Experiences from the "Computers in Global Society" Course

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Abstract

Winona State University (www.winona.edu) has a Global Studies Program. The program committee was interested in technology relevant content to supplement the geo-socio-political emphasis in this program. The computer science department redesigned one of its course "Computers in Society" to "Computers in Global Society". The objective of this course is stated as "**To understand and appreciate Computers Technology and Its Effects in a Changing Global Society".** The course is open to all students and serves as a "Science and Social Policy" component of the University Studies Program (formerly Gen-education curriculum). This course is now adopted as an elective in the Global Studies Program.

This paper presents our experiences from the impressions, and expressions, on the impact of technology from the diverse mix of students.

Introduction:

It is an obvious fact that technology and in particular the pervasive applicative use of computers has transformed society. The computing machinery has revolutionized the process of computation, the maintenance and use of information, and the methods and means of communication. The pace of change has been accelerated with the technological advances enhanced with creative software products and tools.

As individuals, communities, and countries adapt and integrate computer into their economies, they leave behind those who haven't. These create economical and informational chasms among communities and countries.

For those involved in Computer Engineering and Computer Science it is palpable to notice the plethora of industries and avenues where computers have made strides in transforming access and potential. One can attribute this change to technology. But, one can see that this has happened primarily due to the innovative, creative, and pioneering actions and leadership by entrepreneurs. All this motivated, obviously, by the capacity and capability rendered by advances in computing devices.

Competitive edge by individuals, communities, and countries hinge on active engagement with technology and expanding envelop of computer usage. More importantly, it has become imperative to employ technology for productivity, efficiency, and compatibility. Thus, organizational survival is at stake. Thus "Digitize and Device" else Perish seems to be the name of the game.

The General Education, University Studies at Winona State University, component enumerates fundamental and essential skills and criteria that all students must undertake to be successful. Science and Social Policy fall under the umbrella of Unity and Diversity component of University Studies. Under this umbrella courses "promote students' understanding of interrelated concerns of society and sciences." These courses also "integrate issues related to one of the sciences with the social and government policy decisions that stem from these issues."

CS-210 – Computers in Global Society address precisely these issues from the perspective of technology and computer sciences. This course aims to "To help understand the societal implications of computer technology, this course exposes students to some of the basic scientific foundations of computer technology." And to "The impact and significance of the information age is explored in several different contexts including economic, political, cultural, legal, environmental, historical, ergonomic, and psychological." Pre-requisite for this course the basic skills English 111, a writing course.

This course also serves as an elective of the Global Studies Major at WSU. "The Global Studies Major takes a multidisciplinary approach to understanding the growing interconnectedness between people of, and interdependence among, the countries of the world. Courses in this major explore the causes and consequences of this multi-faceted phenomenon and examine the various responses to it." Additionally, "Students majoring

in Global Studies gain a sound understanding of the forces shaping our world and lives so that students are prepared to participate effectively in the world they encounter after graduation, whether they decide to work in the US or abroad." These issues are actively addressed in the deliverance of this course.

In this paper the author presents his approach to this class and his experiences through the discussions and feedback activities of this class. Students who took this class were from diverse cultural and academic background, and primarily were non-CS majors.

CS-210 course work:

At the onset of the course students are asked to formulate their own personal course objectives. The course syllabus as well as the course objective from the instructors' and departments' perspective is brought to their attention. Subjective evaluation of these objectives occurs throughout the semester. These are reflected in student reports as well as in classroom discussions. The course syllabus for Spring 2006 (given below) is available at http://cs.winona.edu/Iyengar/CS-210/cs%20-%20210%20Fall%202005.htm.

Objective:

To Understand and Appreciate Computers Technology And Its Effects in a Changing Global Society.

Text: Computers in a Changing Society, John Preston et. al.

Syllabus:

- **Computer Technology (Ch. 1)**
- **Test 1 ---- 1/31/06 Sample**
- **WWW and Global Reach (Ch. 2)**
- **Test 2 ---- 2/21/06 Sample**
- **Report 2 Assignment**
- **Binary Machines (Ch. 3)**
- **Test 3 ---- 3/9/06 Sample**
- **Software and Its Impact (Ch. 4)**
- **Note on Dialogue**
- **Test 4**
- **Ethical Usage of Computers (Ch. 5)**
- **Test 5**
- **Security and Privacy (Ch. 6)**
- **Report 3 Assignment**
- **Test 6**
- **Where we Stand and What's Next (Ch. 7)**
- **Finals Exam (Comprehensive)**

Test 1	**10 %**
Test 2	**10 %**
Test 3	**10 %**
Test 4	**10 %**
Test 5	**10 %**
Test 6	**10 %**
Study Reports	**15 %**
Final Exam	**25 %**

Grading Scale

	Grade
>= 90%	**A**
>= 80%	**B**
>= 70%	**C**
>= 60%	**D**
< 60 %	**F**

Policy:

Projects and Homework should be done on an individual basis. Co-operative learning is encouraged. Collaboration in generating the submitted work will be construed as plagiarism and will be reported to the department. You are responsible for all material assigned and discussed in class.

Reports Assignment:

Students are required to research, contemplate, and frame three reports. The assignment statements of these reports are given below. The first report pertains to technology prevalence and its impact in different countries around the world (one country assigned for every student). Second one report is a reflective attempt by the student on how access or lack of access, to technology affected the student personally, in the classroom, and in their career choice. The third report required students to argue for and against each of the given position statements on ethics, government role, taxing internet commerce, an international body for internet laws, piracy protection software, and entitlement for technology access.

We also held a class-wide Dialogue on ethical use of computers – so they can collectively understand where they stand on that, what steps can and needs to undertaken by individuals, communities, and governments to effect protection, security, and ethics in the age of technology. Periodically, interesting articles on current technology issues like censorship in China, Government inquisition on Google searchers, etc. are discussed. Together these address the intent of the course **To Understand and Appreciate Computers Technology And Its Effects in a Changing Global Society.**

Report 1:

Review articles and documents from the web, library, newspapers, and other sources. Write a summary report per the following format (xxxx is the topic assigned to you. yyyyyyy is your name):

Title: Digital Divide: Effects of Technology (or Lack Thereof) on xxxxxxxxx.

By: yyyyyy

Date: Spring 2006

Report:

Up to 4 pages, single spaced, 12 point Times Roman font. This report should address:

a) Description of the constituency (country) that is reviewed.
b) Technology and access for this group
c) Ways technology has brought about changes
d) Positive/Enhancing effects
e) Negative/Discouraging effects
f) Strategic initiatives undertaken
g) Future prospects

Summary:

A one paragraph succinct summary of your observations, and your assessment of the impact of technology on this group.

References:

Site all relevant references.

DO NOT COPY INFORMATION FROM YOUR REFERENCES. EXPRESS WHAT YOU GATHER IN YOUR OWN WORDS

Report 2:

Write a report that addresses the following issues.

- How, and in what ways, has access or lack of access, to technology affected you/your family personally?
- How, and in what ways, has access or lack of access, to technology affected your/your family's performance in (and out) of the classroom?
- How is your choice of career impacted due to the prevalent use of computers? How will it impact in the future?

Your report should include.

Course and Report Credentials
An introductory background about yourself
Clear essay addressing and detailing the questions posed above.
A succinct summary
References used (if any)

The report should be up to 4 pages, typewritten (single spaced, 12 font), neat and well organized.
You should place your report in your folder for the class you are enrolled in.

Report 3:

Argue for and against each of the following position statements.

- Preventing software piracy is the responsibility of the software companies and they are solely responsible for technology that will eliminate piracy.
- Commerce on the internet should be taxed similar to any other commerce.
- There should be an International Body that will study, enact, and implement laws that inhibit and punish criminal behavior on the internet.
- Computer manufacturers should be required to include in the hardware technology that would detect and eliminate computer viruses and worms.
- In the interest of National Security, Governments should be allowed free access to internet activity of any individual.

- Access to information is a indelible right of every individual and hence Governments should provide Title XX funds to provide access to every individual.

Your report should include.

Course and Report Credentials
An introductory background about yourself
Develop and present clear arguments that lobbies for AND arguments that lobbies against each of the positions statements above,.
Each arguments (for and against) should be backed with information that provides veracity (with references) – at least a paragraph each.

The report should be typewritten (single spaced, 12 font), neat and well organized.

Summary of Reports:

Given below are a few sample of summary on technology impacts in various countries and groups. We addressed 32 countries from around the globe and 6 various groups. The summary result from all these reports is shared and available to all. The theme that is common to all is that those countries and communities that have adapted well to use of technology have openness, economic progress, and see positive movement in overall standard of living. Those that do not have technology investment are regressive, poor, and struggling to achieve stability. Digital-Divide is apparent and is addressed adequately through this process.

Summary **IRAN**
I have found that the people of this country are not inhibited as much as I first thought. The school of technology is proof of that. They are able to get connected with the internet if they so choose. There are a few roadblocks in their way, such as censorships and the lack of power lines, but it is improving all the time. Technology is growing in this country very steadily, and there won't be a "digital divide" here for very much longer.

In conclusion **Pakistan** is a pretty advanced country as far as technology goes, but it has a ways to go, much like every other country on this great world we live in. In my opinion it is a country that will continue to grow much like the rest of the countries of our world. Why would it stop the technological advance after it has brought us so far today? In some peoples eyes it has made the world a better place to be, but while in others it is a source that has hurt us and should not have been thought up. So as long as these people come along with new ideas, they bring with them a new wave of technology possibilities and enhancements

Before I started this report, I had no idea that **South Korea** was this technologically advanced. I have heard some European countries being offered higher speed broadband connections than us, but had no idea that South Korea offers up to 20mbs in some areas. I will strongly admit to know nothing about history. I didn't even know Japan and Korea had ties. I have heard of technology advanced Japanese culture, but had no idea South Korea was even more so. I do not know the culture that well, but some of the articles I read explained that most Koreans do not go home after work, but instead go out to dinner, to bars, and to other places. This would explain why there is such a mobile demand there (75 percent of them have cell phones). Being a mobile driven society makes it the top spot to test cell phones. Being ahead of the game also allows companies to observe South Korea to what will be the next hot item in the rest of the world within the next upcoming year.

Belarus is still a growing country. Another recent report www.cellular-news.com is that MDC released EDGE technology in Belarus in December 2005. Belarus is still one of the leading optics researchers and it has never been too far behind the times in technology. All things considered with, having a huge set back of having to clean up a nuclear mess Belarus is doing just fine in the technological world

It was difficult to find information at first linking technology and this remote country together, but when I broadened my search I realized that technology, while it is focused on computers, aren't necessarily e-cafes and big office buildings with lots of computers and wireless internet. I forgot that **Mongolia** is just like we were when we were beginning to use

computers in our everyday lives. I didn't even stop to think that there was technology at work in the mining and oil industries in the steppes and deserts, and that the government was pushing for learning at home or in their towns for children in order to help them get an education, learn technology, and give them more opportunities in other countries that surround Mongolia. I think that it was really important to note that, just like in the United States and many countries in the Western Hemisphere, that technology isn't completely positive. The pollution in the urban areas is one that most countries deal with, but unfortunately Mongolia is still slower than many in improving the conditions. One thing that I completely forgot about is that it also creates a gap in the society as a whole, and separates those who can afford internet and telephone service and those who cannot or will not. To me, it doesn't make sense to disregard the positives that can come from using technology, but I also forget about the heritage of the nomads in the country, and how they are currently more or less content with living their lives as they are for as long as they can. I think that it is a very good idea to help children in rural areas to have access to online classrooms on the computer because it can maybe help them think of ways that technology can help them positively in the areas that they are living in, versus seeing that the urban areas just better and leaving the rural behind completely. Overall I think that the country of Mongolia has a long way to go, but that they are headed into the right direction and will control to grow and become a stronger, more populated, and more economic nation because of the growth of technology and its government's acceptance towards it.

Summary: **Sudan** has places where technology has helped the economy become stronger and has helped the people living in those areas. While on the other hand, there are still some places in Sudan that are without any technology in communications. Without this technology, those parts of Sudan might be stuck in the "Dark ages" until they get help to get a reliable communications system up and running.

When compared to the U.S., The **UAE** has very restricted assess to telecommunications and the internet. There are requirements that restrict a person from obtaining this media as well as what they can view once they have the access. This is not the case in the U.S.; we have unlimited access. They seem to have better control of how technology, specifically the internet, is used. Also, unlike the U.S., they have very limited ISP with only one provider which again provides them with a lot of control. This is all the information I was able to find and I am sorry if it is not as thorough as you would have liked.

Latin/South American Immigrants . I think the major problem for the immigrants is the fact that it is hard to find jobs in order to afford computers or the internet. Part of the reason is that there are less Latinos or Cubans that try to further their education. That too is on the rise, but it will need to rise more there to be anymore of a change. Once more of the Latino and Cuban generations of today become more educated on how to work with technology and how to work their finances better then there will be a huge rise on how technology will affect the Latino and Cuban immigrants here in the United States. However, it won't happen unless the younger generation takes the initiative to want to change the way they are viewed by the overall population and world before they will be able to start changing the use of technology. They will need to work hard at finding jobs and trying to better their education, but it is possible to change the number of families with access to both household computers and the internet.

Unfortunately, they are striving to obtain nuclear technology to build weapons of mass destruction. This can be extremely detrimental to the country. Whatever is in store for the people of **Venezuela**, we hope the best for them. It is very interesting to see how much technology can affect the people of any one country. It is amazing to see that there are not only positive effects that technology can bring on, but negative aspects as well. We live in ever changing times that are always rapidly moving with great force. We must keep up with advances in technology around the world, and not work to trample it. Bob Dylan once sung, "The Times, They are a Changin". That song that was written over 40 years ago resonates even more today. Technology advancement is the wave of the future, and yes, our world is changing. Can Venezuela keep up?

Mexico may not have technology in every home in the country, and possibly not in every town, but it is certainly a very important part in allowing Mexico to grow. There are many people in the country who for one reason or another do not have access to electricity and internet access and thus cannot have a computer and this is detrimental to their lives and their possible job selections. But for the people who know how to use a computer their lives are thriving and with advance for the better. The Mexican government knows how important technology is and is trying to get computers and different forms of technology to everyone. Mexico is on the rise of power and economic levels, and that is greatly due to the advancement technology has made in the country in the past few years.

The **Brazil** project, a web based development infrastructure which links people securely to information, computers and other devices leveraging existing standards and protocols. It enables stand-alone systems to work together within the web space. Simply put, the Brazil project is a toolkit for building next-generation web-based applications. The Brazil toolkit uses its own Brazil Scripting Language (BSL), to take the information communicated between Handlers and use it for dynamic HTML generation.

They expect the following things from the projects:

1. The Distributed-Content Web
2. Accelerated Development Cycles
3. Mount and Transform Web Content

I believe that all of the projects **Kenya** is working on to increase computer availability for the public will prove to be successful as well. Public centers with computer and internet access are a great way to get people familiar with computers and the internet. This will hopefully make them realize the importance of computers and cause them to buy

one of their own. And although I am unfamiliar with satellite technology providing internet access, it sounds promising for the Kenyan people. Providing access to the internet at less than half the current price is an amazing thing. Another concept that was new to me was a laptop that does not require any electricity at all. This would be great for the school kids of Kenya. I believe that computers provide a basis for higher learning so if Kenya can follow through with their One Laptop per Child project, I think the level of education will rise. The use of credit cards is also a positive change in my mind. Although it can be a challenge not to overspend, I think that credit cards provide an easier and safer way to purchase items. Not to mention it will help the economy since it costs the government less to process. Overall I believe that the years that lie ahead for Kenya are very promising. They are moving in the right direction towards a more modern society that can function more effectively and efficiently.

Romania is a country that has emerged from obsolete industries and worked to create efficient computer systems to help there industries grow. Its use of technology has helped industries grown and allowed the country to work at becoming a technological power. It has produced some of the best computer programmers in the world. It has the problem of being a country with the most internet crimes. It has brought about the special police force that will focus on internet crimes within the country. The impact of technology has mostly produced a positive outcome among the country. It has allowed industries to grow, the government to become connected, and processes to go at a faster rate. Despite internet crimes within the country Romania has had some positive effects from the use of technology.

To conclude, I believe that **Malaysia**'s prior use of technology and advancements for the future are on a very prosperous track. Malaysia began its quest for knowledge and technology with the 4th prime minister, who had a very influential role in Malaysia's future. I had begun my research with the incorrect assumption that Malaysia would not nearly have as readily accessible technology nationwide. However, I was surprised in finding that technology is prevalent in Malaysia, and the future only looks better. I think that technology has had a very strong impact on the country, and as technology advances in the future, so will Malaysia advance to create a very smart country, one that many even be credible globally.

Hopefully in the near future there will be better access options for the **visually impaired**. What they have now works, but there is still a lot of room for improvement in the accessibility options for visually impaired users. For one, costs could go down for specialty equipment, and be more available. Looking in stores like Best Buy and Circuit City you don't see much for the visually impaired.

My personal view after this research is, for technology to take its full toll and to broaden its path, **Niger** first needs to develop in the area of transportation, which is one of the main reasons why the rural areas cannot be reached instantly. The lack of proper roads and highways and the fact that there is absolutely no railways within the country too is a main drawback. For technology to spread there should be a proper transportation system with adequate roads and railroads, where people could be reached. The people in the rural areas should be given a chance to voice their opinion and have the right to be informed and to maintain communication with the outside world. They deserve a chance to experience at least the basic Tele-communication systems, such as a Telephone service or even a Radio for them to be informed. ICT can have a direct impact on raising living standards and the quality of life for the poor. They deserve proper health care and some of the advanced technology used in medicine just like in the developed countries. The children deserve proper education and the access to computers. Using basic ICT technology like the TV or the Radio can be used to reach out to children in the rural regions.

Ghana There is a growing belief that the intelligent embrace of information technology is perhaps the means of fairly quickly moving the country out of a dispiriting, economic poverty and information poor. The country could leapfrog decades of obsolete development in telecommunications and IT, taking this giant step with systems that are appropriate for the African environment.

Historical Museums. The efforts of today's geniuses will allow the burgeoning generation to excel our most fantastical ideas of information, access, and interpretation. Young students will adapt to this new "literacy," mastering the language and educating the world with a collection of accessible data never before conceived in academia. The new digital museum filled with history's lessons, history's art, and history's community will enable the next generation to transcend life's barriers. Online cultural advancement can only be achieved by providing access to the tools needed to experience the data. Technologies must be standardized, integrated, inexpensive, and available. Ultimately the creation of online museums will benefit the educational future while firmly securing the perpetuity of the past.[8]

In this paper I went over some major points that deal with **high school students** and the effects technology has had on them. We acknowledged the technology they have and use today. We compared both the positive and negative effects some technology has had on this group of people. Then finally we searched for what future prospects we hope to see soon and the steps it took to get there. By doing this I have learned a great deal, not only about this group of people but also about the technology they use in everyday events. With society evolving so fast I don't think there is anyway to tell just what technological advances we will see for this group of people in the near future.

The reflective report on impact of technology on the students', and his/her immediate family, brings out a simple theme. Career choices, no matter what, ultimately will require computer skills. Every one of them visibly contrasts the differences computers have made

between them and their parent's generation. Included are clear assessments of various uses of computers that make them more productive, efficient, and thus make life easier and enjoyable. Finally, every one of them summates the significance of computers as an integral part of their future and the need to capture its potential at the earliest. They do recognize the gravity of technology and the changes and effects it has on one and all.

The final report that addresses global, ethical, and governmental issues requires them to reflect on their responsibilities as citizens of an integrated world. Everyone has stakes in issues of piracy, e-commerce taxation, control and access to web-contents, protection from viruses, and National Security. The size and scope of each of these becomes apparent as they investigate and discuss the pros and cons and the ramifications. Every one recognizes that a combination of developing cogent and fair public policy, that can be implemented and enforced, and responsible citizenry is required for a safe, prosperous, and secure future. At this point the Dialogue session - a intentional and facilitated discussion makes a great impact. Students – from whom next generation leaders will emerge take up these hot topics and lay down the seeds for futuristic thinking and policies.

An underlying trend that is clear and prevalent among the students is the strong notion that technology is "Good as well as Evil", and that this will require the collective will and effort of communities to affect positive change. Student reports also imply a leadership role for the current generation, in setting policy as well as in finding new applications to improve themselves and their community.

Conclusion:

Teaching this course has been a great experience. Fortunate, to be part of the technology movement from early 80s, we have seen the fruits of innovation, the integration of the global community, as well as the disparity in economy and politics around the world. This course highlights these issues and brings home the fact that technology is here and we have make the best use of it. The text book engages the student in the history, current trends, and technological and ethical issues, and hones the terms from the industry. The process of studying Digital Divide around the world, reflection of technology issues on oneself, and discussing global issues that needs monitoring and managing seem to be a active self-directed approach to achieving the goals of **"Computers in Global Society"** course.

Future Work:

A follow up Travel Study Course is being planned. The objective of this course is to bring a first-hand experience to technology and changes affecting India. Included will be visitations to technology centers and academic institutions as well as contrast the effects of technology in various segments of this country.

References:

1) "Computers in a Changing Society", John Preston, et. Al., Pearson Prentice Hall, 2005.
2) WSU 2004-2006 Catalog, and On-line catalog – www.winona.edu.
3) WSU CS-210, Student Reports, Spring 2005 & Spring 2006.