



Multicultural Orientation in Science Education: Appeal, Predicament, and Resolution

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Supported by Chongqing Municipal Institute of Key Research in Humanities and Social Sciences, 2014-2015 Program “Strategies for Popularization of Science Education and Development of Scientific Literacy in the South-Western Region of Ethnic Minorities” (14SKB038)

Received 15 October 2014; accepted 9 December 2014

Published online 26 January 2015

Abstract

Science was once part of the domain of culture. Yet in modern societies, the cultural essence of science has been obscured by its practicality. In contemporary societies, the cultural dimension of science has been gradually restored, and cultural diversity has received greater attention. A multicultural orientation in science education is an appeal for cultural diversity ensuing from ethnic diversity and the imbalance of ethno-regional development, yet it faces many challenges such as globalization, the unreasonable demand of national unity, unfavorable educational conditions and so forth. The concept of intercultural interaction based on the principle of “harmony but not sameness”, rooted in the co-existence of commonalities and differences across multiple cultures, offers a new resolution for the predicament of multicultural orientation in science education.

Key words: Science education; Multicultural orientation; Intercultural interaction; Contemporary societies

Huang, J. Y. (2015). Multicultural Orientation in Science Education: Appeal, Predicament, and Resolution. *Cross-Cultural Communication*, 11(1), 1-5. Available from: <http://www.cscanada.net/index.php/ccc/article/view/6215>
 DOI: <http://dx.doi.org/10.3968/6215>

INTRODUCTION

Conceptually science is a part of culture. In his discussion of human and human culture, Ernst Cassirer stated that “science is the last step in man’s mental development and it may be regarded as the highest and most characteristic attainment of human culture” (2013, p.355). What distinguishes humans from other species is human labor. It is this labor that has created cultural elements that are uniquely human, including language, mythology, religion, art, history, and science. “Humanities-infused” culture is the essence of science, yet this essence has been obscured by the practicality of science in modern societies. At present, our understanding of science has shifted the focus from the social dimension to the cultural dimension with the intention of transforming it from a simple social activity to a complex cultural activity of human beings. The return of science to its cultural origin would undoubtedly present new challenges to science education, including the inevitable challenge of the conflicting appeals between cultural diversity and cultural unity in science education.

1. APPEAL OF MULTICULTURALISM IN SCIENCE EDUCATION

Biological diversity is rarely challenged nowadays. Biodiversity is not only the basis for the existence of life; it also provides a conceptual foundation and methodology for understanding and grasping cultural diversity (Ge, 2007, pp.24-32). In fact, an understanding of biodiversity is a natural sequence to the advanced mental development of humans and a logical orientation. Now that we have reached a wide consensus on ecological diversity, just by taking it one step further would we come to the conclusion that national and regional differences in ecosystems and the diversity of human activities, along with intercultural communication in the long course of human history,

have brought about cultural diversity. With the return of science and science education to their cultural origin, the concept of multiculturalism would naturally bear on science education. In addition, cultural diversity ensuing from ethnic diversity and the imbalance of ethno-regional development in China will infuse vigor into the concept of multiculturalism in science education.

Since ancient times, China has always been a nation of ethnic diversity. After the founding of the People's Republic of China, as part of its effort to implement ethnic policies, the Chinese government adopted "ethnic identification": the 56 ethnic groups that have been formally identified by the government, along with ethnic groups yet to be researched and further identified, constitute the "big family of the Chinese nation" (Ma, 2004, p.113). In this big family, Han is the biggest group, accounting for 91.5% of the population of China according to the 2010 census; other ethnic groups account for the remaining 8.5%, hence the category of ethnic minorities. These ethnic minority groups usually live in the unfavorable environment of remote areas. Due to the influence of natural environment, social development, and development of literacy and education, members of ethnic minority groups are generally speaking much less scientifically literate than their Han counterparts. A 2003 survey of the scientific literacy of the general public in China conducted by China Association for Science and Technology showed that in the western region, where ethnic minorities clustered, only 1.5% of the population had scientific literacy, which was lower than the national average of 1.98% (Huang, 2005, pp.155-159). In addition, with the development of the Chinese society, there emerged a gap between the east and the west, the coastal regions and the inland regions, as well as urban areas and rural areas in terms of economic growth and cultural characteristics.

In contemporary China, differences in ethnicity, region, social class, gender and so forth should be resolved from a cultural perspective. In the long course of adapting to the natural environment, each ethnic group has formed its own cultural system with distinguishing characteristics. These various cultural systems constitute ethno-cultural diversity, which determines the multicultural nature of ethnic education in China; cultural diversity is the context for education in China. As the primary productive force, science and technology dramatically boost economic growth. However, science and technology cannot exist without humans; science and technology have to exercise its power and serve its function in a cultural context through integration into society, life, and the general public. Therefore, the development of scientific literacy among Chinese ethnic groups cannot be separated from their cultural characteristics; the promotion of science education has to take place in the cultural context of each ethnic region. The modernization of ethnic regions

cannot rely on external aids alone. The real solution to the modernization of ethnic minorities is to foster an enthusiasm for development deeply rooted and built up in these ethnic minority groups by integrating traditional science and technology with advanced modern science so that modernization truly becomes ethnic modernization "from within" and the "blood transfusion" type of investment is transformed into a "blood formation" type of investment (Liao, 1997, pp.9-18). As theorized in the psychology of learning, members of different ethnic groups always develop an understanding and explanation of what exists in the objective world in accordance with their own psychic structure and experience, and the formation of psychic structure is shaped by genetic as well as environmental factors (Sun, 1990, p.44). It cannot be denied that most psychic structures and psychic processes of human beings are similar, but differences inevitably exist between and among people from different cultural backgrounds, just like gender-based psychological differences. Hence, theories of multicultural science education provide theoretical guidance for science education and the development of scientific literacy in ethnic regions. The reality of contemporary China determines the need for multicultural science education.

2. PREDICAMENT OF MULTICULTURAL SCIENCE EDUCATION

2.1 The Impact of Globalization

Global cultural diversity is an objective existence in history, but it is also accompanied by relentless problems, which have become particularly obvious in the context of globalization. While it may be an overstatement to say definitions of globalization vary widely, it is true that we have not yet developed a universally shared understanding of what globalization entails, nor can we define its boundary. Nevertheless, the appearance of globalization is entering every facet of our lives in an irresistible manner. The concept of globalization is rooted in the idea of global unity, which has been a recurring theme throughout human history both spiritually and spatially. The pursuit of "unification of the world" in ancient China is precisely an instantiation of this theme. Similarly, the aspiration for and effort toward "unity" has never ceased in the world. In his discussion of the origin and goal of history, Karl Jaspers (1989, pp.5-13) has pointed out that during the times of ancient civilizations, in order to organize the tasks of river basin governance and irrigation, the three great civilizations strengthened the power of their administrative agencies; consequently, nation-states came into being. Later, the improvements of transportation brought about a certain degree of spatial freedom and an expansion of the scope of human interaction, thereby leading to the formation of a series of

“global empires”. Axial civilizations have made a deep and lasting impact on the evolution of the idea of “unity”, which is exemplified in the evolution of the Yellow River Civilization in China. Upon its emergence and formation, by assimilating neighboring ethnic groups, this ancient Chinese civilization gradually snowballed into a unified multi-ethnic nation. With the advent of the information age, the unprecedented ease of communication and telecommunication has provided favorable technological conditions for global unity. The global empire today has become considerably milder and more civilized than its predecessors, which were founded by violent and coercive means such as war. But it has never stopped growing; on the contrary, its cohesiveness speeds up its uninhibited growth. Dominant developed countries try to expedite political and cultural integration of nations around the world by economic, industrial, and technological means. Their efforts toward global unity have facilitated increased interaction among nations as well as constantly increased and deepened intercultural communication among people from different cultural backgrounds, hence the establishment of interdependence. In their economic and political interactions with other countries, as the self-designated “center of human civilization”, many western nation-states advocate “nationalist superiority”. The absolute supremacy of their economy has made it possible for them to coerce other countries and ethnic groups into abandoning their own indigenous cultures and assimilating into the cultures of those western nation-states. Taking advantage of their dominance of the world trade system and their technological supremacy, the developed capitalist countries in Europe and America, particularly the United States, thrive on exporting their cultural products to other countries all over the world (Wang & Zhang, 2009, pp.132-135). All these inevitably present big challenges to multicultural science education in China, a nation that is lagging behind in terms of economic growth and technological development.

2.2 The Unreasonable Demand of National Unity

For a very long time in the past, multiculturalism has remained a reality instead of a value-based appeal. However, when multiculturalists start to shoulder the responsibility of preventing it from disappearing, multiculturalism transforms from a fact to a value-based appeal, which often brings about a series of actions. In unified modern-day nation-states, these actions ensuing from the value-based appeal will face opposition from those concerned about national unity. The contradiction between the appeal of multiculturalism and the appeal of national unity is the hardest to resolve the implementation of multicultural education (Rong, 2009, pp.98-99). The opponents of multiculturalism and multicultural education do acknowledge their existence and they intend no disrespect for other cultures different from their own, yet they believe that multiculturalism and multicultural

education would cause great harm to national unity. It is understandable that the rulers of any country, guided by the principle that “stability is of overriding importance”, would reject multiculturalism and multicultural education, which, for them, are full of risks. In the practical implementation of multicultural education, strengthening the national identification of the ethnic minority students often becomes the ultimate goal of education at the cost of neglecting the original goal of multicultural education, that is, to enable students from different races, ethnicities, and social classes to enjoy educational equality (Banks, 2009, p.3)

2.3 Unfavorable Educational Conditions

The concept of multicultural education, which advocates cultural equality as well as peaceful coexistence and cooperative development of all people regardless of ethnicity, region, social class and gender may be supported by the government and the majority of the general public. However, in contemporary China with limited educational resources, practical implementation of this concept is not an easy task. First, multicultural education stresses identification with one’s own ethnic culture and requires that the student should develop an enthusiasm for the indigenous culture of his or her own ethnic group. At present and for a very long time to come, a congruence of cultural backgrounds between teachers and students is and will remain unattainable. Working with a culturally diversified student population, teachers are required to maintain a culturally neutral stance and steer clear of cultural bias. But in reality, since education achieves its purpose through human interaction, the educator is inevitably endowed with a particular cultural background, adopts a particular cultural stance and orientation, and embodies the values and perspectives of a particular culture. Secondly, the implementation of multicultural education requires that in the process of education, a set of activities including educational philosophy, curriculum criteria, teaching materials, resources and methods, curriculum assessment and so forth be thoroughly considered and the diverse needs of students from different cultural communities be met, all of which would necessarily add to the workload of educators. In pursuit of efficiency, the implementation of multicultural education is in a predicament. Thirdly, while many parents and students may be emotionally inclined toward multicultural education, they are concerned that it may possibly result in incompatibility with mainstream cultures and mainstream society. As current educational assessment and social standards leave very little room for the development of non-dominant cultures, parents are worried that too much ethno-cultural education would have a negative impact on their children’s effort to assimilate into mainstream cultures and mainstream society. Consequently, they are more inclined toward the acquisition of knowledge about mainstream cultures.

3. INTERCULTURAL INTERACTION BASED ON “HARMONY BUT NOT SAMENESS” WILL RESOLVE THE PREDICAMENT OF MULTICULTURAL EDUCATION

The idea of multiculturalism is based on an essentialist view of culture. This view overlooks the dynamic and interactive nature of culture; further, it views and juxtaposes multiple cultures as unrelated, stand-alone objects. Consequently, such an essentialist approach has brought about a great deal of misunderstanding and doubt (Chang & Han, 2013, pp.5-12). But in essence, commonalities and differences co-exist in different cultures. The immense anatomical and physiological similarities among humans determine the similarities in the cultures created by humans in the process of adapting to their habitats of living. At the same time, in the long course of development and due to environmental differences, different communities would inevitably create cultures that would vary to some extent. This phenomenon is well aligned with the principle of “harmony but not sameness” in China. Confucius, who has made a great impact on Chinese culture, once said that “by nature, men are nearly alike; by practice, they get to be different”. That is to say, humans are born with a similar nature; it is the habits they develop later in society that create individual differences. Maletzke (2001, p.14) argued that “the commonalities of man include marriage, phoneme and morpheme, numeral, prohibition of incest, respect for one’s parents, mutual reinforcement, morals and ethics as the foundation of all social organizations, music and painting, one’s name and self-recognition.” Because of these commonalities, because of their unanimous espousal of equality, freedom, kind-heartedness, honesty, reciprocity and other values, humans are able to converse and communicate with one another against the background of a shared set of values, establishing a pattern of interaction characterized by “harmony”. Humans “differ” in “practice”, thereby creating multiple cultures that are “different”. Culture often determines the way of acting of members of a particular society, which includes ways of thinking and feeling; culture has become such an integral part of them that they take it for granted, unaware of its existence (Liu & Li, 2007, pp.57-62). What cultural diversity entails is that every culture has the right to exist; it is not conservative and complacent cultural nationalism; rather, cultural diversity should be based on human commonalities. “Harmony but not sameness” is a rational vision for cultural development. Nowadays the culture and value orientation of “harmony but not sameness”, which emphasizes commonalities on the basis of acknowledgement of diversities, will create a structure of “diversified co-existence” among cultures.

An understanding of the principle of cultural “harmony but not sameness” provides a basis for multicultural education; what is also needed is intercultural interaction based on this principle. The concept of “intercultural education” was proposed in “Intercultural Education in the European Context” delivered at the 21st standing conference of ministers of education held by the European Parliament. This concept maintains and improves the cultural diversity and unity of European societies. In “UNESCO guidelines on intercultural education” issued by United Nations Educational, Scientific, and Cultural Organization (UNESCO) in 2006, it was pointed out that the goal of intercultural education is to change the situation of passive co-existence in multi-cultural contexts. To achieve this goal, we must identify commonalities among diverse cultures through understanding, respect, and dialog between and among different cultures, which provides a basis for our effort toward coexistence and joint development. Intercultural interaction based on the principle of “harmony but not sameness” attaches much importance to the commonalities between different cultures and emphasizes the universality that exists across cultures. Hence, mutual respect between different cultures will be attainable, communication and interaction will become smoother, cooperative growth of all students as well as world harmony and cohesion is likely to be achieved; all these visions are consistent with the goal of education.

CONCLUSION

With the return of science and science education to their cultural origin, the concept of multiculturalism is making an impact on science education; such an impact is even more obvious in present-day China, characterized by cultural diversity ensuing from ethnic diversity and the imbalance of ethno-regional development. Science education in China calls for a multicultural orientation. However, in the context of globalization, on the one hand, the individuality of each culture is suppressed and even strangled; on the other, the unification of the nation virtually facilitates cultural unity and repels cultural differences. At the same time, under unfavorable educational conditions, multicultural orientation in science education is in a great predicament. Of course, with the increase of intercultural communication, people have developed a deeper understanding of the coexistence of cultural differences and similarities; intercultural communication has acquired a new characteristic of interaction and communication on the premise of acknowledgement of cultural differences. This perspective offers a new resolution for the predicament of multicultural orientation in science education. Specifically, on the one hand, science education should acknowledge the existence of jointly created cultures of science and

the cultural contexts for scientific analysis and creation; on the other, based on analyses of the learners' cultures, what is being provided in science education for learners of different cultures should vary in objectives, contents, and methods.

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