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Curriculum as an International Text: Evaluation of Global Education from Junior High School Students' Knowledge and Attitude in Taiwan

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Abstract

This study is interested in understanding curriculum as an international text and evaluating the connections between junior high school students' global knowledge and attitudes and the required national curriculum in Taiwan. The study also examines whether the global knowledge and attitudes vary by demographic variables. By using the Global Knowledge Scale and Global Attitudes Scale, data were collected from 1,017 students in central Taiwan and analyzed by descriptive statistics, chi-square and one-way MANOVA. The results of this study revealed that, first, the global knowledge of the junior high school students was insufficient, but their global attitudes were positive. Second, there was no gender difference in global knowledge but there was a difference in global attitudes. Third, ninth graders held significantly the highest knowledge and attitudes than eighth graders and seventh graders. Fourth, there was a socioeconomic status difference in global knowledge and attitudes. Finally, students with overseas travel experience have better global knowledge and attitudes. This study suggests that practitioners and researchers need to find practical ways to improve global education including curriculum design and implementation, teacher preparation, school environment, and students' assessment.

Keywords: Global education, Global knowledge, Global attitudes, Junior high school students

1. Introduction

The 21st Century is the age of globalization which is an ongoing process of intensifying economic, social, and cultural exchanges across the planet. Globalization is about the increasing integration and coordination of markets, production, as well as of consumption and exchanges of cultures that make the old bound-nation-state increasing untenable. These global economic forces are stimulating the migration of people in unprecedented numbers from and to every corner of the earth. They are challenging schools everywhere and in multiple ways. New global realities increasingly define the contexts in which youth are growing up, living, learning, loving, and working. Indeed, globalization in its various manifestations—economic, demographic, socio-cultural—is a quotidian part of the experience of youth today. North and South, East and West, youth are creating and exchanging ideas with people in faraway places; they are wearing similar clothing, sharing tastes in music, following the achievements of today's global sports heroes and gravitating toward the same websites. This is the first generation in human history in which the fortunes of youth growing up far apart will be demonstrably linked by ever more powerful global socioeconomic and demographic realities

(Suárez-Orozco and Sattin 2007).

How is this relevant to education? According to Kirkwood (2001), students today face a new world order and their daily contacts include individuals from diverse ethnic, gender, linguistic, racial, and socioeconomic backgrounds. Moreover, students experience some of history's most serious health problems, inequities among less-developed and more-developed nations, environmental deterioration, overpopulation transnational migrations, ethnic nationalism, and the decline of the nation-state. Wilson (1993) suggests that schools adopt a global or international perspective in their curricula and that the school mission statement should include the goal that students gain a global perspective as an integral part of their education for citizenship in the 21st Century. Type (1999) argues that changes in educational program, state guidelines, and textbooks should place more emphasis on world cultures, world history, and geography. It has been a little more than 20 years since the term global education was coined. The goals we associate with global education are an important part of the curricula of many other nations for a variety of reasons. Whatever the reasons, global education is becoming a worldwide movement (Tye and Kniep,1991).

Globalization has greatly influenced education, economy and politics. Like other countries of the world, Taiwan is zealously working to improve national competitiveness. Taiwan's educational system now needs to take a step towards upgrading the quality of its education. In keeping with the 21st Century and the global trends, the government engages in educational reform in order to foster national competitiveness and the overall quality of citizens' lives. The Ministry of Education (hereafter referred to as the MOE), therefore, initiated curricular and instructional reforms in elementary and junior high school education. The current *Curriculum Frameworks for Elementary Schools and Junior High Schools* were revised and promulgated in 1993 and 1994 respectively. The current *Curriculum Frameworks* have been gradually and properly implemented. In the 2002 academic year, all of junior high schools started to implement Grade 1-9 Curriculum. According to the Grade 1-9 Curriculum one goal is to further cultural learning and international understanding which involves appreciating and respecting different groups and cultures, understanding the history and culture of one's own country as well as others', recognizing the trend of the globalization in which countries all over the world are integrated into a global village, and developing a global perspective with mutual interdependence, trust and cooperation. In order to achieve this goal, competence indicators are developed and set in seven learning areas at various learning stages. These competence indicators are related to global education.

Elementary and secondary school levels are critical stages for students to develop the concepts and skills of global issues and culture understanding (Angell and Avery, 1992). In this study, we are interested in evaluating the connections between junior high school students' global knowledge and attitude and national curriculum, Grade 1-9 Curriculum in Taiwan. Moreover, global knowledge and attitude vary by students' gender, grade, family social-economic status, and overseas travel experience. By shedding light on the complex ways in which students learn global knowledge and develop global attitude during adolescence, this paper provides information critical to global education. These findings should stimulate reflection on the curriculum of global education, not only in Taiwan but in any society where global education aims at contemporary relevance through its impact on young people.

2. Global Education

What is the global education? There are many definitions of global education. Hanvey (1982) explores education for a global perspective which includes dimensions of perspective consciousness, state of the planet awareness, cross-cultural awareness, knowledge of global dynamics, and awareness of human choices. Global education will enhance the individual's ability to understand his or her condition in the community and the world and will improve the ability to make effective judgments. It includes the study of nations, cultures, and civilizations, including our own pluralistic society and the societies of other peoples, with a focus on understanding how these are all interconnected and how they change, and on the perspective of world issues, problems and prospects, and an awareness of the relationships between an individual's enlightened self-interest and the concerns of people elsewhere in the world. Kniep (1989) has argued that the structure of global education should include four components that are derived from present and historical realities: a) the study of human and universal values, such as human rights, value, dignity, and worth of all human beings; b) the study of global systems, such as economic, political, ecological, and technological systems; c) the study of global issues and problems, such as peace and security issues, developmental issues, environmental issues, and human rights issues; d) the study of global history, such as connections and exchanges among civilizations.

Following Hanvey and Kniep, others have developed the concept of global education. Anderson (1991) defines global education as involving learning about those problems and issues which cut across national boundaries and about the interconnectedness of systems—cultural, ecological, economic, political, and technological. Tye and Tye (1992) point out that global education also involves learning to understand and appreciate our neighbors with different cultural backgrounds than ours, to see the world through the eyes and minds of others; and to realize that all peoples of the world need and want much the same things. Diaz, et al. (1999) define global education as having three kinds of outcomes: cognitive, affective, and participatory. The cognitive dimension is the knowledge which the individual possesses of other cultures and how the world systems operate, the affective is the extent to which the individual

empathizes with the values of other cultures, and the participatory is the willingness to take a stand on issues. Therefore, in order to promote students' cognitive, affective, and participatory outcomes, curricula for the society must include multicultural and international content (Clarke, 2004).

According to Pike and Selby (1999) and Hicks (2003), there are four dimensions of global education. First, the issue dimension embraces five major problem areas (corresponding solutions to them): inequality/equality; injustice/justice; conflict/peace; environmental damage/care; alienation/participation. Second, the spatial dimension emphasizes exploration of the local-global connections that exist in relation to these issues, including the nature of both interdependency and dependency. Third, the temporal dimension emphasizes exploration of the interconnections that exist between past, present, and future in relation to such issues and, in particular, scenarios of preferred futures. Fourth, the process dimension emphasizes a participatory and experiential pedagogy which explores differing value perspectives and leads to politically aware local-global citizenship. Recently, Mansilla and Gardner (2007) recommended the investigation of a conceptual map highlighting four core problem areas that embody globalization's central tensions and dilemmas: economic integration, environmental stewardship, cultural encounters, and governance and citizenship.

Early research on children's cross-cultural knowledge and attitude is often traced to discover how children view their own political and cultural identities at different ages and stages of development, such as in Piaget and Wei (1951). In contrast, many studies administrated in different countries focuses on examining youths' knowledge, attitude, interest, or perception (Asia Society, 2001;Giffin et al., 2002;Osunde, 1996; Pike et al., 1979;RoperASW for National Geographic Education Foundation, 2000;Yu, 2002, Zhao et al., 2006; Zhao et al., 2005). These studies reveal similar findings: that is, that students' global knowledge and attitude are not sufficient. Moreover, there are some studies that have investigated the sources influencing students' global knowledge (Lambert and Klineberg, 1967;Petri, 1988; Davies et al., 2005). Furthermore, several studies (Blankenship, 1990; Roberts, 1994, Giffin et al., 2002) are interested in examining whether the global knowledge varies according to students' gender, grade, and race.

In Taiwan, there are not many studies on global education at the secondary school level, such as examining global education teaching at senior high school level conducted by (Liu, 2008; Wang, 2003). Another research style is document analysis of global knowledge in elementary and secondary school textbooks (Wang, 2003;Wang, 2007;Yang, 2003; Zhang, 2007). Among these studies which were conducted in Taiwan, only one of them (Jian, 1991) probed junior high students' global knowledge and attitude before new curriculum, Grade 1-9 Curricular implementation in Taiwan. In order to respond to the age of globalization, Grade 1-9 Curriculum offers competence indicators as learning objectives related to global education for students' to achieve in each learning areas. However, will the achievement of competence indicators promote better global awareness in junior high school students than the old curriculum system which did not respond to globalization? Nowadays, do Taiwan junior high school students have more knowledge and a more positive attitude toward global education than before?

This study classified global knowledge into four categories by referring and integrating the theoretical frameworks suggested in previous work (Clarke, 2004; Hanvey, 1982;Hicks, 2003; Kniep, 1989; Merryfield, 2002; Pike and Selby, 1999; Tye and Tye, 1992), including a) global correlation systems, b) global issues, c) cross-culture understanding, d) global history and geography. The following are descriptions of each element of global knowledge, also including global attitude:

a. Global correlation systems: the interdependency and correlation among politics, economy, ecosystem, environmental pollution, social change, sciences, technology, and universal system.

b. Global issues: international and controversial issues, such as technology, population, ethnicity, energy resources, food, ecological environment, health and hygiene, and globalism.

c. Cross-culture understanding: understandings and appreciation of different cultural backgrounds, viewpoints, religions, history, and geography.

d. Global history and geography: refer to the evolution of human being's values, the historical development of a global system, and the background and reasons causing global problems nowadays.

e. Global attitude: including tolerance and appreciation, life and human rights, global dependence, communication and cooperation, war and peace, global responsibility, global thinking and local action.

3. Method

3.1 Research questions

The purposes of this study were to investigate global knowledge and attitude for junior high school students in Taiwan. In particular we intended to explore the following questions:

a. How is junior high school students' overall global knowledge and global attitude?

b. Is there a difference among four dimensions of global knowledge as reported by students?

c. Do global knowledge and attitude vary by students' gender, grade, family socioeconomic status, and overseas travel experience?

A questionnaire containing 60 items was developed by the authors to investigate the knowledge regarding students' global correlation systems, global issues, cross-culture understandings, and global history and geography, and 45 items were developed to examine students' global attitude to tolerance and appreciation, life and human rights, global dependence, communication and cooperation, war and peace, global responsibility, global thinking and local action. During the initial development stage of the questionnaire, teacher educators in social studies, secondary school teachers, and junior high school students were invited by the authors to review the questionnaire content to ensure the validity of global education categorizations.

3.2 Samples

The total subjects in the study were 1,017 junior high school students from central Taiwan. There were 485 males and 532 females from eleven junior high schools. The social-economic status of subjects was as follows: 142 high socioeconomic status students (14% of samples), 217 middle socioeconomic status students (21% of samples), and 658 low socioeconomic status students (65%). The grade composition of subjects was as follows: 346 students (34% of samples) were seventh grade; 336 students (33% of samples) were eighth grade; 335 students (33% of samples) were ninth grade. Prior to completing the anonymous questionnaire, students were provided with a brief explanation of appropriate response procedures.

3.3 Research Instruments

The study utilized questionnaires to assess junior high school students' global knowledge and global attitude. Students completed a background information form and a 'Global Knowledge Scale (GKS)' and 'Global Attitude Scale (GAS).'

Global Knowledge Scale. Based upon the work of Pike and Barrows (1979) and Petrie (1988), and by consulting with teacher educators in the social studies, 60 multiple-choice items were chosen for the scale. These multiple-choice items could be divided into four major dimensions. The first part, consisting of 12 items, assessed students' knowledge of global systems including the interdependence and correlations among politics, economy, ecosystem, environmental pollution, social change, sciences, technology, and universal system. The second part, consisting of 32 items, explored their realization of global issues, including international and controversial issues, such as technology, population, ethnicity, energy resources, food, ecological environment, health and hygiene, and globalism. The third part, consisting of 8 items, investigated their knowledge of cross-cultural understanding and appreciation of different cultural backgrounds, viewpoints, religions, history, and geography. The fourth part, consisting of 8 items, tested their understanding of global history and global geography. Each item rated on bipolar yes-no statements, and students were scored to get one point for every correctly answered item. Estimate of test-retest reliability coefficient for the first and second surveys is 0.90. The estimate of reliability coefficient, utilizing Cronbach's alpha, are 0.88 and 0.92 for 1st and 2nd surveys, respectively.

Global Attitude Scale. Based upon the work of Sampson and Smith (1957) and Petrie (1988), and by consulting with teacher educators in social studies, 45 items were chosen for the questionnaire initially. Each item rated on bipolar agree-disagree statements on a 4-point Likert scale (1=strongly disagree, 4=strongly agree), and students were asked to select the one that most accurately describes their global attitude. With additional review of global education, through factor analysis, students' global attitude was categorized into seven main categories with 37 items in total, including tolerance and appreciation (6 items), life and human right (5 items), global dependence (5 items), communication and cooperation (5 items), war and peace (4 items), global responsibility (6 items) and global thinking and local action (6 items). Estimates of reliability coefficient for seven subscales, utilizing Cronbach's alpha, ranges from 0.60 to 0.76. The results are summarized in table 1.

Insert Table 1 about here

3.4 Data processing and analysis

Data analyses were performed using SPSS for Windows 14.0. Descriptive statistics, including mean and standard deviation were conducted for each component of global knowledge as well as for the seven aspects of global attitude. Scale scores were generated using the mean value of the items within each scale. Statistical tests included χ^2 test, MANOVA analysis, Post hoc comparisons.

4. Results

4.1 The junior high school students' overall global knowledge and global attitude

Students' overall correct ratio on the scales of the GKS was 60.1% and the mean for global attitude was 3.45. The results indicated that the global knowledge of the junior high school students was not enough, but their global attitude

was positive.

4.2 The differences among four dimensions of junior high school students' global knowledge

Table 2 shows the item numbers and subjects' correct ratio on the scales of the GKS. In general, the four dimensions of correct ratio on global knowledge of junior high school students ranged from 57.6% to 65.9%. In order to further investigate the differences in item responses among four dimensions and within each dimension, χ^2 tests were administered on GKS; the results are presented in table 2. The non-significant result indicated that there were no differences among four dimensions (i.e., global correlation systems, global issues, cross-culture understanding, and global history and geography) of high school students' global knowledge. Within dimensions, there were significant differences in the global correlation systems of junior high school students' global knowledge.

Insert Table 2 about here

4.3 Global knowledge and attitude in different backgrounds of students

Comparisons on the GKS and GAS scores of gender, grade, family socioeconomic status, and overseas travel experience were conducted by MANOVA analysis and post hoc comparisons.

4.3.1 Global knowledge and attitude in gender difference

The results showed that, first, there was no gender difference in global knowledge (F=1.96, p>0.05). Second, there was a gender difference in global attitude (F=6.698, p< 0.001). In order to further investigate the differences in dimension responses between male and female participants, post hoc comparisons were administered on a dimension-by-dimension basis; the results are presented in table 3. The significant results indicated that female students had higher global attitude toward tolerance and appreciation, communication and cooperation, war and peace, and global responsibility.

Insert Table 3 about here

4.3.2 Global knowledge and attitude in grade difference

The results showed that, first, there was a grade difference in global knowledge (F=20.44, p< 0.001). In order to further investigate the differences in dimension responses among grades, post hoc comparisons were administered on an dimension-by-dimension basis; the results are presented in table 4. The results showed that 9th graders held significantly higher knowledge about global correlation systems, global issues, cross-cultural understanding, and global history and geography than the 8th graders, and that the 8th graders held significantly higher global knowledge in four dimensions than the 7th graders as well. Second, there was grade difference in global attitude (F=3.79, p< 0.001). According to a dimension-by-dimension basis, post hoc comparisons were performed and the results are presented in table 5. The significant results indicated that 9th graders had higher global attitude toward tolerance and appreciation than did 8th and 7th graders.

Insert Table 4 about here

Insert Table 5 about here

4.3.3 Global knowledge and attitude in family socioeconomic status difference

The results showed that, first, there was a SES difference in global knowledge (F=7.72, p< 0.001). Post hoc comparisons were administered on a dimension-by-dimension basis; the results are presented in table 6. The results showed that high and middle SES students held significantly higher knowledge towards global correlation systems, global issues, cross-cultural understanding, and global history and geography than the low SES students. Second, there was a SES difference in global attitude (F=1.82, p<0.05). Post hoc comparisons were administered and the results are presented in table 7. The significant results indicated that, first, middle SES students had higher global attitude toward tolerance and appreciation, communication and cooperation, war and peace, global responsibility, and global thinking and local action than the low SES students. Second, high and middle SES students had higher global attitude toward global dependence than the low SES students.

Insert Table 6 about here

Insert Table 7 about here

4.3.4 Global knowledge and attitude in overseas travel experience difference

The results showed that, first, there was a difference in global knowledge between students with and without overseas travel experience (F=2.93, p<0.05). Post hoc comparisons were administered on a dimension-by-dimension basis; the results are presented in table 8 and showed that students with overseas travel experience held significantly higher knowledge towards global issues, cross-cultural understanding, and global history and geography than did students without overseas travel experience. Second, there was a difference in global attitude between students with and without overseas travel experience (F=2.05, p<0.05). The results of post hoc comparisons are presented in table 9. The

significant results indicated that students with overseas travel experience had higher global attitude toward war and peace than did students without overseas travel experience.

Insert Table 8 about here

Insert Table 9 about here

5. Discussions

5.1 Global knowledge and attitude

The purpose of this study was to evaluate the connection between junior high school students' global knowledge and attitude and the required national curriculum, Grade 1-9 Curriculum in Taiwan. In addition, this investigation also sought to ascertain the influence of gender, grade, family socioeconomic status, and overseas travel experience on students' global knowledge and attitude. This investigation used a 'Global Knowledge Scale' and a 'Global Attitude Scale' as instruments grounded in literature review as the guiding framework to discern the global knowledge and attitude of junior high school students.

Overall, descriptive statistics suggest that students' global knowledge in Taiwan is insufficient, but their global attitude is positive. The results are similar to the outcome of the studies arranged in different countries (Asia Society, 2001; Giffin et al., 2002; Osunde, 1996;Pike et al., 1979, RoperASW for National Geographic Education Foundation, 2000; Zhao et al., 2006, Zhao et al., 2005). Similarly to Jian's findings (1991), which indicating that students' global knowledge in the 90's in Taiwan was insufficient, the present study also found that students' global knowledge is not sufficient after implementing the Grade 1-9 Curriculum. As mentioned above, although there are many competence indicators of global education in the Grade 1-9 Curriculum, which is the direction to design curriculum, including leaning objectives, selecting teaching materials, learning activities, and learning assessment, Chin (2008) argues that most of the competence indicators cannot properly connect to learning objectives. Additionally, Liu (2008) indicates more than 80% of teachers in Taiwan do not recognize competence indicators very highly as the ideal learning goals due to their vague. Petri's (1988) study indicates that the teacher is the main factor influencing students' knowledge. Asia Society's study (2001) also reveals that most students identified their teachers and schools as not being prepared to help them to learn international knowledge. While teachers recognize competence indicators as vague, it might be difficult for them to transform them into learning objectives and to ask students to achieve. The above findings (Chin, 2008; Liu, 2008) might address why students' global knowledge is still not sufficient after implementing the Grade 1-9 Curriculum in Taiwan. However, this study only involved one measure of students' global knowledge and attitudes, other measures (e.g, classroom observation of curriculum implementation) may have been more information regarding global education.

In light of four major dimensions, the items in the dimensions of global history and geography get the highest correct ratio. According to Zhang (2007) and Wang (2003), global history and geography in the social studies textbooks were presented more than any other subject in the sub-category. Additionally, this might be because of the examination system. Although there are many competence indicators of global education in the Grade 1-9 Curriculum, the contents of curricular and instruction have been dominated by the entrance exam, especially at secondary school level. In Taiwan, the entrance exam consists of five domains: Chinese, English, Mathematics, Social Studies, and Science. The knowledge of global history and geography are included in the Social Studies and junior high school teachers emphasized them. This might address why the sub-category of global history and geography have the highest correct ratio.

We discovered that students' global knowledge was insufficient. Although there are many competence indicators of global education are set in Grade 1-9 curriculum, most grade 1-9 school teachers ignore competence indicators and merely rely on textbooks (Chin, 2008). Textbooks can be used as a curriculum implementation tool that influenced students' global knowledge and attitudes (Zhang, 2007; Chi, 2008; Petri, 1988). Textbooks are major source for students acquiring global knowledge. This study suggests that the systems of textbooks verification should be rigid and examine if the competence indicators transform into learning objectives precisely. From previous study (Holden and Hicks, 2007), traditionally, teacher preparation programs have not focused on preparing teachers to teach their students about the world. We suggest that schools of education are beginning to recognize the need to internationalize their programs and we should offer in-service teachers a professional development initiative to help them integrate international content in all major subject areas. In addition, government should provide technology service to encourage the use of information sources from around the world and help teachers engage in international classroom-to-classroom collaborations. Furthermore, nationwide assessments should be reviewed to include global content, and the analytical and higher order thinking skills that students will need to face the challenges of a changing world.

5.2 Demographics

Demographic variables such as gender, grade, family socioeconomic status and overseas travel experience were mostly found to be systematically related to the students' global knowledge and attitude. When examining the gender

difference in global knowledge and attitude, there was no difference in global knowledge. This finding is not consistent with the findings of Jian (1991) and Roberts (1994). These two studies report the similar results that males performed significantly better than females on the global knowledge test. This difference might be due to sample selection, instruments, and locations. However, significant differences were found in that female students held significantly higher attitude towards tolerance and appreciation, communication and cooperation, war and peace, and global responsibility than did male students. This finding is consistent with Jian (1991) and Giffin et al. (2002).

When the impact of participants' grade was considered for global knowledge and attitude, 9th graders held significantly the highest knowledge towards global correlation systems; global issues, cross-cultural understanding, and global history and geography; and 9th graders had higher global attitude toward tolerance and appreciation than did 8th and 7th graders. This finding is consistent with Jian (1991) and Giffin et al. (2002). Eicher, et al. (1975) study found evidence of Piaget's stages of intellectual development, with older students possessing a more accurate and realistic view of the world than their younger counterparts.

Considering the differences in family socioeconomic status and overseas travel experience, there was a socioeconomic status difference in global knowledge and attitude. This finding is consistent with Jian (1991). Additionally, there was a difference in global knowledge and attitude between students with and without overseas travel experience. This finding partially concurs with Jian's (1991) finding, indicating that students with overseas travel experience had higher global knowledge. The results might vary by students' cultural stimulus, family environment and parental expectations. Generally speaking, high socioeconomic status families can offer more resources and provide better environment for their children. Coleman (1988) has argued that family background 'is analytically separable into at least three different components: financial capital, such as family income or wealth; human capital, such as the levels of parents' education; and social capital, such as the relations among parents and children (Coleman 1988:109).' Bourdieu (1997) suggests that the concept of cultural capital offers another perspective for understanding varying levels of parental involvement in children's schooling. Cultural experiences in the home facilitate children's adjustment to school and academic achievement. From this perspective, our findings might be reasonable.

The results of this study reveal quite different patterns among the set of variables examined, for example, there was no gender difference in global knowledge but difference in global attitude; 9th graders held significantly the highest knowledge and attitude; there was socioeconomic status difference in global knowledge and attitude; students with overseas travel experience have better global knowledge and attitude. This finding is particularly valuable for teachers and school administrators to implement the global curriculum, to provide a valuable learning environment, such as international week, global newsletter, cultural gallery, and to offer students global information in order to increase global knowledge and positive attitude. Additionally, we encourage international exchanges and partnerships in which students can participate individually in order to increase their own international knowledge. For example, schools may sign cooperative agreements with other countries for school-to-school partnerships.

6. Conclusions

The 21st Century is the age of globalization. Today students face a new world order and their daily contacts will include individuals from diverse ethnic, gender, linguistic, racial, and socioeconomic backgrounds. Moreover, students will experience some of history's most serious health problems, inequities among less-developed and more-developed nations, environmental deterioration, overpopulation transnational migrations, ethnic nationalism, and the decline of the nation-state. These changes are creating a need to acquire a global education. School curricula should respond to global education, which directly influences students' knowledge and attitude. In order to broaden students' global perspectives, we should emphasize a global curriculum not only on individual development but also on the impact of globalization. Our findings contribute to recent calls for more evidence of the effects of global education on teaching practices. Our data provide the disconnections between students' global knowledge and attitude and national curriculum and stimulate reflection on global education, not only in Taiwan but in any society. Our findings also suggest both practitioners and researchers to create suitable textbooks and school systems that would enhance students learning. We believe that when students attain adequate global knowledge and positive attitudes, they are prepared for global citizenship. On the other hand, if students lack of global knowledge and attitude, it is difficult for them to face global challenge and competitiveness. Moreover, students' global knowledge is insufficient and global knowledge and attitudes vary by students' demographic factors. Schools need to find practical ways to help students that are at a disadvantage by stimulating and empowering them.

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Table 1. Cronbach's alpha values for the instrument of Global Attitude Scale

Dimension	Cronbach's α
Tolerance and appreciation	0.66
Life and human rights	0.75
Global dependence	0.60
Communication and cooperation	0.69
War and peace	0.60
Global responsibility	0.70
Global thinking and local action	0.76
Composite (Seven dimensions)	0.92

Table 2. Subjects' correct ratio and item numbers of Global Knowledge Scale

Dimension	Sub-category	Correct ratio	Item number	χ^2 (p-value)
Global correlation systems		57.6%	8	6.52* (p = 0.04)
	Politics	42.7%	3	
	Economy	61.1%	2	
	Universal system	70.1%	3	
Global issues		59.2%	22	5.73 (p = 0.57)
	Technology	71.3%	3	
	Population	61.3%	2	
	Race	49.3%	2	
	Energy	52.2%	3	
	Food	58.1%	3	
	Ecological environment	63.7%	2	
	Health and hygiene	64.3%	3	
	Globalization	53.7%	4	
Cross-cultural understanding		59.2%	7	0.21 (p =0 .65)
	Culture	61.9%	3	
	Religion	57.2%	4	
Global history and geography		65.9%	8	0.27 (p = 0.60)
	Global history	62.8%	4	
	Global geography	69.1%	4	
Composite (Four dimensions)		60.1%	45	0.03 (p =0 .99)

*p< 0.05.

Table 3. Gender difference in global attitudes and Post hoc comparisons

Source	SS	*df*	MS	*F* value	*Scheffé*
Tolerance and appreciation					
Between groups	185.68	1	185.68	27.19***	2>1
Within groups	6931.25	1015	6.83		
sum	7116.92	1016			
Life and human rights					
Between groups	13.82	1	13.82	2.80	
Within groups	5001.61	1015	4.93		
sum	5015.43	1016			
Global dependence					
Between groups	7.20	1	7.20	1.47	
Within groups	4957.87	1015	4.89		
sum	4965.06	1016			
Communication and cooperation					
Between groups	52.81	1	52.81	9.56**	2>1
Within groups	5610.08	1015	5.53		
sum	5662.89	1016			
War and peace					
Between groups	123.50	1	123.50	27.72***	2>1
Within groups	4521.23	1015	4.45		
sum	4644.73	1016			
Global responsibility					
Between groups	89.41	1	89.41	11.63**	2>1
Within groups	7804.09	1015	7.69		
sum	7893.51	1016			
Global thinking and local action					
Between groups	12.15	1	12.15	1.69	
Within groups	7297.00	1015	7.19		
sum	7309.15	1016			

Note : 1=Male 2=Female

** p <0 .01. *** p < 0.001.

Table 4. Grade difference in global knowledge and Post hoc comparisons

Source	SS	*df*	MS	*F* value	*Scheffé*
Global correlation system					
Between groups	234.95	2	117.48	43.86***	3>2>1
Within groups	2715.94	1014	2.68		
sum	2950.89	1016			
Global issues					
Between groups	1684.39	2	842.20	50.04***	3>2>1
Within groups	17065.36	1014	16.83		
sum	18749.75	1016			

Cross-cultural understanding					
Between groups	451.13	2	225.57	73.93***	3>2>1
Within groups	3093.91	1014	3.05		
sum	3545.04	1016			
Global history and geography					
Between groups	331.33	2	165.67	49.22***	3>2>1
Within groups	3412.68	1014	3.37		
sum	3744.01	1016			

Note : 1=7th graders 2=8th graders 3=9th graders
*** p <0 .001.

Table 5. Grade difference in global attitudes and Post hoc comparisons

Source	SS	*df*	MS	*F* value	*Scheffé*
Tolerance and appreciation					
Between groups	1.60	2	0.78	0.11	
Within groups	7115.32	1014	7.02		
sum	7116.92	1016			
Life and human rights					
Between groups	81.74	2	40.87	8.40***	3>2
Within groups	4933.69	1014	4.87		3>1
sum	5015.43	1016			
Global dependence					
Between groups	21.36	2	10.678	2.19	
Within groups	4943.71	1014	4.875		
sum	4965.06	1016			
Communication and cooperation					
Between groups	3.93	2	1.963	0.35	
Within groups	5658.97	1014	5.581		
sum	5662.89	1016			
War and peace					
Between groups	9.93	2	4.966	1.09	
Within groups	4634.80	1014	4.571		
sum	4644.73	1016			
Global responsibility					
Between groups	31.00	2	15.50	2.00	
Within groups	7862.51	1014	7.75		
sum	7893.51	1016			
Global thinking and local action					
Between groups	46.59	2	23.30	3.25*	
Within groups	7262.56	1014	7.16		
sum	7309.15	1016			

Note : 1=7th graders 2=8th graders 3=9th graders
* p < 0.05. *** p <0.001.

Table 6. Family socioeconomic status difference in global knowledge and Post hoc comparisons

Source	SS	*df*	MS	*F* value	*Scheffé*
Global correlation system					
Between groups	81.61	2	40.80	14.42***	1>3
Within groups	2869.28	1014	2.83		2>3
sum	2950.89	1016			
Global issues					
Between groups	1026.48	2	513.24	29.36***	1>3
Within groups	17723.27	1014	17.48		2>3
sum	18749.75	1016			
Cross-cultural understanding					
Between groups	115.51	2	57.75	17.08***	1>3
Within groups	3429.53	1014	3.38		2>3
sum	3545.04	1016			
Global history and geography					
Between groups	127.23	2	63.61	17.83***	1>3
Within groups	3616.78	1014	3.57		2>3
sum	3744.01	1016			

Note : 1=high SES status 2=middle SES status 3=low SES status
*** p <0 .001.

Table 7. Family socioeconomic status difference in global attitudes and Post hoc comparisons

Source	SS	*df*	MS	*F* value	*Scheffé*
Tolerance and appreciation					
Between groups	73.72	2	36.86	5.31**	2>3
Within groups	7043.20	1014	6.95		
sum	7116.92	1016			
Life and human rights					
Between groups	15.63	2	7.81	1.59	
Within groups	4999.80	1014	4.93		
sum	5015.43	1016			
Global dependence					
Between groups	61.58	2	30.79	6.37**	1>3
Within groups	4903.48	1014	4.84		2>3
sum	4965.06	1016			
Communication and cooperation					
Between groups	67.89	2	33.95	6.15**	2>3
Within groups	5595.00	1014	5.52		
sum	5662.89	1016			
War and peace					
Between groups	59.549	2	29.78	6.59**	2>3
Within groups	4585.178	1014	4.52		
sum	4644.728	1016			
Global responsibility					
Between groups	91.895	2	45.95	5.97**	2>3
Within groups	7801.612	1014	7.69		

sum	7893.506	1016			
Global thinking and local action					
Between groups	56.875	2	28.44	3.98*	2>3
Within groups	7252.271	1014	7.15		
sum	7309.147	1016			

Note : 1=high SES status 2=middle SES status 3=low SES status
* $p < 0.05$. ** $p < 0.01$.

Table 8. Overseas travel experience difference in global knowledge and Post hoc comparisons

Source	SS	*df*	MS	*F* value	*Scheffé*
Global correlation system					
Between groups	5.79	1	5.79	2.00	
Within groups	2945.09	1,015	2.90		
sum	2950.89	1,016			
Global issues					
Between groups	137.88	1	137.88	7.52**	1>2
Within groups	18611.87	1,015	18.34		
sum	18749.75	1,016			
Cross-cultural understanding					
Between groups	34.11	1	34.11	9.86**	1>2
Within groups	3510.93	1,015	3.46		
sum	3545.04	1,016			
Global history and geography					
Between groups	29.31	1	29.31	8.01**	1>2
Within groups	3714.70	1,015	3.66		
sum	3744.01	1,016			

Note : 1=students with overseas travel experience
2=students without overseas travel experience
***p <0 .01.

Table 9. Overseas travel experience difference in global attitudes and Post hoc comparisons

Source	SS	*df*	MS	*F* value	*Scheffé*
Tolerance and appreciation					
Between groups	5.51	1	5.51	0.79	
Within groups	7111.41	1,015	7.01		
sum	7116.92	1,016			
Life and human rights					
Between groups	0.20	1	0.20	0.04	
Within groups	5015.23	1,015	4.94		
sum	5015.43	1,016			
Global dependence					
Between groups	0.01	1	0.01	0.01	
Within groups	4965.06	1,015	4.89		
sum	4965.06	1,016			
Communication and cooperation					
Between groups	5.74	1	5.74	1.03	
Within groups	5657.15	1,015	5.57		
sum	5662.89	1,016			
War and peace					
Between groups	20.69	1	20.69	4.54*	1>2
Within groups	4624.04	1,015	4.56		
sum	4644.73	1,016			
Global responsibility					
Between groups	1.20	1	1.20	0.16	
Within groups	7892.30	1,015	7.78		
sum	7893.51	1,016			
Global thinking and local action					
Between groups	21.03	1	21.04	2.93	
Within groups	7288.11	1,015	7.18		
sum	7309.15	1,016			

Note : 1=students with overseas travel experience
2=students without overseas travel experience
* $p < 0.05$.