



Research article

# Environmental Education Embedded in K-12 Program in Urban and Rural Secondary Schools in Iligan City, Lanao Del Norte, Philippines

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## Abstract

Environmental education helps students experience the natural world and life's sustenance, healthy communities, and provision of food. Hence, as study was conducted should environmental education concept be carried out in the new educational system of the Philippines known as K-12 program for secondary education level. In-person survey interviews using semi-structured questionnaire were administered to 100 randomly selected respondents. Results showed that secondary teachers had embedded environmental concepts and principles in their teaching curriculum and that various teaching strategies were used in this context. Statistical tests showed no significant difference among the teacher respondents in urban and rural schools. This might indicate similarities of teaching curriculum in environmental education embedded in K-12 program for division-wide implementation regardless of schools' location whether it is an urban or rural secondary schools. The use of environmental education curriculum in K-12 program would favor the use of interdisciplinary techniques to explore educational actions needed to address specific issues and concerns. **Copyright © WJER, all rights reserved.**

**Keywords:** K-12 program, public school, Iligan City, environmental education, teaching.

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## Introduction

Today, it can be clearly seen with too many examples that environmental problems now have reached the proportions that threaten the future of mankind. Changing climate conditions, melting glaciers, endangered species and deforestation can be listed as just a few of these examples. The human-induced factors have great role in the formation of this pessimistic picture. The unconscious and wrong practices against environmental values bring about many problems. The way to solve these problems depends on the awareness of society. Here, a big responsibility is on the teachers' shoulders. Because the teachers will educate a generation filled with a sense of responsibility towards the environment and society. However, teachers themselves should carry the sense of responsibility before passing it on to their students. With the community service practices course, the provision of this responsibility to the prospective teachers is aimed at (Karatas and Talas, 2012). In the same way, the term of education is an integral part of any programmatic political document on sustainable development (Bertschy, et al., 2013). In the same way, in sustainable development which requires the balance between the economic, social and environmental objectives, it is of key importance that the public also participates in the broadest sense. For the comprehension of ecological and developmental decisions it is necessary to provide information and to raise the general environmental awareness. An individual or groups of people base their reactions to negative phenomena in the environment on their perception of it, which does not always correspond to the objective state but is modified by different factors, also by the access to information and by the participation of the public in taking the decisions (Špes, 2008).

Accordingly, teachers taught their lessons the way they were taught in their students' days which uses lectures in the classroom (Feller and Lotter, 2009). In Russia, for instance, cultural-ecological approach is an essential methodological basis of modernization of Russian education, held in a worsening of environmental problems and understanding the leading role of culture in their resolution. This confirms the importance of the use of this approach for the development of modern geographic education (Shevchenko, 2015). In the same manner, the academe as a sector that educate people plays a great role in shaping the people in the community. This great responsibility is a big challenge on the educational sector on how they can become agents of change in society specifically on environmental issues. Environmental education as a basic issue will help individual attain sustainability in school that includes experiencing the natural world; learning how nature sustains life; nurturing healthy communities; recognizing the implications of the ways people feed and provision themselves; and knowing well the places where they live, work, and learn (Contreras, 2014). Environmental education are expected to improve learners' writing competence of recount texts by applying topics which learners found in their daily lives (Hapsari, 2015). Similarly, environmental literacy should be coupled with the values of love and concern. The environment concern, incorporated also supports nationwide efforts to bring environmental education to the forefront of student's lives (Contreras, 2014). Accordingly, environmental health connects people's mental well-being. The correlation between nurse and school is increasingly frequent in the health area, corresponding to a space that favors the use of interdisciplinary techniques to explore educational actions addressed to respond specific demands (Rigotto, et al., 2013). For instance, in Saudi Arabia and the Middle East, higher education institutions are major drivers of change in achieving environmental sustainability both within college campuses and beyond campuses in communities at large. Students' assessment of campus sustainability components such as curriculum and research, campus operations, and community involvement. The results show that even though the students indicate a great deal of awareness and concern about campus environmental sustainability, they lack interest and willingness to participate in initiatives towards achieving sustainability (Abubakar, et al., 2016).

As for the growing concerns of the global warming and climate change, more and more organizations adopted environmental initiatives as part of their organizational ethos. Many Higher Education Institutions (HEIs), particularly, have implemented various on campus environmental initiatives through policy as well as teaching and learning activities (Kartiwi, et al., 2014). Climate change can no longer be ignored. It is globally recognized that the evidence for climate change is unequivocal and that action needs to be taken in order to address its negative effects. These effects, such as warmer and drier summers and more extreme rainfall, may threaten the quality of life of those living in urban environments. To limit these threats, a number of climate change adaptation measures can be taken to pre-empt the negative effects of climate change (Rodgers, 2015). For instance, the coastal region in Pare-pare seems increasingly pressured by high population density in coastal areas prone to environmental degradation. From these communities, it seems that they are more likely to behave non-ecologically, such as throwing garbage in water bodies, building a house on the water, diminishing mangrove zones and various trends of environmental degradation which were caused by human action itself. (Agussalim and Mulyadi, 2014).

Cottage industries comprise a sub-group of informal sector income generation activities which are conducted in the home environment and organized around families or households. Cottage industry workers may be



at risk of exposure to harmful substances associated with their work, and given the lack of separation of cottage industry activities from living spaces, their families and neighbors may similarly be at risk of exposure (Teare, et al., 2015). In the same manner, urban residential expansion increasingly drives land use, land cover and ecological changes worldwide, yet social science theories explaining such change remain under-developed. Existing theories often focus on processes occurring at one scale, while ignoring other scales. Emerging evidence from four linked U.S. research sites suggests it is essential to examine processes at multiple scales simultaneously when explaining the evolution of urban residential landscapes.

The urbanization dynamics across multiple sites with a shared research design may yield fruitful comparative insights. The following processes and social-hierarchical scales significantly influence the spatial configurations of residential landscapes: household-level characteristics and environmental attitudes; formal and informal institutions at the neighborhood scale; and municipal-scale land-use governance. While adopting a multi-scale and multi-site approach produces research challenges, doing so is critical to advancing understanding of coupled socio-ecological systems and associated vulnerabilities in a dynamic and environmentally important setting: residential landscapes (Chowdhury, et al., 2011). Accordingly, some perception from the population partially affected by flooding and the role of the environment education from this perspective is essential in addressing the problems (Sabo and Gavrilă, 2011). With this, the environmental perception has been a widely used instrument and relevant in studies that address the relationship between the environment and human actions, by allowing analysis of the perceptions, attitudes and values, key trainers of topophilia which reverberates in conservation action such as tourism that generates expectations of improvements in income and quality of life for the community (Lucena and Freire, 2014).

In Philippines, similar conditions were observed and a new shift of environmental education had emerged and implemented. As such, this study was conducted to describe if environmental education is embedded into the curriculum of K-12 program and on how the teachers respond to it.

## **Materials and Methods**

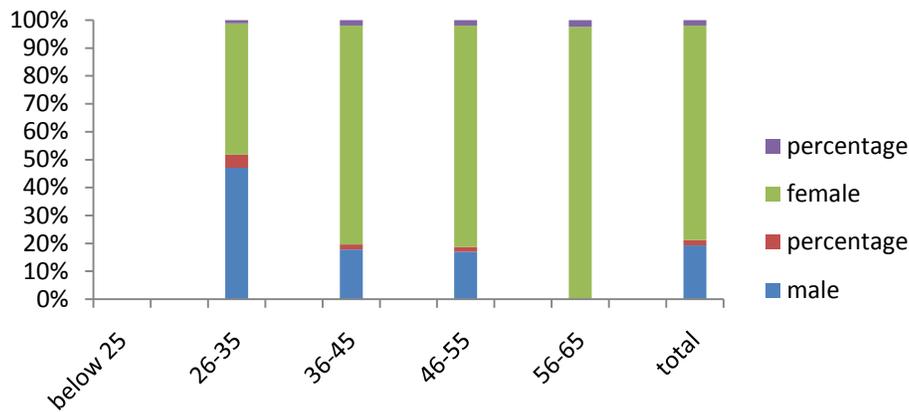
A stratified random sampling using Slovin's formula was applied in determining the respondents in secondary schools of Iligan City, Philippines. A fish bowl method was used as sampling technique. The respondents were 100 K-12 randomly selected secondary teachers. The K-12 teacher respondents were selected by draw lots technique wherein their individual names were written on a sheet of paper, rolled and placed in 4 boxes that were labeled as 2 urban and 2 rural secondary schools. The box was shaken well to have an even mixture of rolled papers. Twenty five names were picked from each of the labeled boxes which then became respondents.

## **Results and Discussions**

### **Socio demographic profile of the respondents**

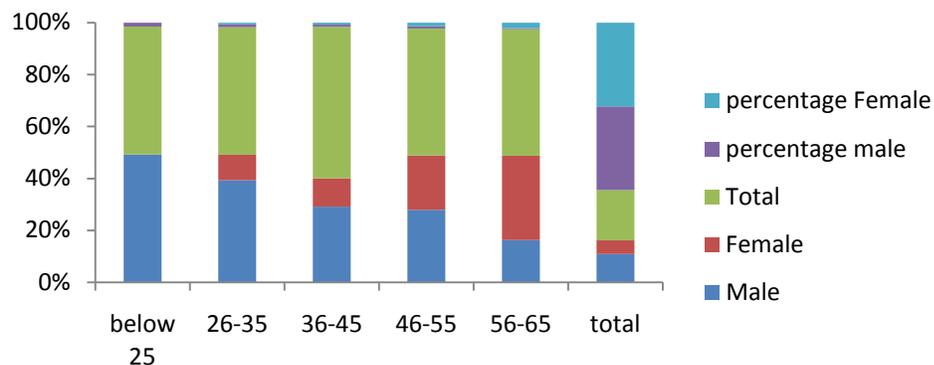
#### **Age**

Twenty percent (20%) of the respondents was at 26-35 age bracket, and 50% for the age bracket 36-45 years old for male, while the age bracket 46-55 was 30%. For female, age bracket of 26-35 years old was 5%, the highest percentage fell on the 36-45 age bracket with 55%, followed by 35% in the age bracket of 46-55 years old, while on the 56-65 years old with 5% (Figure 1).



**Figure 1.** Percentage distribution of respondents' age in urban secondary teachers.

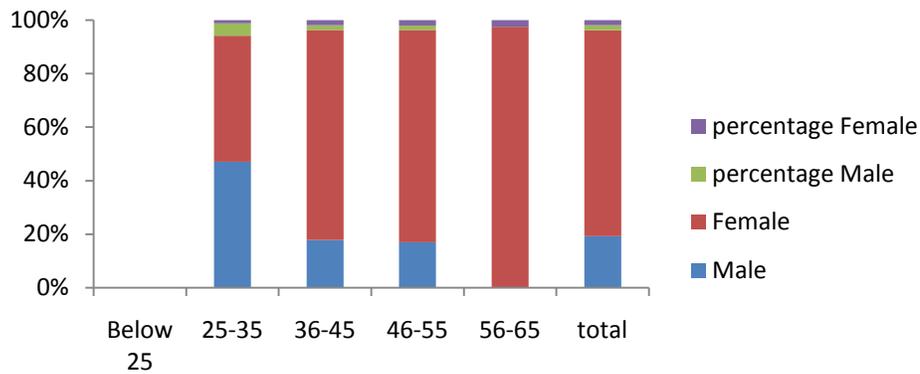
As to the rural respondents, there were 50 respondents composed of male and female teachers. The age bracket of below 25 was 90% in male. For the age bracket 26-35, 50% for male and 12.50% for female. As to the age bracket of 36-45, 10% for the male and for the female 38%. For the age 46-55 years old, 23.50% for male and 38% for female. Lastly, for the age of 56-65 years old, 2.90% for male and 12.50% for female (Figure 2).



**Figure 2.** Percentage distribution of respondents' age in rural secondary teachers.

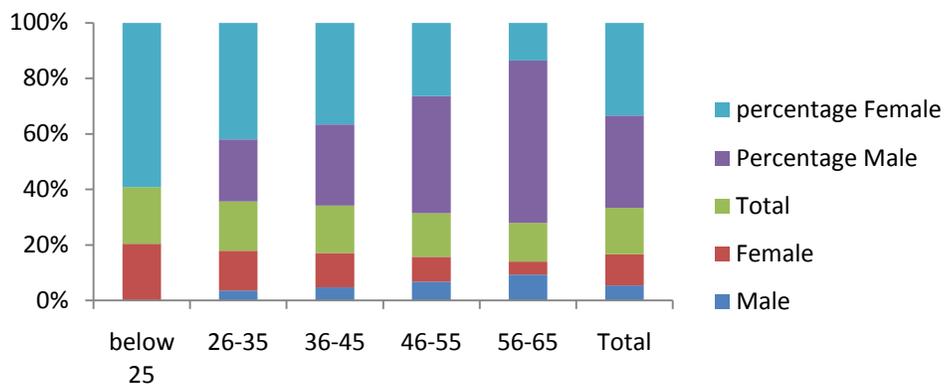
## Gender

Urban sites were dominated by female teachers with a percentage of 55% in the age bracket of 36-45 years old, followed by 46-55 years old with 35%, and 5% in both 26-35 years old and 56-65 years old, respectively. Whereas in male, 50% was in the age bracket of 36-45 years old, 30% in 46-55 years old, and only 20% in 26-35 years old (Figure 3).



**Figure 3.**Percentage distribution of respondents' gender in urban secondary teachers.

In rural sites, female respondents dominated with 47.1% in the age bracket of 36-45 years old, while 23.5% in both 26-35 and 46-55 years old bracket, respectively, and 2.90 in both below 25 and 56-65 years old. In males, the highest percentage fell on 36-35 and 46-55 years old, age bracket 56-65 years old and 26-35 years old with 12.5% (Figure 4).

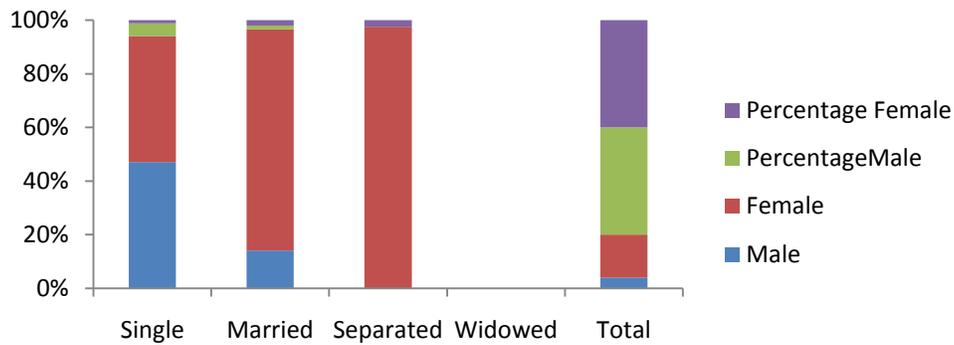


**Figure 4.** Percentage distribution of respondents' gender in rural secondary teachers.

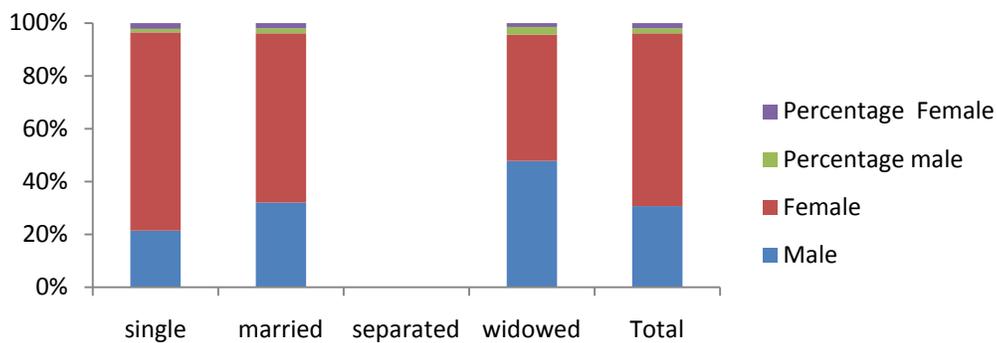
### Civil Status

In civil status of the respondents, 60% married males, while in female 87.5% was married. For the single, male has 40% and 10% for female. In female, 2.50% was separated and none of the males were separated or widowed (Figure 5).

In the rural sites, highest percentage was married both in male and female with 81.25% for male, 76.50% for female, respectively. Among the single respondents, 20.50% for female and 12.50% in male. No male and female respondents were separated. Lastly, there were 6.25% and 2.90% widowed male and female respondents (Figure 6).



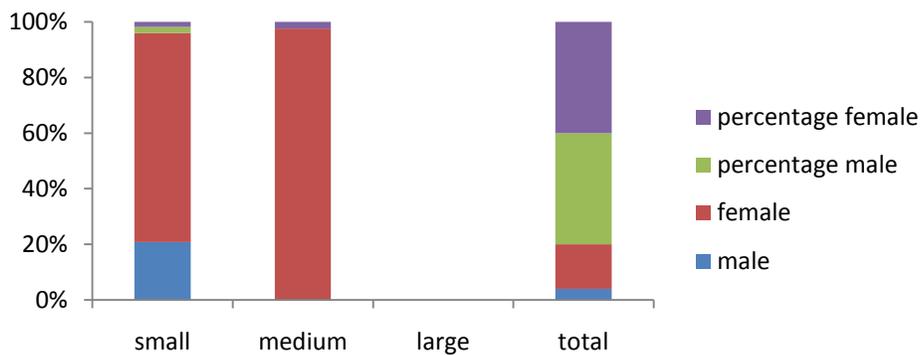
**Figure 5.** Percentage distribution of respondents' civil status in urban secondary teachers.



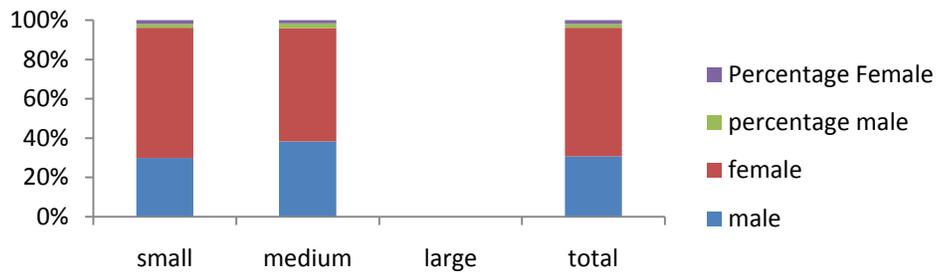
**Figure 6.** Percentage distribution of respondents' civil status in rural secondary teachers.

**Family size**

Urban sites had small to medium sizes of family members with 100% in male and 90% in female (Figure 7). Whereas, among the rural sites, it showed that both male and female respondents had high percentage of 87.5% in male and 91.2% for female in small family size. In medium family sizes, 12.5% for male and 8.8% for female, respectively (Figure 8).



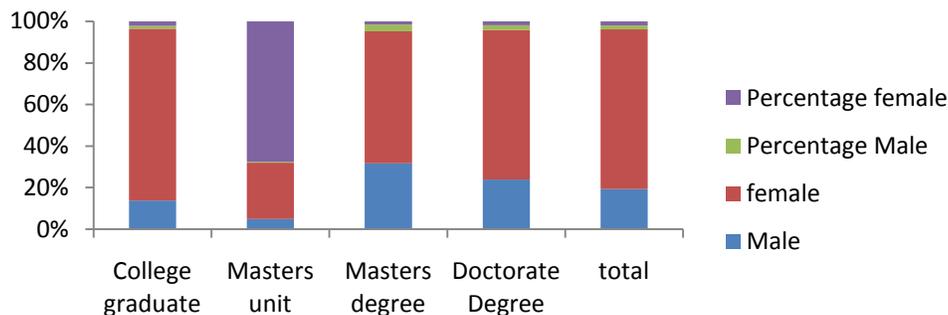
**Figure 7.** Percentage distribution of respondents' family size in urban secondary teachers.



**Figure 8.** . Percentage distribution of respondents' family size in rural secondary teachers.

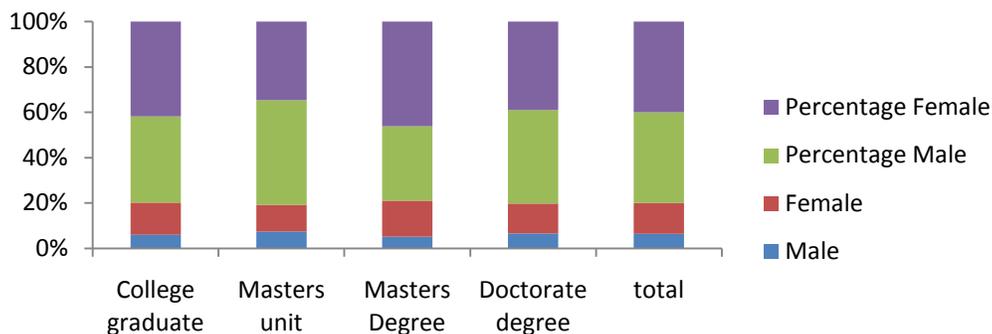
### Educational Attainment

In terms of educational attainment, higher percentage of 45% in female under college graduate followed by 27.5% with masters' units, 20% for the master's degree and only 7.5% percent attained doctorate degree. In male, the highest percentage were at master's degree with 40%, followed by 30% college graduate, 20% with master's units, and 10% for the doctorate (Figure 9).



**Figure 9.** Percentage distribution of respondents' educational attainment in urban secondary teachers.

As to the figure below the highest percentage of male college graduate with 56.25% followed with masters unit 31.25%, bothmaster's degree and doctorate degree with 6.25%.In female 61.8% in college graduate only 23.5% for the masters unit, 8.8% for the master's degree and5.9% for the doctorate degree. (Fig.9)



**Figure 9.** Percentage distribution of respondents' educational attainment in rural secondary teachers.

### Main environmental issues in K-12 curriculum

The main environmental issues of concerns used to describe the doomsday clock time, consequences of greatest concern, causes of global environmental degradation by human activities, atmospheric, and ecological



consequences, and the action plan for the environment and development on Agenda 21 for the survival of humankind.

## Doomsday clock time

Most of the respondents had strongly agreed on the doomsday clock time. This means that both urban and rural teachers had strong awareness on this environmental issue. ANOVA results showed no significant differences between and among the rural and urban secondary schools with P values greater than 0.05 level of significance (Table 1). This means that teachers were at pace of tackling this environmental issue in their curriculum.

**Table 1.** Main environmental issues of concern in determining the doomsday clock time (A), consequences of greatest concern (B), causes of global environmental degradation by human activities (C), atmospheric (D), and ecological (E), and the action plan for the environment and development on Agenda 21 for the survival of humankind (F).

Source of variation	P values for					
	A	B	C	D	E	F
Rural A vs. Urban A	0.66	0.73	0.28	0.48	1.01	0.48
Rural A vs. Urban B	0.48	0.99	0.49	1.25	0.96	1.21
Rural B vs. Urban A	0.23	0.65	0.09	0.43	0.16	0.23
Rural B vs. Urban B	0.12	0.23	0.23	0.98	0.21	0.14
Urban A vs. Urban B	0.99	0.89	0.92	1.01	1.31	1.01

## Consequences of greatest concern

In the context of greatest environmental concerns, almost all teacher respondents had strongly agreed. No significant differences were also observed (Table 1). This results showed that teachers introduced greatest concern on education during their lectures with students. In fact, environmental education were expected to improve learners' writing competence of recount texts by applying topics which learners found in their daily lives (Hapsari, 2015). Likewise, adequate ecological education might be expected in this context (Iovan, 2014).

## Causes of global environmental degradation by human activities

In the context of causes of global environmental degradation, teachers strongly agreed. No significant differences were observed between and among the urban and rural teachers (Table 1). This means that they had agreed and contextualized the need to educate their students especially on the issue of climate change. In fact, the growing concerns of global warming and climate change had created to have more organizations that adopted environmental initiatives as part of their organizational mandates. Many higher education institutions (HEIs), particularly, have implemented various campus environmental initiatives through policy as well as teaching and learning activities (Kartiwi, et al., 2014).

## Causes of global environmental degradation in the atmosphere

The causes of global environmental degradation in the atmosphere revealed to have strongly agreed response among the respondent teachers. This response had no significant differences between and among the urban and rural secondary teachers (Table 1). This might imply that these teachers were more acquainted into adopting eco-education from a trans-disciplinary perspective, as part of the "new education", referring to its current dimensions. Likewise, its goals and its utility in shaping the attitudes and behaviors of contemporary humans towards their environment and towards sustainable living might their immediate concern (Abubakar, et al., 2016).



## **Causes of global environmental degradation in ecological terms**

The causes of global environmental degradation in ecological terms showed a positively strongly agreed answers among the respondent teachers. This response had no significant differences between and among the urban and rural secondary teachers (Table 1). This means that they had supported the nationwide efforts to bring environmental education to the forefront of student's lives (Contreras, 2014). Educational institutions are major drivers of change in achieving environmental sustainability both within college campuses and beyond campuses in communities at large. Students' assessment of campus sustainability components are appraised such as curriculum and research, campus operations, and community involvement (Abubakaret al., 2016).

## **Action plan for the environment and development on Agenda 21 for the survival of humankind**

Strongly agreed response among the respondent teachers was obtained when asked about action plan for the environment and development on Agenda 21 for the survival of humankind. This response had no significant differences between and among the urban and rural secondary teachers (Table 1). This implied the strong essence of this principle in adhering environmentalism to their students' learning and appreciation of nature.

## **Summary and Conclusion**

In this study, it has been observed that both urban and rural secondary teachers included in their classroom activities and curriculum the awareness of environmental education embedded in K-12 curriculum. This is regardless of the place either they were assigned in a rural or urban sites. What they opted was to follow same DepEd curriculum and guide in teaching implementation to the students. The findings of this study showed that both in rural and urban teachers' response of no significant differences, and therefore, a strong indication that environmental awareness programs are implemented in the curriculum. Particularly, it was for the goal of Agenda 21 to have a green future and green environment for sustainable development and sustainable life of the new generations to come. Education leads to more awareness of the new generation and the changing planet nowadays.

## **Implications and Recommendations**

This study implied that environmental education was embedded in both rural and urban secondary schools and implemented in the K-12 program. The findings of this study served as guide of the administrators to be more alert and aware on the things happening in the environment. As such, it might be good if administrators would let the teachers be exposed to different seminars on science symposium, seminar-workshops and other scientific forum, regardless of any area of specialization. This is because it concerned the environment and our daily life and from generation to generation. Further study is recommended in this context upon the start and operation of the K-12 program of DepEd.

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## **References**

- [1] Abubakar, I.R. Al-Shihri, F.S. S. M. Ahmed. 2016. Students' assessment of campus sustainability at the University of Dammam, Saudi Arabia. *Sustainability*. 8(1):59.
- [2] Agussalim, G. D. and B.R. Mulyadi 2014. The Ecological Behaviour of Community in Preserving Land Use in Coastal Areas of Parepare. *Journal of Environmental Science and Technology*. 7(4):218-225.



- [3] Ansary, B.S. 2015. Role of women in sustainable development. *Indian Streams Research Journal*. 2015; 5(6):1-4.
- [4] Bertschy, F., and C.s K. Meret. 2013. Teachers' Competencies for the Implementation of Educational Offers in the Field of Education for Sustainable Development *LehmannSustainability*. 5(12):5067-5080
- [5] Chowdhury, R.R., Larson, K., Grove, M., Polsky, C., Cook, E., Onsted,J., and L. Ogden. 2011. A multi-scalar approach to theorizing socio-ecological dynamics of urban residential Llandscapes. *Cities and the Environment*. 4(1):6-19
- [6] Contreras, R. 2014. Assessment of environmental literacy, Concern and Disaster Preparedness among College Students *Asia Pacific Journal of Multidisciplinary Research*. 2(3): 1-11.
- [7] Eric, G.O., Lagat, J.K., Ithinji,G.K., Mutai, B.K., Kenneth, S.W., and M K. Joseph. 2013. Maize Farmers Perceptions towards Organic Soil Management Practices in Bungoma County, Kenya. *Research Journal of Environmental and Earth Sciences*. 2013; 5(2):41-48
- [8] Feller, R.J., and C. R. Lotter. 2009. Teaching Strategies that Hook Classroom Learners. *Oceanography*. 2009; 22(1):234-237
- [9] Hapsari. F.R. 2015. Developing environment-based materials to teach writing recounts texts. *Al-Ta'lim*. 22(2):143-156 DOI 10.15548/jt.v22i2.123.
- [10] Iovan, M. 2014. Eco-education: A required element of public policies for sustainable social and economic development. *Academicus: International Scientific Journal*. 2014; MMXIV (9):14-28 DOI 10.7336/academicus.2014.09.01
- [11] Karatas, A., and M. Talas. 2012. The importance of community service practices course in improving environmental awareness: The example of Nigde University Faculty education.*Zeitschriftfür die Welt der Türken*. 2012; 4(1):107-124.
- [12] Kartiwi, M., Hasan,H., Gunawan, T.S., and B. A. Husein. 2014. Green IT Attitude and Behaviour in Higher Education Institution: A Gender Perspective. *Journal of Applied Sciences*. 2014; 14(7):714-718
- [13] Lucena, M.M., and E. M. Freire. 2014. Environmental perception as an instrument of social participation in the proposition of priority area in the semiarid. *RevistaInternacionalInterdisciplinarINTERthesis*. 2014; 11(1):147-171 DOI 10.5007/1807-1384.2014v11n1p147
- [14] Morrill, E. R. and S. L. P. Ruvalcha. 2009. The change in body stressed to relaxed body through breathing, visualization and a protective environment together. *EducaciónFísica y Ciencia*. 11(0):81-91
- [15] Rigotto, R.M., Alves,M.D. and E. P. Beserra. 2013. Educational mediation applied with students about environmental health. *ActaScientiarum: Health Sciences*. 2013; 35(1):43-48 DOI 10.4025/actascihealthsci.v35i1.10042
- [16] Roders. M. 2015. Partnering for climate change adaptations by Dutch housing associations A+BE: Architecture and the Built Environment. 2015; 5(5):1-190 DOI 10.7480/abe.2015.5
- [17] Sabo, H.M., and C. Gavrilă. 2011. The impact of flooding and environmental education. *Present Environment and Sustainable Development*. 5(2):159-165.
- [18] Shevchenko, I., 2015. Human development and ecology of the urban landscape in the context of evolutionary values of modern culture in the framework of cultural-environmental module. *Koncept: Scientific and Methodological e-magazine*. 2015; 5(№1, 2015):1-5.



[19] Špes, M., 2008. The importance of environmental awareness and public participation for sustainable development. *Dela*. 0(29):49-62 DOI 10.4312/dela.29.4.49-62.

[20] Teare, J., Kootbodien, T., Naicker, N., and A. Mathee. 2015. The extent, nature and environmental health implications of cottage industries in Johannesburg, South Africa. *International Journal of Environmental Research and Public Health*. 2015; 12(2):1894-1901 DOI 10.3390/ijerph120201894