

THE PUBLIC UNDERSTANDING OF EMERGING TECHNOLOGY IN EAST TAIWAN AREA: AN EXAMPLE OF NANOTECHNOLOGY

Tzu-Yang Huang, Chih-Hsiung Ku

National Dong Hwa University, Taiwan, R. O. C.

E-mail: chku@gms.ndhu.edu.tw

Abstract

The purpose of the research was to understand the public's social image of emerging technology—nanotechnology. Furthermore, the differences among different major students and the decision-making style in “self-evaluation and other-evaluation” were analyzed too. In this research, the social image was defined by three phases, “general image of nanotechnology”, “business decision behavior of nanotechnology”, and “free recall of nanotechnology”. The research instrument was a self-designed questionnaire “college student' social image of nanotechnology”. The participants were 256 college students selected using convenience sampling from one university in the east Taiwan area. The main findings were: (1) Students tended to agree that nanotechnology is better than other general-tech. (2) The college students believed that they have more rational attitude and behavior to make decision than others. (3) Most college students' association related "nanotechnology image" with "high tech" in thinking.

Keywords: nanotechnology image, public understanding, social image.

Introduction

Nanotechnology seems to be an important emerging technology in contemporary society. From the position of education, modern civil should have the competencies of nanotechnology. College students will become new members of the society in the future. They received information of nanotechnology from many ways, such as formal curriculum and mass media. So, the social image of the emerging technology is indeed a concerned issue in modern society. The purpose of the research was to understand college students' social image of emerging technology. The nanotechnology was selected as the target of emerging technology. Beside the social image of nanotechnology that was studied by college students, the differences among different major students and the decision-making style in “self-valuation and other-valuation” were analyzed too.

Research Methodology

In this research, the social image was defined by three phases, “general image of nanotechnology”, “business decision behavior of nanotechnology”, and “free recall of nanotechnology”. Based on the definition of social image above, the research instrument was a self-designed questionnaire named as “college student's social image

of nanotechnology, CSSIN”. The instrument “CSSIN” was designed as Likert’s four-point rating scale. The reliability of phase “general image of nanotechnology” was Cronbach α .77, and was .83 for “business decision behavior of nanotechnology”. The instrument content was based on expert validity by three professionals. One is a scientist, one a science educator, and one a senior teacher.

The participants were 256 college students selected from one university in the east Taiwan area. All participants were categorized as two groups by their majors–science-major group (SMG) and non-science major group (NSMG). The data was analyzed by descriptive statistics and *t*-test for significant difference.

Research Results

Phase 1: General Image of Nanotechnology

The college students’ general image of nanotechnology was shown as table 1. Only the mean of sub-category 3 was lower than 2.5 and the mean of sub-category 1 and 2 were higher than 2.5. So, students tend to agree that nanotechnology was better than other general-tech, and the products of nanotechnology were better than others too. Besides, college students think that people choose nanotech products does not mean that she or he has a better understanding of nanotechnology.

Table 1. College students’ general image of nanotechnology.

Sub-category	Items	M	SD
The high-tech superiority of nanotechnology	The efficacy of nanotechnology product is often superior to the general technology products.	2.84	.571
	Nanotechnology products will be relatively easy to use.	2.68	.588
	The efficacy of nanotechnology product will last longer than the general technology one.	2.62	.614
	To label nanotechnology on the product is helpful to improve the value of the commodity.	3.15	.642
	Nanotechnology products is a high-tech.	3.14	.645
	Subtotal	2.89	.419
The possible development of nanotechnology in the future	Nanotechnology is amazing, it makes life more comfortable and convenient and secure.	2.84	.602
	Extensive application of nanotechnology can solve many problems in the world	3.02	.632
	Continue the development of nanotechnology in the medical field, some terminally ill can be treated by nanotechnology in the future	3.03	.694
	Subtotal	2.96	.483
The understanding and consumption about nano-technology product	People choose nanotech products mean that she or he has a better understanding of nanotechnology	2.12	.765

Phase 2: Business Decision Behavior of Nanotechnology

College students' business decision behavior of nanotechnology was shown as table 2. In addition to item 6, there were significant differences between the other items. It revealed that the college students didn't exclude the purchase of nanotech products, but they believe that they had more rational attitude and behavior to make decision than the others performed.

Table 2. College students' business decision behavior of nanotechnology.

Item number	Evaluating myself on business decision behavior of nanotechnology	M	SD	t-score
	Evaluating others on business decision behavior of nanotechnology			
1	When the prices of products were the same, I would choose the nanotechnology products first.	2.88	.609	6.303**
	When the prices of products were the same, other people would choose the nanotechnology products first.	2.59	.620	
2	I would choose to have the same functionality of nanotechnology products even if the price was higher.	2.27	.556	-2.226*
	Other people would choose to have the same functionality of nanotechnology products even if the price was higher.	2.37	.586	
3	I think that the products of nanotechnology must be better than the normal ones.	2.14	.568	-7.362**
	Other people think that the products of nanotechnology must be better.	2.47	.625	
4	I think nanotechnology merchandise is sold better than general merchandise.	2.55	.684	-2.458*
	Other people think nanotechnology merchandise is sold better than general merchandise.	2.66	.643	
5	When I want to buy something, I will choose the product of nanotechnology in particular.	2.19	.591	-4.879**
	When other people want to buy something, they will choose the product of nanotechnology in particular.	2.39	.609	
6	The recommendation of friends and relatives will increase my willingness to buy the product of nanotechnology.	2.69	.628	-1.124
	The recommendation of friends and relatives will increase other people's willingness to buy the product of nanotechnology.	2.74	.618	
7	Advertising or shopping station sales will increase my willingness to buy the product of nanotechnology.	2.20	.675	-7.574**
	Advertising or shopping station sales will increase the other people's willingness to buy the product of nanotechnology.	2.54	.662	
8	Artist or expert endorsements will increase my willingness to buy the product of nanotechnology.	2.22	.773	-6.752**
	Artist or expert endorsements will increase the other people's willingness to buy the product of nanotechnology.	2.54	.691	
total	Evaluating myself on business decision behavior of nanotechnology	2.39	.406	-5.439**
	Evaluating others on business decision behavior of nanotechnology	2.54	.461	

* $p < .05$, ** $p < .01$

Phase3: Imagination about Application of Nanotechnology in the Future

College students’ imagination about application of nanotechnology in the future was shown in table3. The medical application was most students’ imagination (54.70%). Articles for daily use, cosmetic and skin care products were the second and the third. (19.9%, 14.50).

Table 3. College students’ imagination about application of nanotechnology in the future.

Imagination about application of nanotechnology in the future	All Subjects (N=256)		Science-major (N=115)		Non-Science-major (N=141)	
	number	percentage (%)	number	percentage (%)	number	percentage (%)
Medical	140	54.70	62	53.90	78	55.30
Articles for daily use	51	19.90	13	11.30	38	27.00
Cosmetic and skin care products	37	14.50	11	9.60	26	18.40
Manufacturing of computer and electronics	31	12.10	12	10.40	19	13.50
Manufacturing of materials	21	8.20	12	10.40	9	6.40

Conclusions

The main findings were: (1) Students tend to agree that nanotechnology is better than the other general tech, so the products of nanotechnology are better than others too. (2) The college student didn’t exclude the purchase of nanotech products, but they believe that they have more rational attitude and behavior to make decision than others. (3) Most college students’ association relate "nanotechnology image" with "high tech" in thinking. There are slightly different image associations with" nanotechnology R & D "and "nanotechnology sales" staff in thinking. And the "internet websites" was the best resource for the most college students to get the information of nanotechnology and its products. (4) There was no significant difference between science-major and non-science major students of "nanotechnology general image" and "nanotechnology business judgment behavior". However, the science and engineering department student association "nanotechnology image" and the application of future suspect in thinking tend to use scientific expertise, and the non-science major students tend to use general knowledge or intuition.

Acknowledgement

The authors thank the MOST (Taiwan, ROC.) for funding this project.

References

- Boulding, E. K. (1956). *The image: Knowledge in life and society*. New York: Harper & Row.
- Stevens, S. Y., Sutherland, L. M., & Krajcik, J. S. (2009). *The big ideas of nanoscale science and engineering: A guidebook for secondary teachers*. Arlington, VA: NSTA Press.