

Effect of Games as A Strategy of Learning on Development of Awareness and Attitude of Students towards Climate Change

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ABSTRACT

In this paper, the researchers aimed to assess the awareness level and attitude of secondary school students in one academic institution towards climate change. This experimental research aged 16-17 years old, from different track and strands. Majority of the respondents were 18-17 years old (n=54) with almost equal male to female ratio. Results of the study revealed moderate to high level of awareness on issues concerning climate change. Secondary school students moderately to strongly agree on their role in addressing problems about climate change. Students became aware of climate change through several sources like television, internet, and from school. Majority of them look for further information about climate change by searching through the internet, watching television and from reading books. The high awareness level and strong positive attitude of senior high school students towards issues and concerns about climate change is a good indication that they are more likely to express willingness to act on this global problem. Raising awareness and promoting positive attitude about climate change should be one of the basic courses during early childhood education. The research findings provide an assessment on students' awareness and attitude towards climate change that could help curriculum designers integrate environmental education in curriculums.

Keywords: Environmental, Communities, knowledge, Information, Education.

Climate change awareness starts in school. McCaffrey, Berberco and Scott² pointed out that schools need new strategies and resources to address young people's lack of knowledge about the world. According to The United Nations Educational, Scientific, and Cultural Organization or UNESCO, education, awareness-raising and informed decision making played an essential role in increasing adaptation and mitigation capacities of communities, thus a need to support countries to integrate climate change education in their education system. In the study conducted by Ezeudu, Ezeudu and Sampson, senior secondary students possess low awareness towards climate change. Their respondents also have low attitude towards climate change. Besides this, Dal, Alper, Sonmez and Cokelez noted that teachers are unfamiliar on how to educate their students about issues on climate change. Carr, Buggy and McGlynn⁶ report that students' knowledge of climate change

is rife with misunderstandings, inaccuracies, and in some cases, a general lack of knowledge. Hence, students do not develop awareness and positive attitude towards climate change.

It is without a doubt that climate change is one of the emerging global concerns. Impact of climate change will be felt most by developing countries. Kreft, Eckstein and Melchior⁷ reported that Philippines are among the most vulnerable in terms of climate risk. Evidence of climate change in the India are already felt: visible shifting of seasons, more intense typhoons, and the absurd rising of ocean level⁸. Furthermore, studies have indicated that there is a rising mean temperature⁹. Undeniably, the India is affected by climate change and the need for proper information dissemination about this overwhelming situation should be one of the thrusts of the government especially the education sector. Proper environmental education and awareness can help eliminate and

overcome environmental problems in the future. Assessing students' perceptions on environmental issues will help us understand students' scientific literacy 10 which is considered an important asset for developing responsible decision-makers that will promote sustainable development in the future¹¹. With all these reasons, there is a need to assess the level of awareness and attitude towards climate change among the young. In this paper, the researchers attempted to find out the attitude of the students towards climate change, to raise climate change awareness, and to establish positive attitude towards climate change thus, making the students take the frontline in battling rapid climate change.

Objectives of the Study:

The objective of the study is to assess the awareness level and attitude of selected Grade 8 Secondary School students. Also, the research aimed to identify the demographic profile of the respondents in relation to age, gender and strand under the Academic Track. Lastly, find the sources of information the respondents use about climate change. An understanding of the respondent's awareness and attitude towards climate change is important for government and educational sector to develop curriculum that will enhance climate change literacy. Further, an idea of the public awareness among the future generation is important in improving disaster risk management and resiliency on the possible adverse effect of climate change.

The Impacts of Global Warming and Climate Change

Climate change in IPCC usage refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer (IPCC, 2007a). It refers to any change in climate over time, whether due to natural variability or as a result of human activity. Climate is changing naturally at its own pace since the beginning of the evolution of earth i.e. 4–5 billion years ago but presently it has gained momentum due to inadvertent anthropogenic disturbances. These changes may culminate in adverse impact on human health and the biosphere on which we depend. The multi-faceted interactions among the humans, microbes and the rest

of the biosphere, have started reflecting an increase in the concentration of greenhouse gases (GHGs) i.e. CO₂, CH₄ and N₂O causing warming across the globe along with other cascading consequences in the form of shift in rainfall pattern, melting of ice, rise in sea level etc. The above multifarious interactions causing variation in atmospheric composition, climate change and human, plant and animal health need to be scrutinized and probable solutions to these undesirable changes may be sought. Climate change is a serious global environmental concern. It is primarily caused by the emission of greenhouse gases (GHGs) in the atmosphere by natural or anthropogenic sources. The global increase in carbon dioxide concentration is primarily due to burning of fossil-fuel and land use change, while those of methane and nitrous oxide are primarily due to agriculture. Global warming is a specific example of the broader term "Climate Change" and refers to the observed increase in the average temperature of the air near earth's surface and oceans in recent decades. Its effect particularly on developing countries is adverse as their capacity and resources to deal with the challenge is limited. Scientific studies have shown that the global atmospheric concentrations of carbon dioxide, methane and nitrous oxide which are the most important greenhouse gases, have increased markedly as a result of human activities since 1750. Changes in the atmospheric chemistry have been noticed during last few decades due to the heightened anthropogenic activities. Global negotiations have been under way for sometimes to reduce the emissions of greenhouse gases to 1990 level, but the success of these endeavors are certainly less today due to more reluctance of the major contributors to this change. Considering the business as usual scenario, CO₂ is projected to increase at the rate of 1.8 ppm per year, reaching 397–

416 ppm by 2010 and 605–755 by 2070 (Watson et al., 1998). Along with this, change in other greenhouse gases is likely to result in a temperature increase of earth's surface and atmosphere. If a significant reduction is made in greenhouse gases emission in future even though there will be continued climate change for the next 40 or more years due to past emissions. Now, there is a global consensus about the threat posed by the climate

change. The disagreement is only, on how to go about altering human activities which are responsible for emission of greenhouse gases causing global warming. The culprit is greenhouse gases, notably carbon dioxide, methane and nitrous oxide. These are accumulating to unprecedented levels in the atmosphere as a result of profligate burning of fossil fuels, industrial processes, farming activities and changing land use. The greenhouse gases act like a blanket around the earth, trapping too much of the heat that would otherwise have escaped into space. Causes of climate change There are two major factors discussed below that cause climate change: Natural factors:

1. When sunlight reaches the earth's surface, it can either be reflected back into space or absorbed by Earth. Once absorbed, the planet earth releases some of the energy back into the atmosphere as heat (also called infrared radiation). Greenhouse gases like water vapor (H₂O), carbon dioxide (CO₂), and methane (CH₄) absorb energy, slowing or preventing the loss of heat to space. In this way, GHGs act like a blanket making earth warmer than it would otherwise be. This process is commonly known as the "greenhouse effect."

2. On time scale of a thousand years and longer, changes in the character of the earth's orbit around the sun and in its rotation can significantly affect the way in which the energy from the sun is distributed by season and by latitude. This is known as the „Milankovitch Effect“ and it generates changes which are cyclic in nature.

Consequences of climate change:

Sea level rising: During 20th century, sea level rose about 15 cm (6 inches) due to melting of glaciers and expansion of warmer seawater. Models predict that sea level may rise as much as 59 cm (23 inches) during the 21st Century, threatening coastal communities, wetlands, and coral reefs. **Arctic sea ice is melting:** The summer thickness of sea ice was about half of what it was in 1950. Now a day melting ice may lead to changes in ocean circulation. Plus melting sea ice is speeding up warming in the Arctic.

Glaciers and permafrost are melting: Over the past 100 years, mountain glaciers in all the areas of the world have decreased in size and so has the amount of permafrost in the Arctic. Greenland's ice

sheet is melting faster, too. Sea-surface temperatures are warming: Warmer waters in the shallow oceans have contributed to the death of about a quarter of the world's coral reefs in the last few decades. Many of the coral animals died after being weakened by bleaching a process tied to warmed waters.

The temperatures of large lakes are warming: The temperatures of large lakes world-wide have risen dramatically. Temperature rises have increased algal blooms in lakes, provided favorable conditions for invasive species, increased stratification in lakes and lowered water levels in lakes.

Heavier rainfall causes flooding in many regions: Warmer temperatures have led to more intense rainfall events in some areas. This can cause floodings. **Extreme drought is increasing:** Higher temperatures cause a higher rate of evaporation and more drought in some areas of the world. Crops are withering: Increased temperatures and extreme droughts are causing a decline in crop productivity around the world. Decreased crop productivity means food shortages, which have many social implications.

Ecosystems are changing: As temperatures warm, species may either move to a cooler habitat or die. Species that are particularly vulnerable include endangered species, coral reefs, and polar animals. Warming has also caused changes in the timing of spring events and the length of the growing season. **Hurricanes have changed in frequency and strength:** There is evidence that the number of intense hurricanes has increased in the Atlantic since 1970. Scientists continue to study whether climate is the cause. **Warmer temperatures affect human health:** There have been more deaths due to heat waves and more allergy attacks as the pollen season grows longer. There have also been some changes in the ranges of animals like mosquitoes that carry diseases. **Seawater is becoming more acidic:** Carbon dioxide dissolving into the oceans is making seawater more acidic. This could cause impacts on coral reefs and other marine life

Nature of Research:

The study used experimental research design to describe and assess the level of awareness and attitude of students on climate change. Only Grade 8 senior high school students under the Academic Track were selected as respondents of the study.

Conclusion and Recommendation:

The study revealed that respondents have moderate to extreme awareness on issues about climate change. Respondents show extreme awareness on statements like “climate is dynamic and is always changing through time”, “damage to the ozone layer causes climate change”, “climate change can cause more floods and drought”, and “people can help stop climate change by using more renewable resources of energy”. Further, students showed moderate to high positive attitudes about climate change. Respondents strongly agree on statements like “climate change is a very big problem”, “believe climate change is true”, and “immediate actions should be done on climate change”. The positive awareness and attitude of selected senior high school towards climate change is a good indication that in the future they will seek action to combat this global issue.

Students hear news and information about climate change through peers, newspaper, radio, internet, television and other sources. They seek further information about climate change from school and through books, television and internet. Internet was reported as an integral tool in information gathering and sharing. Information about climate change is important as it influence awareness and attitude. The more informed the senior high school students about climate change the better they can make pro-environmental decisions. Moreover, awareness level and attitude of the respondents did not differ in terms of gender and age, thus these two were not of significant factors in affecting one’s attitude and awareness towards climate change.

Results of the study gives a glance of hope that in the future, the respondents are willing to take immediate actions towards climate change. It is important that the public especially the future generation be educated of climate change. Environmental education should be an integral part of the education system in the Philippines. As climate change is integrated in school curriculum, climate literacy will improve. Government should take into consideration that outside school activities, public information drive, and research can increase awareness and promote positive attitude towards climate change. On this note, the research offers an initial step through an assessment of awareness and attitude of senior high school students as a tool in mitigating, adapting and addressing the issues of climate change.

References:

1. Wunderlich, A. (2013). Earth day all year long: climate change awareness begins in the classroom. Retrieved from <http://www.pbs.org> Retrieved September 10, 2017
2. United Nations Educational, Scientific, and Cultural Organization. (2015). Climate change education and awareness. Retrieved from <http://en.unesco.org>, Retrieved September 10, 2017,
3. Ezeudu, F., Ezeudu, S., & Sampson, M. (2016). Climate change awareness and attitude of senior secondary students in Umuahia education zone of Abia State. Retrieved September 10, 2017
4. Dal, B., Ozturk, N., Alper, U., Sonmez, D., & Cokelez, A. (2014). An analysis of the teachers’ changes awareness. Retrieved September 16, 2017
5. Carr, P., Buggy, C., McGlynn, G. (2015). Climate change awareness amongst secondary level students’ in a Dar es Salaam University College of Education (DUCE) affiliated school in urban Tanzania, Proceedings from the ICSD 201, p.19, pp.1-34
6. Saxena, S. (2016). Ocean levels in the Philippines rising at 5 times the global average. Retrieved from <https://arstechnica.com>. Retrieved September 10, 2017
7. Perez, R. T. (2016). Climate change in the Philippines. Retrieved from <http://www.dlsu.edu.ph> Retrieved September 10, 2017
8. Eroglu, S., Bektas, O., and Tarkin, A. (2016). High school students’ perceptions toward environmental issues: a phenomenological study, *The Online Journal of New Horizons in Education*, 6(4). p. 119, pp. 117-130
9. Lau, K. C., Ho, E. S. C., and Lam, T. Y. P. (2015). Effective classroom pedagogy and beyond for promoting scientific literacy: is there an east asian model?” in *science education in east asia*, edited by M. S. Khine, 13–40.
10. Oruonye, E. (2011). An assessment of the level of awareness of the effects of climate change among students of tertiary institutions in Jalingo Metropolis, Taraba State Nigeria, *Journal of Geography and Regional Planning*, ISSN 2070-1845, 4(9), pp. 513- 517.

11. Lee, T., Markowitz, E., Howe, P., & Ko, C. (2015). Predictors of public climate change awareness and risk perception around the world. *Nature Climate Change*, (5), p. 1, pp. 1014-1023
12. Bello, T. O. (2014). Assessment of secondary school students' awareness of climate change. Retrieved from, Retrieved September 26, 2017
13. Flores, C. (2017). Attitudes about climate change among Mexico City high school students. *Journal of Education, Society and Behavioral Science*, 21(3): 1-8,
14. Hope, S. (2016). Knowledge, attitudes & practices study on climate change adaptation and mitigation in Guyana, Guyana. United Nations Development Program, p.39, pp. 1-80
15. Njokua, C. (2016). Awareness of climate change and sustainable development issues among junior secondary school (JSS) students in Port Harcourt Metropolis, Nigeria. *International Journal of Curriculum and Instruction*, 8(2). pp.29–40
16. Global Shapers Community. (2017). Global Shapers Survey. Retrieved from <http://www.shaperssurvey2017.org>
17. Pew Research Center. (2011). Section 8: Domestic and Foreign Policy Views. Retrieved from <http://www.people-press.org>
18. Nuccitelli, D. (2016). The climate change generation gap. Retrieved, from <http://thebulletin.org>, Retrieved September 26, 2017
18. Bugge-Henriksen, C., & Harker-Schuch, I. (2013). Opinions and knowledge about climate change science in high school students. Retrieved from <https://www> Retrieved September 26, 2017
19. Maibach, E. (2016). Public attitudes about climate change and clean energy. Retrieved from <http://www.eesi.org/briefings/view/100616polling>, Retrieved September 27, 2017
20. Shahadu, H. (2012). Youth understanding of climate. Retrieved from www.lse.ac.uk/media@lse/researchmediaWorkingPapers/MScDissertationSeries/2011/61.pdf, Retrieved September 27, 2017.
21. International Union for Conservation of Nature. (2015). Gender and climate change. IUCN Issues in Briefs. pp.1-2
22. United Nations Children's Fund. (2011). Knowledge, Attitudes and Practices survey on children and climate change, p. 24
23. Leppanen, J.M., Haahla, A.E., Lensu, A.M., & Kuitunen, M.T. (2012). Parent-child similarity in environmental attitudes: a pairwise comparison. *Journal of Environmental Education*, 43(3), pp.162- 176.
24. Tosunglu, C. (1993). A study on the dimension and determinants of environmental attitudes. PhD thesis, Middle East Technical University, Ankara.
25. Ajuang, C. O., Abuom, P. O., Bosire, E. K., Dida, G. O., & Anyona, D. N. (2016). Determinants of climate change awareness level in upper Nyakach Division, Kisumu, County, Kenya. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4938833/>, Retrieved September 26, 2017,
26. Westerman, D., Spence, P., & Van Der Haide, B. (2014). Social media as information source: recency of updates and credibility of information. *Journal of Computer-Mediated Communication*. 19(4): 171-183.
27. Newell, R. & Dale, A. (2015). Meeting the climate change challenge (mc3): the role of the internet in climate change research dissemination and knowledge mobilization. *Environmental Communication*, 9(2), pp.208–227. DOI:10.1080/17524032.2014.993412
28. Kakade, O., Hiremath, S., and Raut, N. (2013). Role of media in creating awareness about climate change- a case study of Bijapur City. *IOSR Journal of Humanities and Social Science (IOSR-JHSS) Volume 10, Issue 1, PP 37-43 e-ISSN: 2279-0837, p-ISSN: 2279-0845.*
29. Filho, L. (2010) Climate change management vol. 1, universities and climate change - introducing climate change to university programmes. Springer, Berlin. Retrieved from <http://www.springerlink.com> Retrieved August 5, 2010

