

319. Effects of Newspapers in Education (NIE) Intervention with News Reports about Global Warming: A Cognitive Learning Perspective

*Chien-Hung Chen**

Department of Business Administration, Dahan Institute of Technology,
No.1, Shuren St., Hualien City, Hualien County, Taiwan
cchg@ms01.dahan.edu.tw

Mi-Hsiu Wei

Department of Communication Studies, Tzu Chi University,
No. 701, Sec. 3, Jhongyang Rd., Hualien City, Hualien County, Taiwan
michelle@mail.tcu.edu.tw

Abstract. The purpose of this study was to exam the effectiveness of an intervention of Newspapers in Education (NIE) which focusing on global warming. A nonequivalent experimental control group design was used. The participants were 209 students in the continuing education division of a technology college in Taiwan. There were

106 students in experimental group, and 103 students in control group. The intervention materials were 150 newspaper reports about global warming selected from Taiwanese newspapers published in 2009. Students in experimental group read five reports each day for one month, while no any intervention was made in control group. The results showed that when media usage behavior and issue involvement in global warming were controlled, the intervention of NIE had significant effectiveness on the concept connections between related concepts (including global warming, climate change, green industry, green consumption, and environment policy). Attitudes toward green consumption and green consumption behavior also increased significantly in experimental group. This study suggests that news media is an effective tool for dissemination of science information. Science news reports selected appropriately could be used as educational materials for science education.

Keywords: global warming, Newspapers in Education (NIE), news, science education, science communication

Introduction

Since the industrial revolution, people have been extensively using fossil fuels such as coal and oil in pursuit of economic growth, resulting in a significant increase of greenhouse gases in the atmosphere (Huang, 2007). In consequence greenhouse effects have caused an increase in the average global surface temperature, and have had a serious impact on the global climate. In addition to the international community's commitment to the reduction of greenhouse gas emissions, people have to seriously consider the post-global warming state of the environment and adjust existing life styles, to face the seemingly irreversible global warming and climate change phenomena (Ku, 2008).

People have more and more diverse channels of knowledge acquisition. In everyday life, knowledge learning through informal channels, such as travel, visits, mass media, newspapers, magazines, the Internet, and multimedia, have been gradually increasing. Millar (1997) pointed out that science or technology impacts can be directly perceived by the general public mostly through news reports on social or scientific issues. Cultivation theory pointed out that the long-term influence of media will affect people's perceptions, attitudes, and behaviors (Morgan & Signorielli, 1990). Among the different types of mass media, newspapers are an important source of information.

In the consumer-oriented era, the collective environmental awareness of consumers has a dominating influence on the market toward green production. Promoting the cognitive between the environment and consumption behavior through public education is a key to the promotion of green consumption. Studies on Newspapers in Education (NIE) of global warming-related issues are scarce. This study can help us to understand the effectiveness of NIE about global warming.

Economic growth

Over the past few decades, unprecedented economic expansion has made the global economy a trend. The

focus of international development in the past 20 years has been to accelerate the integration of developing nations into the global economy through the structural adjustment plans and policy mechanisms of the International Monetary Fund and the World Bank (Roseland & Soots, 2007). The industrial economy has changed tremendously. Cities dominated by industry for a long time are now ready to grab the next wave of global economic opportunity, which is linked to green and clean development (Sawin & Hughes, 2007).

Global warming

In recent decades, due to the rapid increase in population and fast industrial development, carbon dioxide generated from the heavy use of fossil fuels, such as coal, oil, and natural gas, has been far greater than the level of carbon dioxide formed naturally. Coupled with mankind's deforestation and vegetation destruction, as well as the reduction of tropical rainforests, chances to convert carbon dioxide to organic compounds through plants have been declining. Large quantities of greenhouse gases are being discharged, resulting in a rapid increase of the carbon dioxide concentration in the atmosphere and strong greenhouse effects (Liu, 2007).

Climate change

The rapid development of the global economy has resulted in a significant increase in energy use and a sharp rise in the consumption of fossil fuels. Coupled with the large-scale deforestation of land resource development, the global carbon cycle has been damaged, causing the recent warming trend and creating a significant impact on the climate (Ku, 2008). The rising average global surface temperature will have an impact to a certain degree on the weather systems in every region. More and more evidence suggest that global warming has started to cause chaos in the climate systems of many parts of the world, affecting ecosystems and endangering the stability of the human environment (Su, Lin, & Chen, 2008).

Environment policy

In December 1997, on the third conference of contracting members of the United Nations Framework Convention on Climate Change held in Tokyo, Japan, member nations adopted the legally binding Kyoto Protocol. The Kyoto Protocol came into force on February 16, 2005, requiring developed nations to reduce the emissions of six greenhouse gases between 2008 and 2012 (Chan & Hung, 2007; Huang, 2007).

Green industry

In recent years, the EU has released a number of EU environmental directives or regulations, such as RoHS, WEEE, and EuP, directly forcing manufacturers of products entering the EU market to comply with specific environmental requirements. The EuP directive stresses that manufacturers using energy products should assess the environmental impact of their products at various stages, including raw materials, manufacturing and assembly, transportation and distribution, usage and maintenance, and discharge and recycling, and propose concrete measures to improve their environmental impact. Wang, Kuo, & Tang (2007) pointed out that industries and supply chain systems should respond in real time and actively integrate the considerations in the environmental perspective in order to incorporate the ecodesign or design for environment concepts and technology during the product design stage.

Green consumption

Peattie (1992) believed that green consumption means that consumers are aware of environmental degradation and try to buy goods that minimize their impact on the environment, thus achieving their consumption purpose while reducing damage on the environment. Green consumption is the pursuit of sustainable and socially responsible consumption. The behavior criteria for consumers buying green products include reduce, reuse, recycle, regenerate, repair, refuse, and recover.

The global warming related issues summarized in this study included global warming, climate change, environment policy, green industry, green consumption and economic growth.

Methodology

The cognitive association graph of the global warming-related issues proposed in this study is shown in Figure 1, and was the framework of this study with a total of 30 paths of influence.

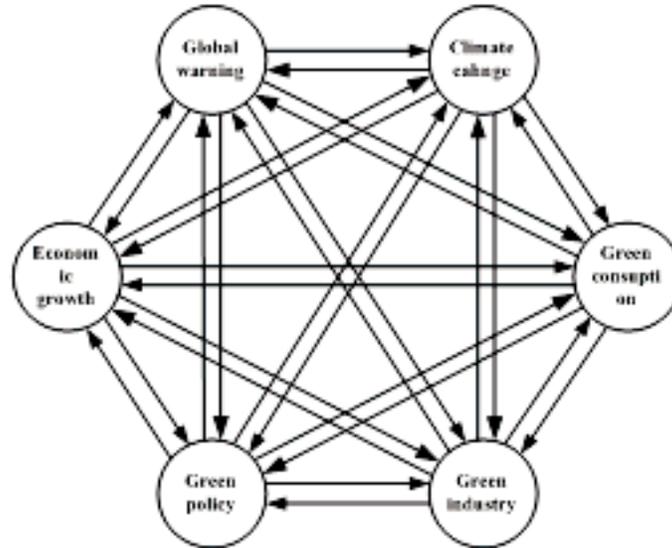


Figure 1. Conceptual model

Study design

This study used the nonequivalent control group design shown in Table 1. The pre-experiment and post-experiment tests used the same measurement tools. In this study, five variables were used as covariates, including number of hours per week spent reading newspapers, number of hours per week spent watching TV, number of hours per week spent listening to the radio, number of hours per week spent online, and degree of global warming-related issue intervention.

Table 1. Experiment design			
Group		Pre-test	Intervention
Post-test			
Experimental group	Y1	X	

Control group
Y4

Y2

Y3

Subject

The research subjects were 209 students from the continuing education division of a technology college in Taiwan, who were divided into an experimental group with 106 subjects and a control group with 103 subjects.

Intervention

The intervention materials were 150 newspaper reports about global warming selected from Taiwanese newspapers published in 2009. Students in experimental group read five reports each day for one month, while no any intervention was made in control group.

Measurement

This study used self-developed questionnaires as research tools. The variables included connections between global warming related concepts, attitude toward green consumption, green consumption behavior, issue involvement in global warming issue, and media usage behavior (Shih Hsin University, 2007).

Results

Regarding connections between global warming related concepts, both the experimental group and the control group believed that there was a positive relationship between global warming, climate change, environment policy, green industry, green consumption and economic growth. To exam the effect of NIE intervention on cognitive, this study employed group as independent variable, post-test of connections between global warming related concepts as independent variables, and with pre-test of connections between global warming related concepts, issue involvement in global warming issue, and media usage behavior as covariates for validation. According to ANCOVA analysis

results, after intervention, a total of 14 post-test variables of concepts connection have significant differences between experimental and control groups at $p < .05$ significance level (as shown in Figure 2).

To verify the changing effects of intervention on attitudes toward green consumption and green consumption behavior, this study used group as independent variables, post-test of the attitude toward green consumption and green consumption behavior as dependent variables, and with the pre-test of the attitude toward green consumption, green consumption behavior, issue involvement in global warming issue, and media usage behavior as covariates. The ANCOVA analysis results indicate that NIE had a positive impact on attitudes toward green consumption and green consumption behavior.

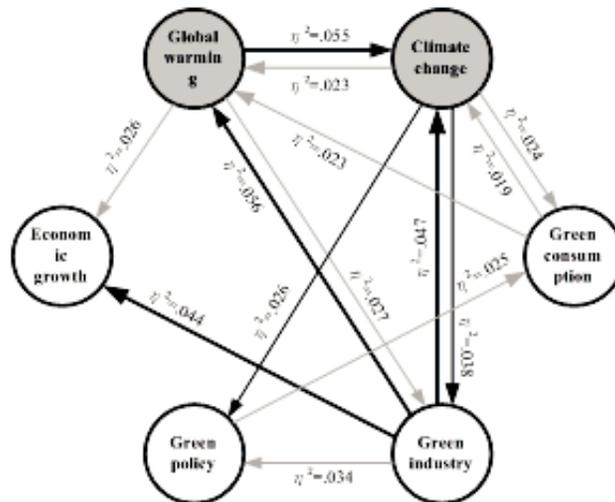


Figure 2. The effect of NIE on concept connections regarding global warming

Conclusion

The NIE intervention enhance concept connections regarding global warming

The NIE of global warming related issues has an enhancing impact on the concept connections of adult students. Such impacts can be found in issues such as the global warming, climate change, green industry, and other topics.

The effect of NIE intervention on green consumption was indirect

After intervention the cognitive enhancement effect of global warming affecting green consumption was mainly achieved through paths as “global warming→climate change→green consumption”, “global warming→climate change→environment policy”, and “global warming→climate change→green industry→environment policy→green consumption”.

The NIE had a positive impact on attitudes toward green consumption

For global warming-related issues, NIE can positively improve the attitude toward green consumption of adult students. The students believed that they should improve their consumption behavior, persuade others to participate in green consumption, affect enterprises to invest in green industries, support the green polices of the government, and should take on environmental protection responsibilities.

The NIE had a positive impact on green consumption behavior

NIE for global warming-related issues can help improve the green consumption behavior of adult students. They believed they would follow the green consumption behavior criteria, including reducing usage, the reduction of unnecessary waste, recycling, regeneration, repairing, the rejection of ecologically harmful products, and ecological restoration.

Suggestion

NIE can be an useful method for environment education about global warming

The results suggested that NIE can be used to environment education. Government and school can use NIE to the promot energy savings and carbon reduction. News stories can be edited for teaching materials according to learning theories and teaching material compiling principles.

Increasing causal links of global warming related concepts in news reports

As the experimental results suggest, the concept connections between global warming affecting green consumption was not yet significant. It was recommended to increas the causal links of global warming related issues to help readers in their cognitive construction.

Analyze the content of news reports regarding global warming issues

This study did not analyze the content and fram of news reports regarding global warming. In the future, it was recommended to further analyze the content to understand what are the newspaper cover news reportes about global warming.

Acknowledgements

Funding of this research work was supported by the National Science Council (grant number NSC 98-2511-S-122-001), Taiwan, R.O.C.

References

- Chan, Y. L. & Hung, K. P. (2007). Industry energy conservation. *Science Development*, 413, 18-23. (In Chinese)
- Charter, M. (1992). *Greener marketing: A responsible approach to business*. Sheffield, England: Greenleaf Publishing.
- Huang, C. F. (2007). CO2 and global warming. *Science Development*, 413, 6-12. (In Chinese)
- Huang, J. C. (2006). The research on the senior high school and the vocational school students' cognition, attitudes and behavior toward green consumption in four counties of southern Taiwan. Unpublished master's thesis, National University of Tainan, Tainan, R.O.C. (In Chinese)
- Hung, S. C. (2009). A study on the attitude and behavior of green consumption of residents in city and countryside. Unpublished master's thesis, Asia University, Taichung, R.O.C. (In Chinese)
- Ku, Y. (2008). In response to global warming. *Science Development*, 421, 6-11. (In Chinese)
- Lee, M. H. (2006). A study of knowledge and behavior of elementary school students' green consumption in Pingtung Country. Unpublished master's thesis, National Pingtung University of Education, Pingtung , R.O.C. (In Chinese)
- Lin, W. N. (2008). A study of green consumer behavior's in metropolitan areas. Unpublished master's thesis, Chinese Culture University, Taipei, R.O.C. (In Chinese)
- Liu, W. T. (2007). Utilization of carbon dioxide. *Science Development*, 413, 34-39. (In Chinese)
- Millar, R. (1997). Science education for democracy: What can the school curriculum achieve? In R. Levinson & J. Thomas (Eds.), *Science today: Problem or crisis?* (pp. 87-101). London: Routledge.
- Morgan, M. & Signorielli, N. (1990). Cultivation analysis: Conceptualization and methodology. In N. Signorielli & M. Morgan (Eds.), *Cultivation analysis: New directions in media effects research* (pp. 13-34). Newbury Park, CA: Sage.
- Peattie, K. (1992). *Green marketing*. London: Pitman Publishing.
- Roseland, M., & Soots, L. (2007). Strengthening local economics, In Worldwatch Institute (Ed.), *State of the world 2007: Our urban future* (pp.152-171). New York: W. W. Norton & Company.
- Sawin, J. L., & Hughes, K. (2007). Energizing cities, , In Worldwatch Institute (Ed.), *State of the world 2007: Our urban future* (pp.90-111). New York: W. W. Norton & Company.
- Shih Hsin University College of Communication Research Center of the communication industry (2007). *2007 Shih Hsin University communication database: Report on media use behavior*. Taipei: Publisher. (In Chinese)
- Su, H. C., Lin, C. K., & Chen, P. S. (2008). Climate change impacts on public health. *Science Development*, 421, 12-17. (In Chinese)
- Wang, C. H., Kuo, T. C., & Tang, Y. H. (2007, December). The study of Counseling electronics industry to promote eco-design. *2007 Conference Proceedings of Clean Manufacturing and Sustainable Development* (pp. 125-132). Taipei: Ministry of Economic Affairs. (In Chinese)
-