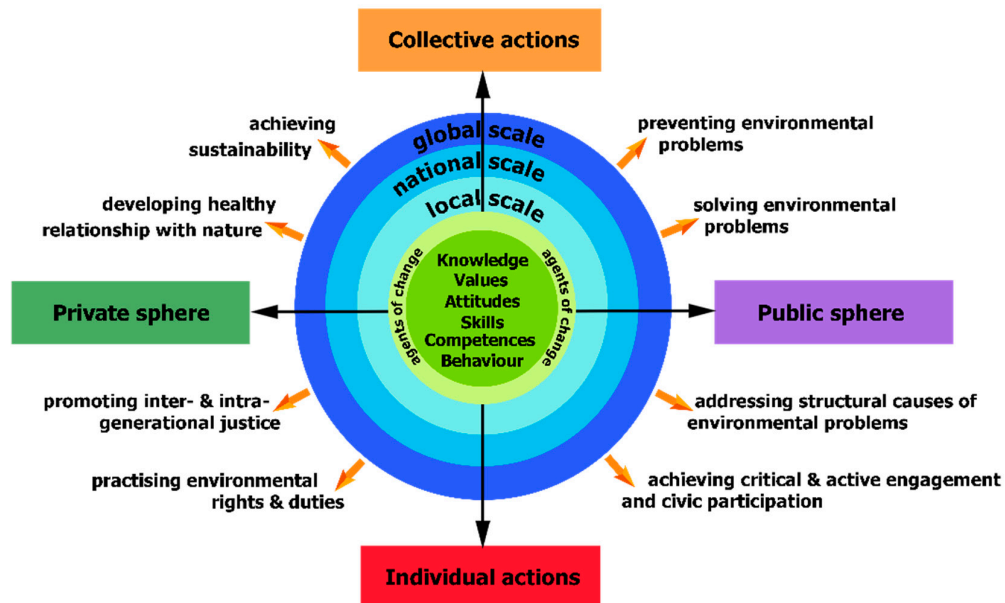


Figure 2. The EEC model (source: Hadjichambis and Paraskeva-Hadjichambi, [14]).

According to Melo-Escrichuela [15], the discourse regarding Environmental Citizenship can be classified into two main categories: the personal duty or lifestyle approach, and the participatory rights approach coming from both the liberal and republican political theories. The liberal approach gives emphasis on individual responsibility and on claiming rights to environmental goods (therefore, in individual actions), while the republican approach gives emphasis on participatory rights in decision making, deliberation, civic participation and on the commitment to the common good (therefore, collective actions) (Hadjichambis and Paraskeva-Hadjichambi, [14]). Stern [16] stated that pro-environmental behaviour could be divided into two broad types: private and public sphere. The purchase, use and disposal of personal and household products that have environmental impact are attributed to the private sphere pro-environmental behaviour. According to the same author [8], environmental activism and the support of public policies are attributed to the public sphere pro-environmental behaviour. In the EEC model, environmental citizenship actions are acknowledged as actions in the public sphere when they affect the relations in societies, and as actions in private spheres when they affect the relations between individuals and societies [17]. It is obvious that the EEC model focuses on, among others, the capacities and commitments for effective and democratic citizenship. However, it must be acknowledged that there are different (and at times conflicting) visions of citizenship with political implications. According to Westheimer and Kahne [18], three visions of “citizenship” are highlighted: the personally responsible citizen (citizens must have good character; they must be honest, responsible and law-abiding members of the community), the participatory citizen (citizens must actively participate and take leadership positions within established systems and community structures) and the justice-oriented citizen (citizens must question and change established systems and structures when they reproduce patterns of injustice

over time). In addition, cosmopolitan international relations theorists envisage global issues being addressed on the basis of new forms of democracy, derived from the universal rights of global citizens. They suggest that, rather than focusing attention on the territorially limited rights of the citizen at the level of the nation-state, more emphasis should be placed on extending democracy and human rights to the international sphere [19]. Extending political theorist David Held's model of cosmopolitan democracy [20], education for environmental citizenship could be explored in the context of globalisation, noting that citizenship education addresses issues at local, national and global scales. All human lives are increasingly influenced by events in other parts of the world. Such a perspective is critical in preparing young people to live together in increasingly diverse local communities and simultaneously in an interdependent world.

The aim of this paper is to contribute to the development of a theoretically grounded and empirically validated metric for measuring environmental citizenship as defined by its pan-European agreed definition by the experts participating in ENEC. Empirical studies for measuring environmental citizenship are lacking in the literature, as are empirically validated metrics for measuring environmental citizenship. Therefore, this study presents the structure of the concept of Education for Environmental Citizenship (EEC model) as well as how the ECQ was developed. Based on the data collected from secondary school students, the validation of the questionnaire is described. In sustainability studies, there is no metric that can measure students' environmental citizenship in a comprehensive way. Consequently, an important gap has been filled by the ECQ, giving researchers and practitioners the opportunity to use a research instrument for measuring and assessing students' environmental citizenship.

## 2. Materials and Methods

### 2.1. Developing the ECQ

The process of developing the ECQ was based on the existing literature of environmental citizenship. An initial pool of related items was extracted and reviewed by an expert panel. The first version of the metric was piloted with a small number of students and then was revised to increase the instrument's readability and comprehensibility. A new version of the ECQ was developed after student focus group discussions, and a final version was extracted after a factor analysis. (Figure 3).



**Figure 3.** Stages followed for ECQ development.

#### 2.1.1. Generation of the Items

The first step in the development of the ECQ was a comprehensive review of the literature. The purpose of this review was to identify existing environmental citizenship instruments or specific items related to environmental citizenship in order to develop a set of potential items to be used in an environmental citizenship metric. This process resulted in a number of items originally derived from the International Civic and Citizenship Education Study (ICCS) based on the work of Schulz and his colleagues [21] which were related to civic and citizenship education but not explicitly related to environmental citizenship. The purpose of the ICCS was to investigate the ways in which young people are prepared to undertake their roles as citizens in a range of countries in the 21st century. Therefore, this group of items was modified by the authors to relate exclusively to environmental citizenship and not to citizenship in general. Another source of items was the study by Bouman et al. [22] from which the whole E-PVQ (Environmental Portrait Value Questionnaire)—with 17 items related to environmental values—was used. This group of items was translated into Greek and piloted as described above to increase readability and comprehensibility. A third group of items was collected from the Sustainability Consciousness Questionnaire (SCQ) [23]. From this study, nine

items were selected that related to sustainability attitudes which were considered relevant to an environmental citizenship questionnaire. Again, this group of items was translated and slightly modified to increase readability and comprehensibility. Finally, a number of items were developed by the authors based on the EEC model's theoretical background, in order to cover dimensions related to the knowledge of environmental citizenship characteristics and intention to act as an agent of change. The source of items and their focus area are presented in Table 1.

**Table 1.** The source of items and their focus area.

Question	Focus area	Source of the question and adjustments
1	Past and present actions as ECn	Modified from ICCS, Student Questionnaire, Schulz et al. [21], Q15
2	Knowledge for EC	Developed based on EEC Model, Hadjichambis and Paraskeva-Hadjichambi [14]
3	Conceptions for EC	Modified from ICCS, Student Questionnaire, Schulz et al. [21], Q23
4	Skills of ECn	Modified from ICCS, Student Questionnaire, Schulz et al. [21], Q29
5	Attitudes of ECn	Adopted from "The Sustainability Consciousness Questionnaire", Gericke et al. [23]
6	Values of ECn	Adopted from "The Environmental Portrait Value Questionnaire", Bouman et al. [22]
7	Future actions inside school	Modified from ICCS, Student Questionnaire, Schulz et al. [21], Q30
8	Future actions outside school	Modified from ICCS, Student Questionnaire, Schulz et al. [21], Q32
9	Future actions as agents of change	Developed based on EEC Model, Hadjichambis and Paraskeva-Hadjichambi [14]

### 2.1.2. Review of Items

An expert panel made up of two university researchers and three biology secondary school teachers reviewed the initial 91 items based on clarity, comprehension, accuracy and content validity. This process resulted in 80 items which formed the first version of the ECQ.

### 2.1.3. Pilot Study

The first version of the ECQ was piloted with 30 secondary school students (10<sup>th</sup> grade). The students were asked to mark any difficult or incomprehensible words or terms. These words were revised in the ECQ. The revision was only on language, on specific words or terms. No items were removed or added.

### 2.1.4. Student Focus Groups

Two focus group discussions with six and seven 10<sup>th</sup> grade students (different from those who participated in the pilot study) were conducted aiming to identify any problems with the 80 items in terms of language comprehension, appropriateness for students' age and relevance to students' habits and everyday life.

### 2.1.5. Final Version of ECQ

The above process in the development of the ECQ resulted in 76 items (Appendix A) representing three different areas related to environmental citizenship (EC) (Figure 4). The first area involved *Past and Present Actions* (Q1) that are undertaken as environmental citizens (ECn). In this area, six items were included. The second area was related to *Competences* of environmental citizens such as knowledge about environmental citizenship (Q2: 11 items), conceptions for environmental

citizenship (Q3: 12 items), skills of environmental citizen (Q4: 6 items), attitudes of environmental citizen (Q5: 8 items) and, finally, values of environmental citizen (Q6: 15 items). These 52 items correspond to the core of the EEC model where the green cycle is situated, to the eight outcomes (orange arrows) and to the three different scales (local, national, global). The last area is related to *Future Actions* as environmental citizen: inside school (4 items), outside school (11 items) and as an agent of change (Q9: 3 items). Behaviour, which is mentioned in the green cycle, is linked to Q7–Q9.

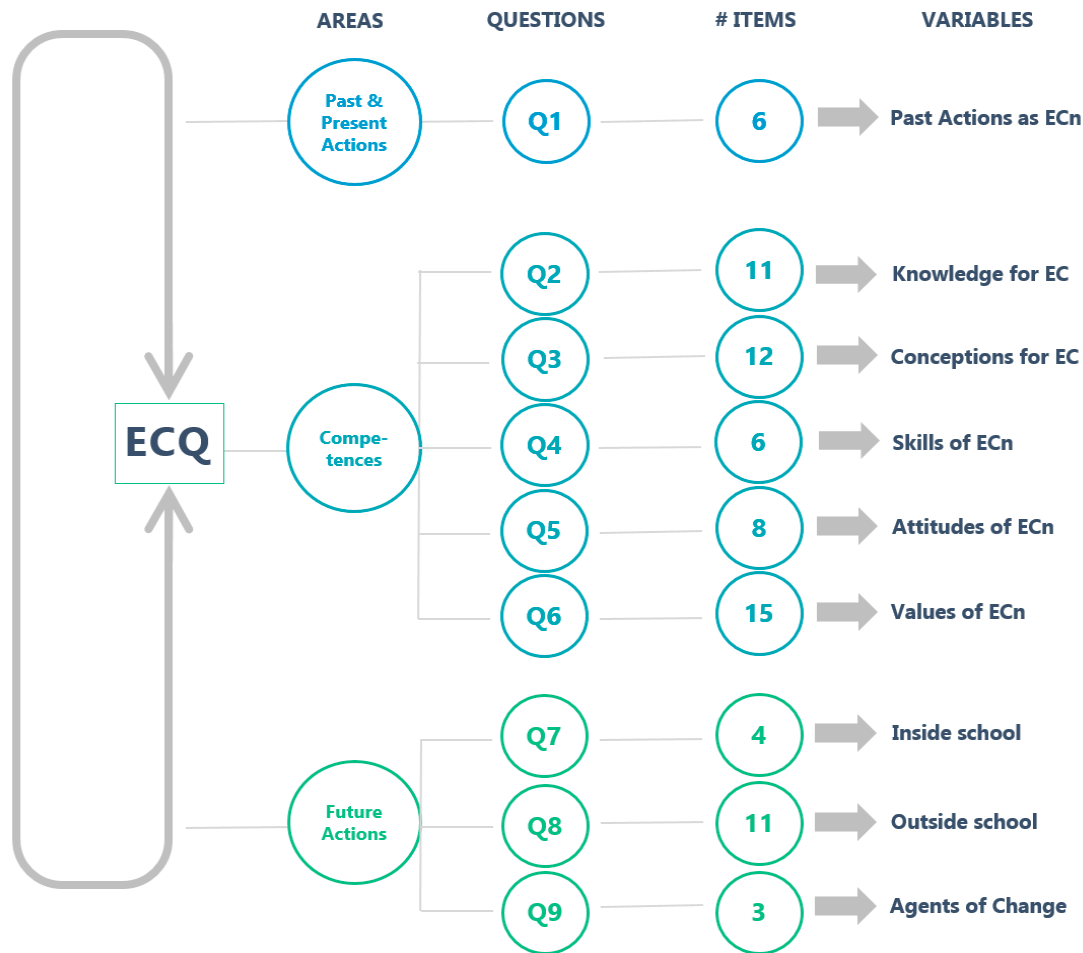


Figure 4. The ECQ structure.

Questions 7 and 8 of the area of Future Actions correspond to different individual and collective actions in private and public spheres which are symbolized with the four rectangles of the EEC model. In Table 2 can be found the items that refer to past and present or future actions (Q1, Q7, Q8 and Q9) and how they correspond to the private and public spheres, as well as to individual and collective dimensions. Each of those actions can be implemented into the three scales (local, national, global).

**Table 2.** Classification of items related to actions in dimensions and spheres.

	Individual Dimension	Collective Dimension
Private Sphere	1a, 1b, 1c, 1g, 8a, 8b, 8h, 8i	/
Public Sphere	1e, 1f, 7b, 7c, 8d, 8e, 8g, 9a, 9b, 9c	7a, 7d, 8c, 8f, 8j, 8k

## 2.2. ECQ Sample

The ECQ was administered to 520 10<sup>th</sup> grade students (58% female and 42% male). A large percentage of students—74%—studied science subjects and 26% studied other subjects such as classical and economic studies. In order to increase the generalisation of the results, the student population mirrored a representative sample of the country. Twenty-five minutes were needed by students to fill the questionnaire.

## 2.3. Item Analysis and Reliability

Sample size is one of the factors affecting the reliability of factor analysis [24]. In this study, the sample size used ( $n = 520$ ) is considered very good for performing a factor analysis [25]. The same authors [25] provided the following scale of sample size adequacy: 50—very poor, 100—poor, 200—fair, 300—good, 500—very good and 1000 or more—excellent. Four items (1d, 5a, 6j and 6n) were removed to achieve an adequate Cronbach's Alpha coefficient for each factor, and therefore 76 items remain in the Final ECQ [26], as can be seen in Figure 4.

## 3. Results

### 3.1. Factor Analysis

A Principal Component Analysis (PCA) was conducted via the use of confirmatory factor analysis. Table 3 shows the range of factor loadings of the 76 items in the ECQ.

**Table 3.** Factor loadings of the 76 items of ECQ.

Range of Factor Loadings	Number of Items	Percentage of Items	Items
< 0.450	10	13.2%	6m, 6p, 6o, 3b, 8a, 3d, 3a, 6k, 5e, 6l
0.451–0.550	11	14.5%	1e, 8i, 6i, 6f, 6g, 2i, 8b, 5i, 2k, 4f, 8h
0.551–0.650	19	25.0%	4d, 1g, 2j, 3f, 5c, 3c, 6c, 3g, 6e, 5b, 1c, 8k, 6h, 6b, 5h, 3j, 2d, 5g, 5f
0.651–0.750	20	26.3%	1f, 3e, 5d, 4b, 4c, 8j, 2a, 6q, 8e, 2b, 8d, 3h, 6a, 1b, 3k, 1a, 8g, 8c, 2h, 7d
> 0.751	16	21.1%	6d, 4e, 3i, 7c, 2g, 7a, 9b, 4a, 2f, 3l, 2e, 8f, 2c, 7b, 9c, 9a

The vast majority (87%) of the 76 items showed factor loadings above 0.450, which is the value considered acceptable. Only 10 items showed factor loadings below 0.450. Five of these belonged to Factor 6 (Values of Environmental Citizen), three to Factor 3 (Conceptions of Environmental Citizen), one in Factor 5 (Attitudes of Environmental Citizen) and one in Factor 8 (Future Actions outside School).

From the reliability analysis of the nine factors (Table 4), Cronbach's Alpha was greater than 0.702, indicating high reliability in all factors. The greatest reliability was found in the factors: Knowledge for Environmental Citizen, Conceptions for Environmental Citizen and Future Actions outside School.

**Table 4.** Reliability statistics for the nine factors.

Areas	Factors	Number of Items	Cronbach's Alpha	
Past and Present Actions	Past Actions as ECn (F1)	6	0.702	0.702
Competences	Knowledge for ECn (F2)	11	0.893	0.925
	Conceptions for ECn (F3)	12	0.836	
	Skills of ECn (F4)	6	0.755	
	Attitudes of ECn (F5)	8	0.733	
	Values of ECn (F6)	15	0.734	
Future Actions	Future Actions inside School (F7)	4	0.779	0.896
	Future Actions outside School (F8)	11	0.839	
	Agents of Change (F9)	3	0.747	
<b>Cronbach's Alpha</b>		<b>76</b>	<b>0.944</b>	

### 3.2. Sampling Adequacy and Sphericity Test

Both the Kaiser–Meyer–Olkin (KMO) test and Bartlett's test of sphericity have been used to test whether the data (variables) are suitable for factor analysis (measure of sampling adequacy and sphericity, respectively). The KMO indicates the proportion of variance among variables that might be common variance and can take values from 0 to 1, but Kaiser and Rice [27] suggested that values less than 0.5 are unacceptable and should be rejected. According to Field [24], all values above 0.5 should be kept in the analysis. It can be seen from Table 5 that the Kaiser–Meyer–Olkin (KMO) values were greater than 0.7 for all the factors, which indicates that enough items were predicted by each factor of this study (greater than 0.5, which is acceptable). Kaiser and Rice [27] suggested that values between 0.7 and 0.8 are good and values between 0.8 and 0.9 are meritorious. Regarding “Skills of ECn” and “Agents of Change”, values of KMO were under 0.7. In these two cases, the KMO values were between 0.60 and 0.69, which are acceptable but mediocre. The reason for these results could be the focus of future research.

**Table 5.** Sampling adequacy and sphericity.

Factor	KMO	Bartlett's Test of Sphericity		
		Approx. Chi-Square	df	p-value
Past Actions as ECn	0.770	490.473	15	<0.001
Knowledge for ECn	0.863	3487.770	55	<0.001
Conceptions for ECn	0.818	2914.836	66	<0.001
Skills of ECn	0.673	939.465	15	<0.001
Attitudes of ECn	0.752	833.139	28	<0.001
Values of ECn	0.751	3277.396	105	<0.001
Future Actions inside School	0.780	541.616	6	<0.001
Future Actions outside School	0.818	2610.993	55	<0.001
Agents of Change	0.684	386.774	3	<0.001

Furthermore, Bartlett's test of sphericity was significant, indicating that correlation matrix is not an identity matrix supporting the factorability of the correlation matrix. In conclusion, there is no questioning the use of factor analysis, and this can be considered as an important advantage for this study.



### 3.3. Eigenvalues and Percentage of Variance

All factors had eigenvalues greater than 1 for all factors and percentage (%) of variance greater than 40% for most of the factors (Table 6). Only the factor Values of Environmental Citizen can explain less than 30% of variance related with the Environmental Citizen.

**Table 6.** Eigenvalues and percentage of variance.

Factor	Eigenvalues	Percentage (%) of Variance
Past Actions as ECn	2.441	40.683
Knowledge for ECn	5.370	48.820
Conceptions for ECn	4.519	37.661
Skills of ECn	2.757	45.952
Attitudes of ECn	2.924	36.556
Values of ECn	4.234	28.226
Future Actions inside School	2.411	60.274
Future Actions outside School	4.444	40.399
Agents of Change	2.025	67.503

### 3.4. Correlation between Factors

Pearson's correlation coefficient was used to investigate possible significant relationships between Attitudes and Values of Environmental Citizen and Future Actions inside and outside Schools and as Agents of Change (Table 7). Pearson's correlation coefficient suggests a statistically significant correlation between all the above factors at  $p < 0.01$  level of significance. Specifically, it can be observed that there is a strong positive significant correlation between Attitudes and Values of Environmental Citizen ( $r = 0.667$ ,  $n = 519$ ,  $p < 0.01$ ), which is the highest correlation. These results are in accordance with the literature taking into account that both values and attitudes are predictors of pro-environmental behaviour (e.g., Corner et al. [28]). Also, there is strong positive correlation between Future Actions outside School and Future Actions inside School ( $r = 0.645$ ,  $n = 520$ ,  $p < 0.01$ ), between Future Actions outside School and Agents of Change ( $r = 0.621$ ,  $n = 519$ ,  $p < 0.01$ ) and also between Future Actions inside School and Agents of Change ( $r = 0.615$ ,  $n = 519$ ,  $p < 0.01$ ).

**Table 7.** Pearson's correlation matrix.

Factor	F5	F6	F7	F8	F9
Attitudes of ECn (F5)	1	<b>0.667</b> **	0.314 **	0.349 **	0.216 **
Values of ECn (F6)		1	0.436 **	0.478 **	0.479 **
Future Actions inside School (F7)			1	<b>0.645</b> **	<b>0.615</b> **
Future Actions outside School (F8)				1	<b>0.621</b> **
Agents of Change (F9)					1

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ .

Moderate and low positive correlations were observed among the other combinations of the above factors of Table 7. The lowest positive correlation was observed between the factors Agents of Change and Attitudes of Environmental Citizenship ( $r = 0.216$ ,  $n = 518$ ,  $p < 0.01$ ).

The results of the students' mean values (Table 8) suggest that the students have relatively high scores regarding the Knowledge for Environmental Citizen and in Past Actions as Environmental Citizens. However, their mean values for Attitudes and Values of Environmental Citizen were relatively low. Moderate mean values were recorded for Skills and Conceptions of Environmental Citizen as well as for Future Actions inside and outside School and for Agents of Change. These results could be expected given that these students have had the opportunity to participate in several

environmental education school programmes and to take some environmental actions since the beginning of their studies in compulsory education in Cyprus, and bearing in mind that environmental knowledge can more easily be acquired than other factors such as environmental attitudes and values [29].

**Table 8.** Students' results in ECQ.

Factors	Min	Max	Mean Value	SD	Theoretical Min–Max
Past Actions as ECn	1.17	3.50	2.74	0.33	1–4
Knowledge for ECn	1.09	4.00	2.89	0.66	1–4
Conceptions for ECn	1.00	3.67	2.08	0.51	1–4
Skills of ECn	1.00	4.00	2.58	0.59	1–4
Attitudes of ECn	1.00	3.00	1.54	0.40	1–4
Values of ECn	1.07	2.93	1.72	0.34	1–4
Future Actions inside School	1.00	4.00	2.28	0.61	1–4
Future Actions outside School	1.00	4.00	2.55	0.51	1–4
Agents of Change	1.00	4.00	2.02	0.62	1–4

#### 4. Discussion and Educational Implications

In this study, we described the development and validation of the ECQ as an instrument for the evaluation of environmental citizenship. Through an extensive review of the relevant literature and the relevant instruments, a number of possible items were identified which were reviewed by an expert panel. The remaining items were pilot tested and then discussed in student focus groups. For these items, a factor analysis for the statistical validation of the ECQ was undertaken.

The ECQ questionnaire can fill a gap in the literature as there is no questionnaire specific to environmental citizenship. So far, no comprehensive, holistic and validated metric is available which assesses environmental citizenship. Only partial questionnaire items measuring political consumer behaviour (e.g., Micheletti et al. [30]) exist [23]. This need became even greater after the comprehensive definition of 'environmental citizenship' by the European network for environmental citizenship involving more than 120 experts and researchers from 38 countries including Europe, Israel, USA and Australia [11].

The ECQ can be used to assess environmental citizenship in different contexts but also to evaluate educational interventions if this validated tool is implemented before and after an educational intervention or an environmental education programme. Some of the authors' results of another study can support this claim but these results are out of the scope of this current study. It may also provide feedback on which environmental citizenship factors have been differentiated and which should be given greater emphasis and attention. In addition, the ECQ can be used to compare results from different contexts, regions and countries, different teaching practices (e.g., participatory action research, community-based learning) and in different types of education (e.g., formal, nonformal). In this case, of course, its effectiveness should be tested in different contexts, regions and countries and with different age groups, with possible modifications that might be needed.

The ECQ's innovation is that it provides a direct correlation of questioning items with the EEC model's constituents (Figure 2) by incorporating questioning items for knowledge, values, attitudes, skills, competences and behaviours to assess environmental citizenship. The ECQ also includes items on agents of change and possible individual and collective actions in the private and public spheres, inside and outside the school, as well as on different scales (local, national and global).

One possible limitation of the ECQ is that it has been implemented and validated in a single European country (Cyprus). Applying the ECQ to other countries and other contexts may be a direction for future research. Another possible limitation is that it has a total of 76 items. This limitation on the large extent of the questionnaires is generally known in the literature (e.g., [31]). Future research may also consider creating a shorter version of the ECQ.

## 5. Conclusions

The aim of this study was to develop and validate an instrument for assessing environmental citizenship for secondary school students. Validation results proved that the ECQ could fill the gap in the literature for a comprehensive, holistic and validated instrument in the research of environmental citizenship. The developed metric clearly demonstrates some important connections to the ICCS (International Civic and Citizenship Education Study) framework but focusing on environmental citizenship rather than on general citizenship, something that has not been found in the literature so far. The ECQ is also very relevant to the context of global education and to sustainability education, studies, projects and programmes. This instrument contributes to a better understanding of secondary school students' environmental citizenship, an important area for sustainability studies, because students as existing citizens but also as future citizens have a crucial role to play in achieving sustainability and sustainable development goals (SDGs). Any sustainability measure and policy cannot succeed without the effective involvement of citizens and practicing of their environmental rights and duties. In addition, students as citizens can identify their priorities for the areas and actions that need to be emphasized and can participate in decision-making processes and prompt decision-making centres to act more effectively and drastically, addressing the causes of the environmental problems. They can also adopt a more environmentally friendly and sustainable lifestyle and contribute to inter- and intra-generational justice. In addition, students can maximize the attention to a socio-environmental problem through proper networking on local, national and global networks and, finally, can play a critical role as agents of change for the environment and sustainability.

**Supplementary Materials:** The following are available online at [www.mdpi.com/xxx/s1](http://www.mdpi.com/xxx/s1), Figure S1: title, Table S1: title, Video S1: title.

**Author Contributions:** Conceptualization, A.H.; Methodology, A.H. and D.H.; Validation, A.H. and D.H.; Writing—review and editing, A.H. and D.H. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Acknowledgments:** This study is partly based on work from Cost Action ENEC – European Network for Environmental Citizenship (CA16229) supported by COST (European Cooperation in Science and Technology).

**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A

### Environmental Citizenship Questionnaire - ECQ

#### Part A. Activities as Environmental Citizen – Past and Present

1. Have you ever been involved in activities of any of the following organisations, clubs, or groups outside school?

(Please tick **only one** box in each row)

	Yes, I have done this <u>within the last six months</u>	Yes, I have done this <u>but more than six months ago</u>	Yes, I have done this <u>but more than a year ago</u>	No, I have never done this
a) An environmental action group	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
b) An environmental organisation	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
c) A human rights organisation	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
d) A voluntary group doing something to help the community ( <b>excluded</b> )	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

e) An organisation collecting money for an environmental purpose	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
f) A group of young people campaigning for an environmental issue	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
g) An animal rights or animal welfare group	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Part B: Competences of an Environmental Citizen

2. At school, to what extent have you learned about the following topics?

(Please tick **only one** box in each row)

	Not at all	To a small extent	To a moderate extent	To a large extent
a) How to contribute to the prevention of environmental problems	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
b) How to contribute to the solution of environmental problems	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
c) How to develop a healthy relationship with nature	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
d) How to contribute to the achievement of sustainability	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
e) What are the environmental rights and duties of a citizen	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
f) How to assess structural causes of environmental degradation and problems (roots)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
g) How to actively participate in society	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
h) How to promote inter- and intra-generational justice	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
i) How to act and network at a local level (community, town, area)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
j) How to act and network at a national level (country)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
k) How to act and network at a global level	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

3. How important are the following behaviours for being a good environmental citizen?

(Please tick **only one** box in each row)

	Not important at all	Not very important	Quite important	Very important
a) Voting in every national election	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
b) Joining a political party	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
c) Following environmental issues in the newspaper, on the radio, on TV, or on the Internet	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
d) Showing respect for government representatives	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
e) Engaging in environmental discussions	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
f) Making personal efforts to protect natural resources (e.g., through saving water or recycling waste)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
g) Respecting the rights of others to have their own opinions	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
h) Supporting people who are worse off than you	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

i) Engaging in activities to help people in less developed countries	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
j) Participating in peaceful protests against laws believed to be unjust	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
k) Taking part in activities promoting environmental rights	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
l) Participating in activities to benefit the environment	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

4. How well do you think you would do the following activities, now, as a student?

(Please tick only one box in each row)

	Not at all	Not very well	Fairly well	Very well
a) Discuss a newspaper article about an environmental conflict	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
b) Argue your point of view about a controversial environmental issue	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
c) Organise a group of students to achieve environmental changes at school	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
d) Follow a television debate about a controversial environmental issue	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
e) Write a letter or email to a newspaper giving your view on a current environmental issue	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
f) Speak in front of your class about an environmental issue	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

5. The following statements are related to our relationship to the environment. There are no right or wrong answers. (Please tick only one box in each row)

I think that...	Very much disagree	Disagree	Agree	Very much agree
a) Using more natural resources than we need does not threaten the health and well-being of people in the future ( <b>excluded</b> )	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
b) We need stricter laws and regulations to protect the environment	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
c) It is important to take measures against problems which have to do with climate change	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
d) Everyone ought to be given the opportunity to acquire the knowledge, values, and skills that are necessary to live sustainably	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
e) We who are living now should make sure that people in the future enjoy the same quality of life as we do today	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
f) Women and men throughout the world must be given the same opportunities for education and employment	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
g) Companies have a responsibility to reduce the use of packaging and disposable articles	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
h) It is important to reduce poverty	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
i) Companies in rich countries should give employees in poor nations the same conditions as in rich countries	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

6. How important for you are the following statements? (Please tick only one box in each row)

It is important to me to / that...	Not important	Slightly important	Important	Most important
a) Prevent environmental pollution	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
b) Protect the environment	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
c) Respect nature	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
d) Be in unity with nature	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

e) Every person have equal opportunities	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
f) Take care of those who are worse off	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
g) Every person is treated justly	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
h) There is no war or conflict	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
i) Be helpful to others	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
j) Have fun ( <b>excluded</b> )	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
k) Enjoy life's pleasures	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
l) Do things that I enjoy	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
m) Have control over others' actions	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
n) Have authority over others ( <b>excluded</b> )	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
o) Be influential	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
p) Have many possessions	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
q) Work hard and be ambitious	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

### Part C: Intention to act in the future as an Environmental Citizen

7. Listed below are different activities that might be offered at your school. If you were given the chance, how likely is it that you would participate in each activity as a student inside your school?

(Please tick **only one** box in each row)

	Not at all likely	Not very likely	Quite likely	Very likely
a) Join a group of students campaigning for an environmental issue you agree with	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
b) Take part in environmental discussions in a 'student assembly'	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
c) Participate in writing articles for a school newspaper or website regarding an environmental issue	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
d) Organise a group of students to achieve environmental changes at school	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

8. There are many different ways in which environmental citizens may express their opinions about important issues in society. Would you take part in any of the following activities to express your opinion in the future as a student outside school?

(Please tick **only one** box in each row)

	I would certainly not do this	I would probably not do this	I would probably do this	I would certainly do this
a) Talk to others about your views on environmental issues	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
b) Contact an elected representative	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
c) Take part in a peaceful march or rally	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
d) Collect signatures for a petition	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
e) Contribute to an online discussion forum about environmental issues	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
f) Organise an online group to take a stance on a controversial environmental issue	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
g) Participate in an online campaign	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
h) Choose to buy certain products in support of social justice (e.g., fair trade, ethically sourced products)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
i) Spray-paint protest slogans on walls	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
j) Stage a protest by blocking traffic	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
k) Occupy public buildings as a sign of protest	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

9. How likely is it you would do the following in the future?

(Please tick **only one** box in each row)

	I would certainly <u>not</u> do this	I would probably <u>not</u> do this	I would probably do this	I would certainly do this
a) I would try to change society and promote sustainability	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
b) I would educate my peers but also adults to act in eco-friendly ways	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
c) I would actively participate in decision-making and also engage in action-taking	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

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