Using Web 2.0 Technologies in Middle and High School Physical and Environmental Science Classes for Collaborative Studies

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INTRODUCTION

Today, climate change is a vital issue that has been focused by the individuals, government and non-government organizations worldwide. Due to the aberrant nature of global weather in recent years, people are becoming more anxious about their future generations. Governments and organizations from the various countries, especially who are affected by global warming have brought up climate change issues to the United Nation and other concern agencies to protect them from the possible disaster of climate change. That movement has enforced the world leaders to think and talk against environmental pollutions that cause global warming and climate change. Thus, the global warming and climate change issues have become important topics in the intercultural forums.

Intercultural communication is a kind of global interaction that could be used for cross-cultural dialogue for global warming and climate change issues. It could prepare people living in diverse society in the various corners of the world to become aware of the possible disasters of global warming and climate change, and help them work together against environmental pollution and global warming. Thus, it is urgent to bring up the people from every corner of the world into a common platform where they can disseminate their voices on climate change issues to the world leaders.

One of the best ways to effective intercultural communication is by sharing one's own personal experiences with others. Web 2.0 is such a technology that can be used in building many virtual societies where young students from various corners of the world can come together and share their part and present experiences caused by environmental pollution, global warming, and climate change. Based on the advanced and interactive features of Web 2.0 technologies, Blogging could be appropriate medium to build many virtual intercultural platforms at home and abroad. Such intercultural platforms could bring young students from diverse culture and society in a single platform to let them discuss about the possible effects of climate change, and let them able to work against environment pollution.

As a big party of energy consumer, individuals and organizations in the United States have responsibility to help young students living in the every corner of the world becoming aware of climate change. This paper presents s model of using Web 2.0 technologies in middle and high school physical and environmental science classes for building collaborative studies for

climate change education. The intended model will be implemented and evaluated through a simulation project that is expected to be started in summer 2011, and ended in fall 2011. Data will be collected by the end of summer 2011. By the end of the study quantitative and qualitative data will be collected and analyzed to find the outcomes of the study, and write the study report.

BACKGROUNG REVIEW

Causes and Effects of Global Warming and Climate Change

Weather represents the current statistics of temperature, wind, rainfall, humidity, atmospheric pressure, atmospheric particle count, and some other meteorological elements of a certain area or region. In contrast, *climate* refers to the average weather conditions of that area or region over a long period of times, ranges from three to four decades (Anonymous, 2010.). Thus the climate change refers to the long-term change in the average weather conditions or statistical distribution of weather patterns over a period of times that range from several decades to thousands or millions of years (Houghton, 2001). It may be a change in the average weather conditions or a change in the distribution of weather events with respect to an average, for example, fewer or greater extreme weather events. Climate change may be limited to a specific region, or may occur across the whole Earth.

Evidences say that the increase of global temperature is the main cause of climate change, and that is happening due to the excessive release of gases such as CO_2, CH_4, CFCs, N_2O, O_3 into the earth's atmosphere (Ulukan, 2009). These gases are considered as the main factors of global warming as these affect the interaction between the first and the second atmospheric layers of the earth (troposphere and stratosphere respectively) by preventing the reflection of solar rays (IPCC, 2007; Ulukan, 2009). Increasing temperature, irregularities in rain, flood, drought, going down the underground water level, shorter or longer range of seasons, changing precipitation patterns, reducing snow cover, changing soil moisture, melting sea ice and glaciers, raising sea-water level, earlier flowering and ripening of flowers and fruits, migration of plants and animals towards the poles, are the visual signs of global warming (Bates, Kundzewicz, Wu, & Palutikof, 2008; Ulukan, 2009). Definitely these go beyond with many other non-visible signs of global warming; thus, of clime change.

According to the 2007 Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC), the average temperature of the Earth's near-surface air and oceans has been increased 0.74 ± 0.18 °C (1.33 ± 0.32 °F) during the 20th century, and is projected to be continued in the 21st century (IPCC, 2007). According to the United States National Academy of Sciences [USNAS], most of the observed temperature increase since in the last half of the 20th century, has been caused primarily by human activities that have increased the amount of greenhouse gases in the atmosphere including excessive burning of fossil fuel, and deforestation (USNAS, 2008). As the developed and industrialized countries use a large portion of fossil fuel and natural energy they are considered as mostly responsible for global warming. Although there are international agreements e.g., 1997–Kyoto Protocol, to limit these undesirable and dangerous developments, there is an objection that some countries are still reluctant to participate and address this crucial issue (Oberthur, 2001; Ulukan, 2009).

Importance of Disseminating Global Warming and Climate Change Issues to Young Students

Although the effects of global warming are not seen equally in every corner of the world, the adverse situations of global warming are mostly seen in the developing and underdeveloped countries. A number of countries that are very close to the sea water label are very much concern about global warming and have been asking developed countries to take initiative to reduce the emotion of greenhouse gases. These countries have brought up climate change issues to the United Nation and other concern agencies to protect them from the possible disaster of global warming and climate change.

Consequently, the terms climate change and global warming have been considered as important issues worldwide, and have gotten attention by the individuals, government and non-government organizations worldwide. Individuals and people of these organizations are expecting a disaster or major change in the nature and environment in the near future. Environmental scientists, politicians, legislators, and governments have been working in long-term projects and plans for reducing global warming and environmental pollutions.

Thus, the global warming and climate change have become important issues in the national and international intercultural forums, and demand to be expanded from top to bottom, especially among young students to make everybody be aware of these. Intercultural communication is a kind of global interaction that could be used for cross-cultural dialogue for global warming and climate change issues. It could prepare young students living in diverse society in the various corners of the world to become aware of the possible disasters of global warming and climate change, and help them work together against environmental pollution and global warming.

One of the best ways to effective intercultural communication is by sharing one's own personal experiences with others. Web 2.0 is such a technology that could be used to build many virtual societies where young students from various corners of the world can come together and share their past and present experiences caused by environmental pollution, global warming, and climate change for free of charge. Based on the advanced and interactive features of Web 2.0 technologies, Blogging could be appropriate medium to build many virtual intercultural platforms at home and abroad. Such intercultural platforms could bring young students from diverse culture and society in a single platform to let them discuss about the possible effects of climate change, and let them able to work against environment pollution.

Understanding Web 2.0 Technologies

Blogs, Wikis and Podcasts are the most popular Web 2.0 based tools that provide web-based communities and programs, web applications and services, web hosting, audio-video sharing, social-networking, and many more services. These have been becoming popular among the younger generation to make intercultural communication effective and interactive.

Blogs. A blog, an acronym for web log, is an easier web publishing tool that allows users to create and publish web pages with personal or anecdotal information to share with others. A Blog takes in a user-friendly commentary format with separate postings rather than a threaded discussion board (Richardson, 2006). Users' ability to leave comments is the distinct feature of a blog. A typical blog combines text, images and links to other web pages, blogs, and contents related to the topic. A Blog usually provides news or comments on a particular subject or a person's opinion in text, picture, audio and video formats. Creating or editing a blog requires only basic computing knowledge. Blogs can be visited by local and global communities.

Social Networking Sites. Social networking sites are the Web 2.0 based applications that allow users to share personal information with each other in convenient ways. Social networking sites focus on building and reflecting of social relations and interactions among young students who possess the same interests. Social network sites essentially represent individuals' profiles, social links and a variety of additional services. They enable users to share ideas, opinions, activities events, and interests within their individual networks over the Internet through e-mailing and instant messaging. Facebook, Hi5, LinkedIn, MySpace, Nexopia, Twitter and YouTube are successful applications of social networking services. They emphasize online collaboration, social collaboration and resource sharing among users free of charge.

Advanced Features of Web 2.0

Web 2.0 not only has additional features from its predecessor Web 1.0, traditionally known as *web technology*, it is qualitatively different from Web 1.0 in many ways. Web 2.0 enables its users to interact with other users actively (such as in chartrooms) and view information passively that is provided to them by its developer. The dynamic features of Web 2.0 allow its users to interact with other users actively or to change website content interactively, interoperably and simultaneously. If *Netscape* is the standard bearer for Web 1.0, *Google* is the standard bearer for Web 2.0.

In Web 2.0 platform everyone is a both consumer and seller of information who defines and designs the contents of the web. The interactive features of the Web 2.0 technology enable its users to actively participate and contribute to develop and enrich the web page contents. Web 2.0 users also become able to create, share and enhance their knowledge and thinking with other users in the network. They share knowledge and information wherever it is located and whenever it is needed through the web.

Improved functionality of Web 2.0 tools such as openness, remising, and freedom of control over data have made it exceptional when compared to the traditional Web development approach. This means that Web 2.0 tools allow users to add their own content with few or no restriction at all. Web 2.0 allows its users not only to retrieve information but also encourages them to input additional resources to the application as they prefer.

On a Web 2.0 site, users can own data and can have control over that data (O'Reilly, 2005). A Web 2.0 site allows its users to interact with other users or to simultaneously change website content from any location, any time. In order to do this, Web 2.0 technology uses open source coding, which means that the Web design codes are available for others to use and customize freely. It has caused the Web to shift from being a medium in which information is transmitted and consumed into being a platform where content is created, shared, remixed, repurposed, and passed along (Downes, 2005).

Possibilities of Building Web 2.0-Based Intercultural Platform for Helping Young Students Being Aware of Global Warming and Climate Change

Web 2.0 tools are the advanced technologies that can be media to share experience with others either explicitly or anonymously. The interactive and read-write natures of Web 2.0 technologies, such as Blogs, facebooks, Wikis, Podcasts could facilitate users' participation in and build many rich and user-centered virtual communities that could attract more people to participate and interact in building many collaborative societies simultaneously (Alexander, 2006). By participating in such a virtual community, young students can share their past and present experiences caused by environmental pollution and global warming for free of charge.

Thus, Web 2.0 could be an appropriate technology to build many local and global virtual communities among young students in different cultures to help them be aware of global warming and climate change.

Blogging is a Web 2.0 tool that has tremendous usage in building effective, interactive, and collaborative virtual platforms (Solomon & Schrum, 2007). Based on the advanced and interactive features of Blogging technology, it could be appropriate media to build many virtual intercultural platforms at home and abroad. Such intercultural platforms could bring young students from diverse culture and society in a single platform to let them discuss about the possible effects of climate change, and let them able to work against environment pollution.

In the proposed model we would like to develop a blog where middle and high school students from different corners of the world discuss about various contemporary issues about climate change, and put their view for effective solutions. In line with intercultural education, this could bring up a new dimension in the environmental studies. However, to suggest any specific conclusions might be presumptions at this time.

METHODOLIOGY

In the proposed model an intercultural communication platform will be developed using some of the newly developing adaptive technologies, such as Blogs, Wikis, Podcasts, Facebook, LinkedIn, etc. In this platform young students from various corners of the world will be invited to join in, and express their personal view on some contemporary global issues such as climate change, global warming, democracy and political corruption, poverty, disunity, lack of education, resources in the Middle East countries where is still in the under-developed countries. A snowball sampling method will use to recruit other participants. "Snowballing sampling' entails selecting a few people who can identify other people who can identify still other people who might be good participants for a study. This approach is most useful when a study is carried on in a setting in which possible participants are scattered or not found in clusters (Lunenburg & Irby, 2008). According to Creswell, (2002) and Patton, (1990), snowball sampling is an alternative way to grow a sample with informants suggesting others who may be of value to the study. This approach is most valuable when a study is carried on in a setting in which possible participants are scattered or not found in clusters (Heckathorn, 2002; Snijders, 1992). Then a few potential respondents will be contacted and asked whether they know of anybody with the characteristics that they are interesting in our research. Each participant will be given the opportunity to add to the list of possible participants. Finally, the data will be processed based on their nature, and a report will be published with the detail method and outcomes.

EXPECTED RESULTS/APPLICATIONS

It is expected that there will be more benefits accrued by using Web 2.0 technology in building intercultural virtual platform for helping young students being aware on climate change. First, it can promote more collaboration among the participating young students from different cultures. Second, it may motivate young students to explore, discuss and share their views and suggestion for being aware on climate change and work against environmental pollution. Third, Web 2.0 based collaborative learning might also enable researchers, educators and legislators to disseminate their knowledge of new ideas among each other in ways that cannot take place without it. When an individual participant gets a different or interesting idea in his view, s/he

may become more willing to continue further discussion or participate with other people or blogs. This could be a good opportunity to more widely share information for first time researchers as well as general people whose voices and perspectives cannot be published in news media or refereed journals. As more people participate in online discussion on important climate change topics, and take the opportunity to express their voice on media, increased understanding in science topics might ensue.

Finally, and probably the most important advantage of Web 2.0 based intercultural activities is that educators, especially, the physical science teachers can motivate their students to participate in Blogging discussion during their leisure time outside the class period or school time. For students who have Internet access on their own or through their parents' computer or cellular devices, Web 2.0 based discussion could take place anywhere, e.g., around the dining table, on the school bus, in a restaurant, or at a shopping mall. Participating children can motivate their parents and relatives to join in the discussion and play active role in reducing environmental pollution. However, to suggest any specific conclusions might be presumptions at this time.

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