Overcoming Global Ignorance: Developing Geographic Literacy in a World Regional Geography Course

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OVERCOMING GLOBAL IGNORANCE: DEVELOPING GEOGRAPHIC LITERACY IN A WORLD REGIONAL GEOGRAPHY COURSE

A Thesis
Presented to
The Faculty of the Department of Geography and Geology
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
Of the Requirements for the Degree
Master of Science

By
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December 2007
OVERCOMING GLOBAL IGNORANCE: DEVELOPING GEOGRAPHIC LITERACY IN A WORLD REGIONAL GEOGRAPHY COURSE

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The most recent Roper Survey (2006), a study of geographic literacy among 18-to 24-year-olds, found that despite constant coverage of the war in Iraq since 2003, 63% of Americans surveyed could not find Iraq on a map. Similar shortcomings abound in the poll, pointing to what must be considered a “geographic illiteracy” among Americans. This national geographic illiteracy has global implications that range from the local to the global scale, including issues of politics, economics, foreign policy, environmental policy, and resource use to name just a few.

How badly prepared, then, are students entering colleges and universities in terms of basic geographic knowledge? What are the societal consequences of failing to address geographic ignorance, and what instructional methodology could successfully address the problem? Once baseline geographic knowledge is assessed in the classroom, how can it be improved? The hypothesis of this study is that teaching students geography through a rigorous system that reinforces the Five Themes of geography through regular analysis of current events can help to improve geographic knowledge and understanding, and that this heuristic device can be expected to increase students’ base geographic knowledge by at least 30% over the course of a semester, bringing average pre-course F grades to a B within a short period of time.
The study group was comprised of three World Regional geography classes offered during the spring 2007 semester at Western Kentucky University’s Glasgow campus. Students took a pre-course survey prior to any lecture over the subject material. This same survey was administered at the end of course prior to the final exam, with the difference between the two representing the improvement score. During the semester the students were given eight assignments where the students had to analyze a current event using the Five Themes, with the expectation that these assignments would increase their knowledge content over the semester by the target average of 30%. The study returned a below-target actual increase of 15% – nonetheless a significant increase – but this increase could not be statistically attributed to the Five Themes rubric. The Five Themes heuristic did not appear instrumental in improving geographic knowledge during the course of a semester as the study duration may have been too short. However, the significant level of student improvement suggests that this concept warrants further investigation as a pedagogical methodology through a much more extended set of trials.

Although this study, as designed, produced inconclusive results, it unexpectedly revealed evidence that factors of age and gender may strongly affect geographic learning, raising questions about adopting any one-size-fits-all approach to geography education. The study also suggests that the current trend of providing a single course in geography in pre-college education does not suffice in bridging the gap of geography illiteracy in America. The results argue for suggesting a need for new directions in educational policy and practice at both the secondary and post-secondary levels.
Introduction

The most recent Roper Survey (2006), a study of geographic literacy among 18-24 year olds, found that despite constant coverage of the war in Iraq since 2003, 63% of Americans surveyed could not find Iraq on a map. Of those surveyed, 69% were able to identify China – one of the few recognizable countries outside of North America – but many failed the questions concerning social, cultural, and economic characteristics of China. Similar shortcomings abounded in the poll, pointing to what must be considered a "geographic illiteracy" among Americans. This national geographic illiteracy has global implications.

A society that is geographically illiterate is unable to comprehend or understand the diversity of factors needed to make intelligent decisions to function in economic, political, cultural, social and environmental spheres (Risse 2005). The process of globalization, which refers to increasing global connectivity and integration of these spheres, may have begun with 15th century European exploration or earlier, but the speed and intensity of globalization since the 1990s may be leaving some societies behind in the merging connections between places (Bradshaw et al. 2007).

The Roper results suggest that the United States may be one of those societies left behind, arguing that most recent graduates of the United States' educational system are unprepared for an increasingly global future (Roper 2006). These same students will go on to make decisions that affect the United States' roles in foreign policy, economic competitiveness, and resource use, just to name a few, or elect individuals to serve in those positions who may themselves be geographically illiterate (De Blij 1999). Many of the biggest challenges confronting the world today are geographic in nature.
Policymakers need to understand how geography shapes these challenges and should use geographic knowledge and technology to find solutions to these problems (Keeling 2007).

At the local scale, Kentucky’s economy has links that spread beyond the US borders, both in employment by foreign companies and in the exporting of local products and services. According to the 2002 State New Economy index, Kentucky ranked 13th among the states in percentage of workforce employed by foreign companies (ITA 2002). Kentucky has also emerged nationally as a leader in expanding its international trade. Over the past decade, Kentucky ranked sixth in export growth (KWTC 2005). A workforce of globally oriented firms earns more than a force of workers not globally oriented, which means a higher standard of living for those engaged in an international market (Progressive Policy Institute 2002). For Kentucky to continue economic growth in the global market, and to secure a higher standard of living, knowledge of foreign cultures/societies would seem to be essential for all citizens.

Western Kentucky University’s vision of becoming a “Leading American University with International Reach,” and its mission to “prepare students to be productive, engaged leaders in a global society,” reinforces the need for knowledge of the world outside the US borders (WKU 2007). This knowledge is accepted as necessary to strengthen links and agreements between countries and to stimulate growth for the Commonwealth of Kentucky. To this end, WKU has recognized the need to emphasize instruction about overcoming geographical ignorance. Considering the most recent findings in the latest Roper Survey, however, is this actually achievable, or are America’s students starting too far behind to catch up?
The last Roper (2006) survey graded Americans with a 54% score for geographic knowledge, a failing score assumed typical of most high school graduates in the U.S. How badly prepared, then, are students entering colleges and universities in terms of basic geographic knowledge? What are the societal consequences of failing to address geographic ignorance, and what instructional methodology could successfully address the problem? Once baseline geographic knowledge is assessed in the classroom, how can it be improved?

These questions reflect a gap in the existing literature with regard to overcoming geographic illiteracy. A gap that geographic educators should address. The hypothesis of this study is that exposing students to a rigorous system of reinforcing the Five Themes of geography through regular analysis of current events can help to improve geographic knowledge and understanding. This study aims to demonstrate that by using a Five-Themes rubric as a heuristic device, instructors could increase their students’ base geographic knowledge by at least 30% over the course of a semester, bringing average pre-course F grades to a B within a short period of time.
Research on Geographic Illiteracy

The final grade for Americans on the 2006 National Geographic-Roper Global Geographic Literacy Survey, which polled more than three thousand 18-24 year olds in the United States, was an F, with only 54% of the questions answered correctly. Among the Roper Poll’s shocking findings is the discovery that 11% of those Americans surveyed could not find the United States on a map. Other alarming finds include nine in ten not locating Afghanistan, three quarters could not find Israel, and a full 63% could not find Iraq. All of these countries have been a major foci of U.S. foreign policy and are covered constantly in media news reports! Six in ten do not know a second language, 20% think the Sudan is in Asia, 48% think that most Muslims live in India, and half could not even find New York on a map of the U.S. Interestingly, the Americans surveyed significantly overestimated the U.S. population size, while citizens of other countries were more likely to know the correct population size of the U.S. (Roper Survey 2006).

A beginning college instructor in the United States need not teach long before discovering that many young college students are untrained and unused to thinking outside of their own personal surroundings and circumstances (MSNBC 2007). Ignorance of other people and their places could result in a tendency to treat such persons with less empathy, concern, compassion and respect, leading ultimately to intolerance and negative decision-making. The Roper Survey (2006, 7) suggests that these results show that “young people in the United States...are unprepared for an increasingly global future;” they are, in essence, “geographically illiterate.”
The United States is engaged economically and militarily with the rest of the world. Politicians are voted into positions to make decisions over the application of military force and economic engagements, and are placed in these decision-making positions through elections. In light of the Roper findings, can citizens make correct decisions at the polls with incorrect knowledge? Does an individual truly understand what his or her vote supports?

During the 2004 national and local elections, the issue of gay marriages dominated the debates between candidates. Yet in the subsequent two years, this issue has had a relatively low impact on the nation by comparison to issues dealing with foreign relations. In 2007, a majority of Americans were unhappy with the situation in Iraq, but at the time of the 2004 election some were more concerned with homophobia than with issues of broader geographic importance. When voters are more geographically literate they are in a better position to make a meaningful decision when voting; they understand what and whom they are supporting, and this is characteristic of true democracy (Keeling 2003).

Beyond the U.S., this type of ignorance can lead to failures in foreign policy. America, with its diversity, has up to now attracted foreign-born entrepreneurs and promoted the success of American consumer goods and exports. America upset this balance with its perceived post-9/11 emphasis on militarism (Allenby 2005). The Bush Administration's response to the attacks focused on threats and cultivation of fear and demonstrated contempt for all those who disagreed with it. The Bush Administration failed to recognize that the wars we fight today are not military but cultural, and many in positions of military decision-making are often culturally ignorant of the world around
them. Unfortunately this does not augur well for the United States in the global system, and tends to overemphasize the stupid American. America has developed a reputation around the world of being a typical schoolyard bully whose only superior quality is military strength (Allenby 2005).

The U.S. administration’s lack of knowledge about ethnic diversity in Iraq has caused setbacks in its Middle East policies. Murphy (2006c) argues that the existing gap between political rhetoric and reality is growing by the day. Public accountability is virtually impossible in the absence of a basic level of global understanding and inquisitiveness, he says, and goes on to argue that the Iraq venture has been conducted and promoted through a combination of on-the-ground illusions and unasked questions – all made possible by a geographically challenged population.

Murphy (2006b) explores that gap more deeply in the context of current affairs in the Middle East, pointing out that the current U.S. Administration sees the area as a staging ground for increasing attacks by the Islamic World on the West. This could be an indicator of why 64% of Americans, according to various polls, believed that Saddam Hussein had strong links with Al Qaeda. The geographically literate do not see that connection, nor do they describe the entire Islamic world as a staging ground for terrorism, but realize that this is an area that has some dangerous terrorist movements (Murphy 2006b). The same kind of inadequate knowledge about ethnic diversity in Iraq plagues the United States in its Afghanistan policies. “The failure of U.S. policy in Afghanistan results from a profound level of geographic and cultural ignorance about how the country is structured,” observes Keeling. (2006, 1) He adds that little attention has been paid to the geopolitical context of the region, its relationships with surrounding
neighbors, and the fact that American policy makers see Afghanistan as a homogenous state – both politically and culturally – when in reality it is extremely diverse.

Americans travel to faraway places vicariously as the nightly news and other television programming virtually transports them around the world, yet most Americans are unable to find these places on a world map or discuss their cultural characteristics, (Keeling 2003). Americans cannot claim that events in faraway places do not impact America, nor continue to deny that America’s direct influence as a dominant military superpower with men and women stationed all over the world does not at times cause conflict. The world is dynamic, and once-stable relationships can become unstable; in dealing with those cultures, actions must be coupled with knowledge of why the conflicts exist.

The consequences of global ignorance are not always military conflicts. Americans’ lack of knowledge of foreign cultures can have negative consequences for the nation’s economic, political, and cultural interests as well. America’s trade relationships with Japan, for example, are challenged by persistent disputes over trade and defense (Donovan 1996). A long-term strategy for strengthening those relationships and diffusing disputes relies on building skills in cultural diplomacy through international educational experiences. Few American students have the direct experience of study abroad, but exposure to diversity in the geography classroom can provide a critical infusion of cultural knowledge. Without this cultural knowledge, the U.S. will not have the skilled workforce required to function well in the realms of international business, banking, law, manufacturing, science, or education. The Japanese have a huge advantage in international trade because of the high numbers of Japanese students who study abroad
and learn the market, the culture, and the language of their competitors. A better understanding of Japanese culture and language by Americans could improve reciprocal relationships and increase the Japanese demand for American exports (Donovan 1996).

The role of knowledge as a factor in economic growth has only recently been identified. For many years economists believed that labor and capital alone enhanced the wealth of nations, with knowledge (in the form of technology) serving as the wild card (Clausen 2006). Clausen argues that social thinkers like Daniel Bell and Peter Drucker recognize that technical and scientific know-how is only the beginning of prosperity, and that knowledge societies need people who are able to think for themselves, need institutions able to adapt to change, and need social structures that are open and attractive to people around the world. For example, although North Korea may have the technology to build a nuclear weapon, it is anything but a knowledge society.

Throughout the past century, geographic themes such as geopolitics, regional studies, urbanization, environmental studies, GIS, and globalization have played major roles in society. A mission to study geography must be sustained to generate benefits within a knowledge society (Wolman 2004). When commerce and contact between nations increases, so does the importance of understanding common experiences and diverse attitudes (Kerkman et al. 2004). This is increasingly important in the state of Kentucky, as 2006 data show U. S. subsidiaries employing nearly 84,700 Kentuckians, which is an increase of more than 3% over the last five years. Kentucky now ranks 20th in terms of employment by U.S. subsidiaries (Organization of International Investment 2007). Kentucky, like the nation at large, must foster the growth of geographic knowledge to maintain and increase this economic status; the need for global knowledge
is fueled by the fact that many students will have careers that are international in one way or another (Lewis 2000).

Though many Americans believe that national power is linked to military dominance, advanced economies today rely increasingly on global financial and information networks and highly flexible economic and political institutions. This change in definition of what it means to be a superpower may leave America lagging behind. To obtain and keep superpower status requires more than just military power; it requires a balance among economics, science, and technological capability, military might, and institutional and cultural forces (Allenby 2005). Could it be that certain institutional and cultural forces are proving to be the United States’ weak link?

Lewis (2000) comments that the poor quality of many Americans’ geographic knowledge may be related to American media choices. The media often focus on the “endlessly exploited war of the week news as well as a select few perennials such as the Israeli-Palestinian conflict, while remaining oblivious to the dozens of struggles being continually waged elsewhere” (Lewis 2000, 612). For many Americans, if an issue is not on the television evening news or on the front page of the newspaper, then it does not exist. The popular media cannot be expected, then, to promote geographic literacy. This important role must fall to academia.

Global ignorance, as explored by Lewis (2000), is not a label applied solely to America’s youth; it is also appallingly prevalent among scholars, journalists, and others who write about globalization and world history. Global ignorance from the “experts” – those supposed to enlighten others – simply further confuses the public.
An egregious example of geographic ignorance permeating the highest echelons of society concerns Rutgers professor of political science Benjamin Barber. In his book *Jihad vs. McWorld* (1995) Barber refers to Indonesia, the most populous Muslim nation in the world, as a "Buddhist" country – entirely missing the recent history of religiously spurred tension and fighting (Lewis 2000). How can such a book be written, edited, and published with such mistakes – mistakes that a child doing a report on Indonesia with only an encyclopedia as the reference would not have made?

Another scholar Lewis (2000, 614) analyzed made the comment that "globalization is us" (the United States) and that all countries should emulate the United States. Lewis replied that such assumptions simply fuel the stereotype of the ethnocentric American, leaving the rest of the world with the impression that Americans assign little importance to activities outside of U.S. borders. This level of myopia might be combated, Lewis (2000) suggests, were there sufficient support from institutions of higher learning. If Lewis is correct in identifying the media as primary among several forces actively degrading American society's level of geographic literacy, then a proactive role for education becomes increasingly vital.

The educational system, from the educators to the students, evidences a deficiency of global focus, and a starting point to rectify the lack of global knowledge in this country must begin with educators. "The ways in which the world was taught were never adequate; today they are dismally dysfunctional" (Lewis 2000, 604). Lewis stresses that if the U.S. does not address the educational challenges of globalization, the greater the potential for mistakes from the minute to the catastrophic.
The 1948 announcement by the then-president of Harvard University, James Conant, that “geography is not a university subject” could be considered the start of the demise of geography as a discipline (Murphy 2006c). Since then, geography has virtually disappeared from elementary and secondary schools and has been abolished at some universities. Unfortunately, this Harvard president’s view is by no means an isolated example; as many have noted, the nation’s leaders themselves frequently demonstrate a low level of geographic literacy. These leaders are unlikely, therefore, to advocate for something about which they are unaware. The first challenge will be to teach all Americans – from the most senior leaders all the way down to the youngest students – what geography actually is and how it is used to solve problems.

Clausen (2006) examined the shape of our institutions of higher education in America and found that in 2005 there were over 2,000 four-year colleges and universities with a combined student body in excess of 17 million students, with more than one million bachelor degrees awarded each year. He believes that higher education in America is more of a sprawling enterprise and, though the envy of the world, its achievements are not what they could be. The National Commission on the Future of Higher Education reported this past August that the quality of student learning – as measured by assessments of college graduates – is declining. The Commission found that only 31% (down from 40% ten years ago) could “fully comprehend something as simple as a newspaper story” (Clausen 2006, 32). Clausen suggests that these findings are more than likely a combination of the lack of education taking place in the primary and secondary education systems, further reinforced by the lack of engagement at the
higher education level. It has become clear that this is due in no small part to the changing priorities for both types of education (Clausen 2006).

Many universities are willing to lower academic quality to keep their classrooms full, and to encourage easier courses and less stringent grading to keep students from withdrawing because of failure. At one time universities would routinely fail a quarter or more of freshmen to maintain academic standards; no longer. A major change has taken place, and the National Commission on the Future of Higher Education warns that there are “disturbing signs that many students who do earn degrees have not actually mastered the reading, writing and thinking skills we expect of college graduates” (Clausen 2006, 36). Future assessments are needed to understand this growing concern.

Only 20.2% of all higher education institutions combined offer an undergraduate major in geography. Narrow that to the liberal arts colleges alone and only 7% offer a degree in geography. One might assume that the availability of geography programs would have a high correlation to the academic interest of students attending a liberal arts college (Bjelland 2004). In his article Enhancing Geography’s Role in Public Debate, Murphy (2006a) quotes a recent study by Peter Dicken, who states that while geographers have devoted considerable attention to the intrinsically geographic concept of globalization, they have been largely ignored in mainstream discussions of globalization. Murphy (2006a, 1) further suggests that this is related to geography’s “somewhat marginal position in the educational landscape,” as well as the lack of a geography curriculum in P-12 and many higher education systems. How can the decrease in geography’s popularity in our educational system be reversed? One suggestion is alleviating the bad or confused reputation about what geography actually is and what
geographers actually do. Having an educator in the P-12 and college systems better trained to teach geography could make all the differences, suggests Jones (2006); if the first experience a student has with geography is poor, students likely will not choose subsequent courses in the discipline. He argues that this could be overcome if instructors follow a few basic concepts, such as:

1. Explain what the discipline actually is so students can see the broad possibilities offered by studying geography.
2. Choose material relevant to the students.
3. Reach out on a personal level.
4. Let the memorization of place-locations be a by-product of learning.
5. Take a truly holistic approach to teaching.

Davis (1992) relates that his fifth grade teacher could not convey to her students why the Nile flowed upward on the map. She was not able to translate information from the map to the real-world situation; without the proper training during pre-service years, she, like many other teachers, lacked the experience to convey basic geographic information. Yet teachers are key to keeping interest in geography high. This is evidenced by Jones (2006), who, like many of his colleagues, remembers the pivotal instructor who heightened his experience and encouraged him to continue in the geography discipline.

Teacher education remains a significant issue affecting the quality of geography instruction nationwide. Recent concerns have focused on not producing enough highly qualified geography teachers. The causes are multifaceted and multidimensional, including changes in federal and state certification requirements that have diminished the roles of colleges and universities in preparing teachers for service. Teacher education is now highly politicized and fractionalized, pitting liberals versus conservatives, right versus left, and unions versus politicians. Unfortunately, this comes at the same time that
geography education reform is calling for higher standards and an increased number of geography courses in the curriculum (Bednarz et al. 2005).

The No Child Left Behind Act of 2001 established teacher quality as a priority. This new requirement has been built upon research that finds students reach higher learning when their teacher's content knowledge is higher (Bednarz et al. 2005). The No Child Left Behind Act requires that teachers have advanced certification in a subject matter. Since 1994, the number of social studies teachers with majors in their field has dropped from 80% to 78% (Council of Chief State School Officers 2003); this is the case for geography where a teacher can have a degree in a field related to geography. Again, this highlights the lack of significance federal and state legislatures are affording the importance of subjects like geography. Alternative certification programs are making it easier for anyone with a Bachelor's Degree to get a teaching certificate, with very little formal or professional preparation as educators (Bednarz et al. 2005).

Clearly the lack of geography content that teachers receive in their pre-service training, coupled with the lack of geography represented in state-level assessments, contributes to its loss of importance in P-12 education (Bednarz et al. 2005). Kentucky's Assessment Resource booklet, updated in December 2006 (KASC 2006), shows the changes in weighting and assessment determined by the State Board of Education. At the primary and middle school level more emphasis is put on reading and mathematics, increasing by 3% compared to social studies and science, which only increased by 0.25%. At the high school level it is even more discouraging, with a decrease in all subjects. Though standardized testing takes place almost every school year from fourth grade on, social studies is only tested during the fifth, eighth, and eleventh grade school years. At
the High School level, diagnostic/predictive measurements for high school and college are given, but they only explore the subjects of reading, mathematics, english, and science. I saw this emphasis on these subjects while visiting a local primary school to present a program for the National Park Service on land use. This program was considered "social studies" in conjunction with the students' curriculum. During the presentation the children were asked, one after another, to leave the hands-on-activity to complete an AR reading test on the computer, devaluing the program in which they were participating.

I recently interviewed a college student, (Nemon 2007) from Chicago, who desired to become a K-8 school teacher, emphasizing social studies. She was advised to change the subject area to one that had more emphasis in the Chicago public schools. She decided to emphasize in English instead. Fewer geography majors are entering secondary education, because the emphasis is on other subject material (Bednarz et al. 2005). This student's parents are both high school teachers, one in the public system and the other in a private Catholic school. Each has very different curricula to follow, as the private schools are not governed by state testing. This same student graduated from a private Catholic high school and, while attending University, had the sense that her knowledge of world affairs is above her peers. She was awarded extra credit in a class for being the only student to know who Donald Rumsfeld was. (It should be noted that when she took World Regional Geography at her small liberal arts college, the class was taught by the head of the Department of History and not a trained geographer.)

During the Fall 2006 semester, this student spent one day a week in a junior high school as part of her course work. She found that the students knew exactly what would
be on their tests and often would state that when going over something. Their teachers were going as far as saying, "this is on your test." The teachers seem to be under stress over their students' performance on these tests, just as an assembly line foreman might worry if a quota is not met. Children are being taught to memorize for the moment, with no emphasis on retention. The knowledge leaves them soon after testing, as there is no application of the information in a way that would keep it in their long-term memory.

Current demographics show that the average teacher is female, 43 years of age, and planning retirement in the near future. California retirement rates for 2002 were 1.7% of the total teachers, and that rate has been projected to increase to 5% by the 2007-2008 school year (Bednarz et al. 2005). The need for competent educators will continue to increase as the baby boomers retire. This is a concern for geographers, but should be for the nation as well. Beginning teachers struggle to understand and teach the curriculum because, typically, curricula provide few details about actual subject matter, "like rich descriptions of specific content, sequence, instructional materials and pedagogical methods. This is especially true today in those states and school districts where the prevailing school environment is dominated by the high-stakes, test-focused, and state standards based curriculum (Bednarz et al. 2005, 107). Assessments have become the curriculum rather than the foundation for the curriculum.

Solutions are available to educators wishing to add geographical literacy back into the curriculum. My Wonderful World, a campaign led by the National Geographic Society to increase global learning in school, at home, and in the community, is helping educators better prepare the nation's youth for living in an interconnected world with the goal of giving children the power of global knowledge (My Wonderful World 2006).
Organizations that are members of *My Wonderful World* include the National Geographic Society, 4H, the American Federation of Teachers, Sesame Street/Children’s Television Workshop, and the Association of American Geographers. The National Geographic Society began the annual National Geographic Bee, where over five million students in 4th through 8th grades from 18,000 schools compete for a $25,000, $15,000, and $10,000 scholarship. Associations of geography teachers known as Geographic Alliances have been established in all 50 states to revive geography in the P-12 schools as a required subject. These Alliances offer workshops and fieldwork to educate teachers in expanding their geographic knowledge (Rosenberg 2006).

An Advanced Placement in Human Geography program, developed by the College Board in 2000, allows students to study a college-level curriculum of human geography and gain possible college credit before graduating high school (Baily 2006). To date, 40,000 students have taken the course (Gray et al. 2006), and that number is growing by 10% annually (Bailey 2006). Research conducted by the U.S. Department of Education has found that completing a solid academic core in high school was more strongly correlated with a student’s attainment of a bachelor's degree than high school test scores, grade point average, or class rank. Current research also indicates a direct positive correlation between AP classes taken in high school and the likelihood of earning a college degree (KDE 2007). Schools are not required to offer AP classes, but doing so fulfills Kentucky Senate Bill 74 (an Act relating to college preparatory educational programs). Two Kentucky universities, WKU and Morehead State, offer week-long courses for teachers wishing to teach the course, which also fulfills their professional development requirements.
Do AP courses provide any special advantage for schools? Kentucky Senate Bill 74 mandates a core curriculum that may involve Advanced Placement. This speaks volumes for the value of AP courses in schools. Schools that offer AP courses demonstrate their commitment to academic excellence and their participation strengthens the links between secondary and higher education, encourages student achievement, and raises teaching standards (KASC 2007).

In 2001 the number of exams given in Kentucky for Advanced Placement Human Geography was under 10 and that number has grown over the last 5 years, although Kentucky still ranks relatively low in comparison to other states (Gray et al. 2006). Gray et al.’s (2006) study also found that the number of tests given at a school with the Advance Placement class available within the first two years was low but they found that momentum built over the next several years through word-of-mouth and student experiences. Kentucky is in a good position to continue the growth of this program, having two universities with programs to train the teachers. This program serves to benefit Kentucky as well as the nation by promoting an Advance Placement at the secondary level and by further encouraging geography classes at the college level.

An interesting solution to bringing geography back into the curriculum was to add it to math. A study by Dorn et al. (2005) found that adding a curriculum that combined geography with mathematic skills was one way to bring geography back into the classroom. In this study of 113 classrooms, the Arizona Geographic Alliance developed a package of 80 lessons combining the two; it found a statistical increase in both math and geography skills. In another way of connecting geography to the No Child Left Behind requirements, the Arizona and Michigan Geographic Alliances are finding that
geography instruction is also helping improvements in reading comprehension. The authors feel that the time has come for a national program of "connecting geography in a systematic way to reading, writing and mathematics" (Dorn et al. 2005, 156). In another study, Gregg and Sekeres (2006) found that learning geography encourages the learning of new nouns and verbs and also the context of using those words, which increases students' vocabulary.

Opportunities to aid teachers in effectively teaching geography include the Kentucky Geographic Alliance, participating in anything offered by the National Council for Geographic Education, and engaging with a workshop sponsored by the College Board for Teachers wishing to offer Advanced Placement Human Geography (Jones 2006).

The ability to teach geographic literacy takes on particular importance in the instruction of technologies like Geographic Information Systems that are swiftly becoming commonplace in society and wielding increasing power in the daily lives of individuals. The new technologies of GIS, GPS, satellites, and computer modeling allow new levels of spatial analysis. These new possibilities were virtually impossible with paper. Add in statistical analysis and the capabilities to display spatial analysis are incredibly enhanced. In recruiting students to geography departments it is vital to show that the demand for geographers is high. Careers exist for graduates of geotechnology in areas such as planning, education systems, local and federal governments, environmental planning, and the need should continue to grow (Estaville et al. 2006a).

The power of new geographic technology allows professionals to measure time and space more precisely than ever before, transforming the field and making possible
comprehensive studies of both Earth’s processes and human activities and the interaction between the two (Wolman 2004). The human landscape continues to change dynamically at increasing rates. Many future careers will need to address questions of sustainable development for growing populations. The United States Department of Labor shares the belief that future employment demands are indeed bright for geographers as forecasted by the prestigious international journal *Nature* that identified “geotechnology as one of the three most important emerging and evolving fields, along with nanotechnology and biotechnology” (Estaville et al. 2006a, 95).

To take advantage of these opportunities, Estaville et al. (2006a), suggests university departments must correlate programs with societal demands, from the local to the global, in producing those individuals capable of sophisticated geospatial analyses of social, economic, political, and environmental issues. They recommend that this can especially be effected by modifying degrees and programs to include those that focus on GIS. This study further encourages departments that offer GIS to collaborate with other departments and local community organizations to help develop student and societal views on its potential uses and careers in this field. When departments assist their graduates in employment, they promote a trickle-down of GIS knowledge and experience to the secondary education level; this will, it is hoped, encourage our education systems to emphasize social studies and geography (Estaville et al. 2006a).

Grassroots programs are beginning to exist that highlight to high school students the value of geotechnology capabilities and careers. The potential of these programs lies in their ability not only to promote study and career choices in the geosciences but to continue to erode the misconception that geography is simply about location. John
Bayerl, a grassroots' leader and PhD candidate in the college of technology, with an emphasis in education, at Eastern Michigan University, has been able to implement such a GIS program into the high school curriculum in the city of Dearborn, Michigan (Bayerl 2007). He comments on the benefits of the program:

**Q. What do you teach and who are your students?**

* A. I'm teaching a couple different courses here. The 'main' course is GIS Certification, a two hour block, two year long course leading to certification. This if for 11th and 12th graders and includes basic and advanced uses of GIS, as well as some instruction on GPS, satellite technology, remote sensing and aerial photography. Mixed in with this are a bunch of work-related skills kids can use in ANY high-tech, computer-type job.

**Q. Where does the funding for the program come from?**

* A. The program is funded out of the district's general fund (the same way they pay for other classes).

**Q. What software do you use and are you able to keep current software?**

* A. We use ESRI ArcGIS 9.1 with Spatial, 3D, Image and Network Analysis extensions, a combination data-set/basic GIS program called GEODESY, and AGI's Satellite Tool Kit 6.0. The ESRI stuff really ISN'T that expensive ($500 per program for a LAB license). We paid a little extra to get the “update” option. I think the next (v 10.0) software will cost us $100 per lab.

**Q. The kids you are teaching – why do they choose your classes?**

* A. Who knows? Some have an interest in computer applications (don't want networking or web-design—the only other options). Some are interested in careers in city planning, business, government, etc. Some just need a safe, fun place to fit in.

**Q. How do you think taking this class benefits the kids?**

* A. It teaches state-of-the-art technology skills. It also teaches general IT skills applicable to many career choices. They learn the geography (and many of the other skills/ knowledge) because they
have to in order to complete a local project—not by memorization or rote repetition. The learning comes secondary to the problem solving. Since students are naturally inquisitive, if you challenge them with a problem, and start them down the path, I find that they will "figure out" what they need to know and apply them to learning it. You will hear this called a "constructivist" approach (or sometimes "positivist"). In my experience, it the best way to get kids to learn.

As an example, if I give kids a project to map the member nations of OPEC and give them a list of country names, they use technology to display exactly where Saudi Arabia and Argentina are...and might say "oh...I thought they were all in the middle east". They now know something about OPEC that they didn't know before, and I didn't teach them...they discovered it on their own. This is something they can relate to, because they constructed their own knowledge in terms they can relate to. Such is the power of GIS.

**Q. How does the course benefit the community?**

A. Projects relate to the community. I try for the kids to solve real problems whenever possible.

Why stop at the high school level? GIS has also been identified as a tool for teaching geography in the elementary grades. A study by Shin (2005) found that by implementing GIS into elementary curriculum students improved their map skills and geographic knowledge by enhancing geographical thinking, which could help students achieve future career goals. The most challenging aspect, at this level, is the educators' lack of knowledge of GIS. A survey found that only 11% of P-12 teachers knew of or had heard about GIS. This only reinforces the need for a geography curriculum, including GIS, that should be a stronger part of the teacher's pre-service training (Shin 2005).

Such knowledge is available. The university and community college systems offer widespread access to geographical knowledge, regardless of social class or
Western Kentucky University has specifically acknowledged the importance of geographic literacy through its mission to prepare students for success in a global community, and its evolving goal to respond to regional, national, and global changes (WKU 2007).

This community is already engaged in a global community. It can never be too soon for students to begin an understanding of their diverse world, because it is now facing them every day in a variety of interactions, (socially, politically, and economically). If American citizens generally, and Western Kentucky University graduates specifically, are going to be more prepared for success in a global society, there must be a basic understanding of the geography of the global system or world-space.

Demographics show that the United States is expected to become more diverse over the coming decades, with minority populations becoming a majority of the population later this century (Pulsipher and Pulsipher 2005). The Geosciences Diversity Enhancement Program, a three-year program funded by the National Science Foundation to enhance diversity in the geosciences (Wechsler et al. 2005), identified minority groups underrepresented in the fields of science. Minorities represent 25% of the population and 15% of total Bachelor’s degrees granted in science and engineering, but only 4.6% of all Bachelor’s degrees in the geosciences and only 3.3% of the Master’s degrees in geosciences. Wechsler et al. (2005) found that a lack of enthusiasm for the geosciences has much to do with the lack of information of possible careers with this degree, and they call for faculty, at the high school and college level, to increase discussion of potential careers with their students.
It will, therefore, be up to geographers to keep the discipline dynamic and relevant, to keep it properly represented at the highest levels for consideration by educators and decision-makers. It should not be thought of as a discipline that steals its information and concepts from other disciplines, but rather as one that embraces all of the others. The basic and widespread misunderstanding of the nature and importance of geography is the leading difficulty that geography departments face in recruiting students and building core competencies in the discipline (Estaville et al. 2006b). This literature review reveals that the broad issue of geographic ignorance has been widely detailed, the specific issue of how to build core competencies is less well studied. There remains a significant gap in the literature concerning the methods necessary to assess the pre- and post-course knowledge base of students.
Methodology

Western Kentucky University’s (WKU 2007) mission to “prepare students to be productive, engaged leaders in a global society” can be strengthened through a World Regional Geography course. This course has been identified as one with a high failure rate at Western Kentucky University. Students tend to struggle with the concepts and relationships of connecting people with places. Possibly this ill preparedness is rooted in the educational journey that students take before ending at the doorstep of higher education. In light of the recent Roper results, it may be necessary for educators to re-evaluate course curriculum and instruction methods. Exploring the context of teaching geography to the general student body may be “fertile ground for further exploring learning styles in geography” (McKendrick 2001, 272).

As argued in the introduction, a gap exists in the literature on overcoming geographic illiteracy. In the early 1990’s, in light of the dismal standing the United States had in an earlier Roper Survey, the Five Themes of geography were developed by the Joint Committee on Geographic Education of the National Council for Geographic Education and the American Association of Geographers (Education World 2001). This study utilized these themes to build geographic knowledge. These five specific themes were developed to help focus teacher and student thinking when it comes to geography and build geographic vocabularies.

The Five Themes are Location, Place, Human Environment Interaction, Movement, and Region. Location focuses on the absolute or relative location of where something is located. Place takes that a step further to describe how one place is different from another by looking at physical or human characteristic. The Human Environment
Interaction focuses on the relationship between people and places and how people have altered a place for their needs. The fourth theme, Movement, looks at the patterns of how people, products, and information flow for one place to another. Lastly, the Region theme examines the variety of ways the world can be divided for further study.

To address the issue of how educators can aid students in overcoming geographical illiteracy, this study targeted a group of 70-80 college students enrolled in Geography 110, World Regional Geography, during the Spring 2007 semester, at WKU’s extended campus located at Glasgow Regional Center in Glasgow, Kentucky. A pre-course survey was administered the first day of class prior to any lecture over course material. The average score, based on the working hypothesis, should have been 54%, matching the average score by Americans in the latest Roper Survey (2006). At the end of the course, just prior to the final exam being handed out, each student would receive the same survey. This study’s working hypothesis is that the scores should have improved by 30% with an average score of 84%, indicating improvement from an F to a B average, as a consequence of engaging students explicitly with the Five Themes rubric.

As an incentive to do their best, the students were told that they would receive extra credit on the midterm examination for completing the survey to the best of their ability. The students had no knowledge that they would be retaking the survey until it was administered during the final examination period. A pre- and post-course survey was administered in a research study by Forsyth and Maier (2006) and found effective in tracking the attitudinal changes of ninth graders about world cultures after taking a world geography course. The attitudes of the ninth graders were found to be more positive after the world geography course by reducing negative stereotypes and pre-judgments of
cultures outside the U.S. The ultimate goal of this attitudinal change, in the ninth
graders, could be met through future positive relationships directly or even indirectly,
through voting and other decision-making actions concerning American foreign policy
(Forsyth and Maier 2006).

As in the Roper (2006) survey, the pre-course survey had a variety of questions to
gauge student knowledge. Questions of factual knowledge such as population sizes, and
natural disasters, and questions regarding map skills and map reading, similar to those
included in the Roper survey, were included. Again, Americans averaged a dismal score
of 54% correct on this latest national survey, in spite of the numerous catastrophic events
reported in the news over the last few years that might have been expected to broaden
public awareness about geography. It is anticipated that the target group in the current
study would have comparable pre-course survey scores to the Roper Survey.

To collect basic social data on the test group, a personal questionnaire was given
to each student participating in this study. Answers to the personal survey were
compared to answers in the pre-course survey for understanding trends that may emerge
between incorrect answers and human social-cultural characteristics, trends in the
characteristics that lean toward geographical illiteracy or literacy. These characteristics
included political affiliation, religious affiliation, citizenship, access to the Internet,
Internet sites frequented, and whether students stay current with world events. Non-
parametric analysis will be performed to determine if relationships exist between the pre-
and post-course survey results. Identifying the characteristics of students who start the
course at a basic or deficient level of geographic literacy, and comparing this information
with the characteristics of those that scored well on the pre-course survey, may provide
insight as to what could be emphasized to increase geographical knowledge and aid educators, at all education levels, to determine measures necessary to prepare students for a globalized world.

In the highest-scoring countries of the previous Roper polls – Sweden and Germany – at least 70% of respondents had traveled internationally in the last three years and the majority spoke a second language (Trivedi 2002). In the personal survey conducted for my study, the students were asked if they speak another language at home, if their families are recent immigrants, and if they had traveled abroad. The Roper poll indicates a correlation between traveling and geographic knowledge. Students with the opportunity to travel and interact with people internationally tend to be more geographically literate.

The primary goal of this study was to measure improvement in the students’ geographical knowledge base, but also to see an improvement in their ability to think geographically outside of the classroom as they go forward in decision-making capacities, interacting with a globalized society. Through the semester, students were introduced to a more critical approach to learning and analysis than just reading the text or skimming lecture notes to prepare for an exam. The deeper approach to learning was expected to improve the students’ ability to understand geographical concepts and relationships and improve their scores on the post-course surveys.

Many students appear to be unprepared to think critically and independently when beginning at the university level. A study conducted by Thompson et al. (2005) found that many college students arrive far from being well-prepared independent learners. Many pre-university studies found students to be more dependent on their
teachers throughout their study, even though university level studies require a greater level of independent learning skills. A high-school English teacher in the local community shared that she was criticized by co-workers for making her students mentally over-exerted; the problem, they felt, was that this teacher engaged students in critical thought that left students too exhausted for the remaining lessons of the day. Is this not the very concept that our primary education system should support to prepare students for higher education and to function in a very competitive world?

To encourage more independent learning of geographic content, the students in this study would be interpreting geographical information using the Five Themes of geography (location, place, human-environment interaction, movement, and regions). The Five Themes of geography were developed to assist educators and students in better conveying geographical knowledge. Throughout the semester students were required, for course credit, to analyze eight current events or short films by breaking down and identifying the Five Themes of geography as expressed therein. During the first lecture, students became acquainted with the Five Themes and were encouraged to explore further the Themes’ meanings.

Assignments were completed with a research question and hypothesis, as a hypothetical research project that the student would take on. This gave the students the opportunity to ask the most important geographical questions – why are things happening here and what can be done? The students were also to write a brief narrative, in journal form, to explain how they felt about the subject matter or if they were familiar with it before class. One study found that teaching geography in a writing-based/journal format proved to be an excellent way for students to “master the foundation of knowledge they
will need to survive in our global village” (Hooey and Bailey 2005, 260). These heuristic assignments were intended to provide students with an opportunity to strengthen their critical-thinking capabilities while enhancing self-educating techniques like discovery and problem solving.

Students are more likely to learn when they are actively involved in carrying out research projects (Healy 2005). This type of active classroom fieldwork helps them grasp what they are actually studying from a view deeper than a book report; further evidence shows that students involved in research-based inquiries develop more sophisticated levels of intellectual development because the doing and thinking are clearly linked (Healy 2005). Giving the students the opportunity to analyze and critically think for themselves, enhancing their knowledge to cope with continuing life experiences should, one would think, be the goal of any higher education course.

It is not uncommon for young adults to mirror family, friends, and peers in their opinions about global events. Challenging them to learn how to think and learn independently, how to gain the ability to make connections and apply them to what they are studying, is vital to having a deeper appreciation for the knowledge learned (Thompson et al. 2005). Deep learning, Thompson et al. (2005) stated, takes surface learning a step further, where the students focus on underlying meanings, main ideas, themes, and principles for successful application. They stress that students must also feel a need to do so. Geography has already been identified as a way of reinforcing citizenship education by teaching young people how to take part in the decision-making process, by developing an intelligent understanding of global links that foster a sense of interdependence of people and places, and by providing both an understanding of the
concept of sustainable development and the skills to act on that understanding (Yarwood 2005). Getting these geography concepts across to students encourages and allows them to think outside of the social framework that was passed down to them – a rite of passage into thinking for themselves. This would benefit society as a whole but also the individual, who should experience soaring confidence levels.

In a study by Maguire et al. (2001), first-year geography students found that when exposed to geography-based skills that emphasized deep learning approaches, these skills not only became more instrumental in their approach to learning but gave them more confidence in their ability to do so. It is hoped that the results of the current study will lead to new pedagogical emphases that could enable students to learn from their own experiences and analyses, both in the context of the course and in future classes or social settings, where they will feel more enlightened to add an opinion. Students may actually find that they like the news because they, in fact, understood the information. Another beneficial outcome would be for these students to become more active in a local setting with their new-found confidence. When WKU students have learned to be more engaged, they can be of greater service to their local communities, and active community involvement promotes citizenship (Yarwood 2005).

Finally, acknowledging an enhanced tolerance for world cultures and differences would be a preferred by-product of this study. Tolerance, in turn, can improve active citizenship, which can be defined as that which gives learners the capacity to play an effective role in society and that enables them to become informed, thoughtful, and responsible citizens who are aware of their rights and conscious of their duties (Haigh 2005). Applying and practicing their new skills should enhance their experience in future
careers in the global market and help them to become active in the “freedom” that comes with living in a democratically elected society promoting fundamental change. Overcoming the misconceptions of what geography is may promote an appreciation for the discipline, strengthening the number of non-geographers who take geography classes, further highlighting the need for more geographically literate citizens.
Data Acquisition and Analysis

The body of literature on geographic pedagogy paints a stark picture of a nation in decline in terms of its geographic knowledge, and clearly outlines the consequences of that deficit. The literature likewise makes a clear case for a renewed emphasis on geography in the formal classroom. However, few comprehensive examinations exist of methods for countering the decline in geographic literacy through enhanced emphasis on geography as an educational discipline. This study attempts to address this gap in the literature.

A pre-course survey was administered to the students in the subject classes in World Regional Geography prior to any lecture material on January 29, 2007. This survey canvassed student responses concerning both factual geographic information as well as a short map location section including both international and domestic locations. These surveys were similar in structure and content to the survey given in the Roper poll. All questions were based on core content material for a world regional geography course. The pre-course survey was not returned to the students and was not seen again by them until the last class period on May 7, 2007 when it was administered again as the post-course survey.

The study tested the hypothesis that scores between the pre-course and post-course surveys would increase due to eight assignments based on the “Five Themes of geography” rubric. The scores for the pre-course survey would be a baseline for student’s geographic knowledge when entering college. The working hypothesis stated that average scores on the pre-course survey should be around 54% – the average score for Americans surveyed in the 2006 Roper survey – and that through the regular analysis
of the Five Themes of geography these student scores should increase 30%, with an average score of 84%, bringing grades from an F to a B on basic geographic knowledge.

Along with the two surveys and eight Five Themes assignments, each student also completed a personal survey, the information from which would be used to look for possible patterns, trends or characteristics of the study’s population. It was hoped that this information would shed light on the status of the population’s geographical knowledge.

The answers for the pre- and post-course surveys and personal survey were put in numerical form and loaded into Microsoft Excel™. Averages for each answer on the pre-course and post-course surveys were calculated, as well as the improvement between the answers from the pre-course survey to the post-course survey. For each student a percentage was calculated for their eight Five Themes assignments. The final percentage grade for each student in the course was also applied as a factor. In addition, average scores were calculated for the entire population, individually and as a whole, for total scores on each survey as well as the percentage of improvement between the two surveys, the final grade, and the Five Themes assignments for comparison.

A number of statistical tests were used to test significance between the mean scores. A matched pairs t-test was used to analyze means of samples of the same size. This data is nonparametric from a nonrandom sample as the entire population enrolled in the classes was surveyed. A nonparametric and parametric test was performed for most test of difference of means for comparative purposes. The nonparametric test used was the Wilcoxon Rank Sums test and the parametric test was the two sample t test since some test performed did not have equal population sizes. Being nonparametric data, a
Spearman’s Correlation Coefficient was run on a number of the data points to see if a high r score would be obtained to see if a regression analysis was warranted for the improvement score increasing being dependent on any of the other observations.

**Population profiles**

Three classes with a total of 64 students completed the course and took both pre-course and post-course surveys. Nine other students enrolled in the courses, were not included in the final analysis. These students received an F in the course for non-attendance in the second half of the course or for failing to attend the final exam. These students did not complete the post-course survey, eliminating them from the final analysis.

Information coming from the personal survey showed that a majority of the students graduated from Barren county schools or in counties adjacent to Barren County (Figure 1.) Seventy percent were 18-24 years olds, while the rest were nontraditional students. There were 33 female students, and 29 males. Seventy-eight percent consider themselves to be middle class. A 90% majority adhered to Christianity and 50% feel politically conservative.
Slightly more than 50% of the students had taken a geography course prior to attending college. The average grade for this course fell around ninth grade. Heading into the course, when asked how they rated their geographic knowledge on a scale of one to ten, with ten being greatest, the average score was 4.72. When asked how they compared their geographic knowledge to others, a majority of the students, 54, considered their knowledge to be greater than or equal to the average person.

None of the 64 students were fluent in a second language but 52 had received instruction in a foreign language. Only one student was the first generation of her family born in this country, while the majority was fourth-generation or greater in the United States. When asked to list their ethnic heritage, most answered European or Native American. Twelve of the 64 had a current United States passport or were in the process of obtaining one, and only 17 had actually traveled outside of the United States. Sixty six percent answered they traveled outside of Kentucky only "yearly" or "never."
When asked if they kept up on news and current affairs only two respondents said they did not and a total of 48% said they obtained most of that information from on-line sources. Only four students did not have internet access at home; all 64 have access at school. Only eight of those questioned responded that they were on the internet only weekly – the rest were on daily or every couple of days. Students were asked to list their favorite websites, and the sites with the highest percentages returned were MySpace, FaceBook, email sites, and shopping sites.

**Pre-course and post-course survey findings**

Again, the pre-course and post-course surveys were identical and administered on the first day of class and the final class period, respectively. A total of 24 questions were asked. Most questions were multiple choice answers accompanied with a few fill-in-the-blanks questions. The survey also consisted of nine locations, four in the United States and five abroad. The post-course survey reflected student improvement on all questions save two: Two of the map location questions registered no improvement, as all students answered those two questions correctly on the pre-course survey. The tables that follow correspond to the questions from the pre- and post-course surveys. Each table shows the answers chosen for both surveys, the number of students who answered correctly, and the percentage of students who answered correctly. Each table also lists the improvement between the pre- and post-course surveys for the correct answer.

In this first question, the students were asked to name the theory about the great slabs of solid material that make up the Earth’s crust and that move. In the pre-course survey students did very well, with 92% of the students answering correctly, and a full 100% were able to answer in the second survey (Table 1).
Table 1: Plate tectonics

<table>
<thead>
<tr>
<th></th>
<th>Pre- No.</th>
<th>Pre- %</th>
<th>Post- No.</th>
<th>Post- %</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continental drift</td>
<td>3</td>
<td>4.60%</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>plate tectonics</td>
<td>59</td>
<td>92%</td>
<td>64</td>
<td>100%</td>
<td>8%</td>
</tr>
<tr>
<td>Transition zones</td>
<td>1</td>
<td>1.56%</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Geomorphology</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>No answer</td>
<td>1</td>
<td>1.56%</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

The students were asked to choose, from the four possible countries, which country had the biggest concern about the natural disaster of tsunamis. This is the first question of two in which the percentage of correct answers decreased by the second survey. Almost 88% of the students answer Japan correctly on the pre-course survey but the score dropped by nearly 5% by the post-course survey (Table 2). Interestingly, the number of students choosing Pakistan rose to nine. One possibility for this change may be that in the last few weeks of class the massive tsunami of December 2005 was discussed and an animation of the destructive waves was shown in class. This disaster and animation did depict the impact on South Asia.

Table 2: Tsunamis

<table>
<thead>
<tr>
<th></th>
<th>Pre- No.</th>
<th>Pre- %</th>
<th>Post- No.</th>
<th>Post- %</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>56</td>
<td>87.50%</td>
<td>53</td>
<td>82.13%</td>
<td>-5%</td>
</tr>
<tr>
<td>Pakistan</td>
<td>2</td>
<td>3.10%</td>
<td>9</td>
<td>14.06%</td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>3</td>
<td>4.69%</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Nigeria</td>
<td>2</td>
<td>3.10%</td>
<td>2</td>
<td>3.1%</td>
<td></td>
</tr>
<tr>
<td>No answer</td>
<td>1</td>
<td>1.56%</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

What country did we invade after 9/11 to dismantle the Taliban was the third question. This is the first fill-in-the-blank question. A dismal 55% of the students were
able to answer this question correctly, with an improvement of 20% by the second survey (Table 3). Interestingly, 41% answered Iraq on the first survey though every student would have been at least a teenager when the events of 9/11 occurred. This is another great example of geographic illiteracy in this country.

Table 3: Taliban

<table>
<thead>
<tr>
<th></th>
<th>Pre-No.</th>
<th>Pre-%</th>
<th>Post-No.</th>
<th>Post-%</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>35</td>
<td>55%</td>
<td>48</td>
<td>75%</td>
<td>20%</td>
</tr>
<tr>
<td>Iraq</td>
<td>26</td>
<td>41.62%</td>
<td>13</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Iran</td>
<td>1</td>
<td>1.56%</td>
<td>1</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Pakistan</td>
<td>0</td>
<td>0.00%</td>
<td>1</td>
<td>1.56%</td>
<td></td>
</tr>
<tr>
<td>Bagdad</td>
<td>0</td>
<td>0%</td>
<td>1</td>
<td>1.56%</td>
<td></td>
</tr>
<tr>
<td>No answer</td>
<td>2</td>
<td>3.10%</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

Students were asked to list the three major world religions with the largest number of adherents. This question, a fill in the blank, was purposely set up in this fashion. Living in south central Kentucky for almost 15 years, I have heard on many occasions several misconceptions regarding Christian religions, the most common being the impression that Catholics are not Christians. The issue did display itself in the pre-course survey, with fifteen students including Catholicism as a major world religion on a list with Christianity (Table 4). This number did drop to only two by the post-course survey. Four students made the mistake of listing both Islam and Muslim as different religions on the pre-course survey. Hinduism showed the greatest improvement of over 53% between the two surveys.
Table 4: Religions of the world

<table>
<thead>
<tr>
<th></th>
<th>Pre-No.</th>
<th>Pre- %</th>
<th>Post-No.</th>
<th>Post- %</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Christian</td>
<td>44</td>
<td>68.75%</td>
<td>62</td>
<td>96.88%</td>
<td>28.13%</td>
</tr>
<tr>
<td>Islam</td>
<td>38</td>
<td>59.38%</td>
<td>55</td>
<td>85.94%</td>
<td>26.56%</td>
</tr>
<tr>
<td>Hindu</td>
<td>10</td>
<td>15.63%</td>
<td>44</td>
<td>68.75%</td>
<td>53.12%</td>
</tr>
<tr>
<td>Judaism</td>
<td>16</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catholic</td>
<td>15</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protestant</td>
<td>4</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arabic</td>
<td>1</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buddhism</td>
<td>18</td>
<td></td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scientology</td>
<td>1</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presbyterian</td>
<td>1</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muslim</td>
<td>4</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A third question concerning physical geography asked which ocean body receives the rain water from our region. Both surveys revealed decent scores on this question with over 78% correct on the first survey and improving to over 84% by the second (Table 5).

Table 5: Where does Kentucky water run?

<table>
<thead>
<tr>
<th></th>
<th>Pre-No.</th>
<th>Pre- %</th>
<th>Post-No.</th>
<th>Post- %</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantic Ocean</td>
<td>9</td>
<td>14.06%</td>
<td>6</td>
<td>9.38%</td>
<td></td>
</tr>
<tr>
<td>Pacific Ocean</td>
<td>5</td>
<td>7.81%</td>
<td>4</td>
<td>6.25%</td>
<td></td>
</tr>
<tr>
<td>Gulf of Mexico</td>
<td>50</td>
<td>78.13%</td>
<td>54</td>
<td>84.38%</td>
<td>6.25%</td>
</tr>
<tr>
<td>Caribbean Sea</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>no answer</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

Students were asked to fill in the name of the largest mountain chain in South America. The table depicts only the percentages for those who provided the correct answer, the Andes Mountains (Table 6). Only 40% answered correctly on the pre-course survey, but another 30% answered correctly by the end of the semester. Many students left this question blank, or guessed, and the somewhat disappointing list of guesses is in
Table 6. Among the more disappointing replies were “the Appalachians,” which run through eastern Kentucky.

Table 6: Major mountain chain in South America

<table>
<thead>
<tr>
<th></th>
<th>Pre-No.</th>
<th>Pre- %</th>
<th>Post-No.</th>
<th>Post- %</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andes Mts.</td>
<td>26</td>
<td>40.63%</td>
<td>45</td>
<td>70.31%</td>
<td>29.68%</td>
</tr>
<tr>
<td>Appalachians</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Himalayas</td>
<td>6</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rockies</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alps</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kilimanjaro</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mt. Everest</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amazon</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

With highly mechanized agriculture and super hybrid seeds shaping the agriculture of North America, this question seemed an appropriate inclusion for the survey. A number of students from the Glasgow campus were agriculture majors as well as having roots in a farming family. This may have contributed to the students overestimated the percentage of North Americans who are engaged in agriculture (Table 7). There is much improvement between the two surveys – almost 44%.

Table 7: Employment in agriculture

<table>
<thead>
<tr>
<th></th>
<th>Pre-No.</th>
<th>Pre- %</th>
<th>Post-No.</th>
<th>Post- %</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>15%</td>
<td>10</td>
<td>15.63%</td>
<td>1</td>
<td>1.56%</td>
<td></td>
</tr>
<tr>
<td>10%</td>
<td>19</td>
<td>29.69%</td>
<td>8</td>
<td>12.50%</td>
<td></td>
</tr>
<tr>
<td>5%</td>
<td>15</td>
<td>23.44%</td>
<td>7</td>
<td>10.94%</td>
<td></td>
</tr>
<tr>
<td>less than 2%</td>
<td>20</td>
<td>31.25%</td>
<td>48</td>
<td>75.00%</td>
<td>43.75%</td>
</tr>
<tr>
<td>no answer</td>
<td>0</td>
<td>0.00%</td>
<td>0</td>
<td>0.00%</td>
<td></td>
</tr>
</tbody>
</table>
The eighth question on the survey asked students to choose the European country that most recently practiced ethnic cleansing. As expected, the highest percentage went to Germany, which practiced ethnic cleansing more than sixty years ago (Table 8). The correct answer of Yugoslavia came in 10% less than Germany, with only 18% of the students answering correctly. All of the students in these classes were alive during the ethnic cleansing and breakup of Yugoslavia. There has also been a large migration of Bosnians within thirty miles of Glasgow to the community of Bowling Green. Though the number of students answering this question correctly did improve by the post course survey, the number of students choosing Iraq increased up to 32% of the answers. The question specifically asked which country in Europe; it had been less than a month since these classes took a map quiz, including Iraq, on the countries of Southwest Asia.

<table>
<thead>
<tr>
<th>Country</th>
<th>Pre-No.</th>
<th>Pre- %</th>
<th>Post-No.</th>
<th>Post- %</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>18</td>
<td>28.13%</td>
<td>6</td>
<td>9.38%</td>
<td></td>
</tr>
<tr>
<td>Norway</td>
<td>1</td>
<td>1.56%</td>
<td>2</td>
<td>3.10%</td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>14</td>
<td>21.88%</td>
<td>9</td>
<td>14.06%</td>
<td></td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>12</td>
<td>18.75%</td>
<td>24</td>
<td>37.50%</td>
<td>18.75%</td>
</tr>
<tr>
<td>Iraq</td>
<td>14</td>
<td>21.88%</td>
<td>21</td>
<td>32.81%</td>
<td></td>
</tr>
<tr>
<td>No answer</td>
<td>5</td>
<td>7.81%</td>
<td>2</td>
<td>3.10%</td>
<td></td>
</tr>
</tbody>
</table>

Over 70% of the students were able to correctly answer the question of what the term “carrying capacity” means on the first try (Table 9). By the second survey that number had increased to over 95% correct.
Table 9: Carrying capacity

<table>
<thead>
<tr>
<th></th>
<th>Pre-No.</th>
<th>Pre- %</th>
<th>Post-No.</th>
<th>Post- %</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>45</td>
<td>70.31%</td>
<td>61</td>
<td>95.31%</td>
<td>25%</td>
</tr>
<tr>
<td>B</td>
<td>6</td>
<td>9.38%</td>
<td>1</td>
<td>1.56%</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>1</td>
<td>1.56%</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>11</td>
<td>17.19%</td>
<td>2</td>
<td>3.10%</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>no answer</td>
<td>1</td>
<td>1.56%</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

When asked to choose the current U.S. population, a majority of students overestimated the size of their own country, with the leading answer coming in at three billion (Table 10). Eight students chose seven billion, the current world population. This was common in the Roper Survey, as many overestimated the size of the United States. This question showed an improvement of over 26%, bringing the total of correct answers up to 64% – regrettably leaving 36% in the dark concerning their own country’s population. A similar question on the Roper survey found that only 31% could correctly estimate the U.S. population.

Table 10: U.S. Population

<table>
<thead>
<tr>
<th></th>
<th>Pre-No.</th>
<th>Pre- %</th>
<th>Post-No.</th>
<th>Post- %</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 million</td>
<td>24</td>
<td>37.50%</td>
<td>41</td>
<td>64.06%</td>
<td>26.56%</td>
</tr>
<tr>
<td>700 million</td>
<td>4</td>
<td>6.25%</td>
<td>8</td>
<td>12.50%</td>
<td></td>
</tr>
<tr>
<td>3 billion</td>
<td>27</td>
<td>42.19%</td>
<td>12</td>
<td>18.75%</td>
<td></td>
</tr>
<tr>
<td>7 billion</td>
<td>8</td>
<td>12.50%</td>
<td>3</td>
<td>4.69%</td>
<td></td>
</tr>
<tr>
<td>no answer</td>
<td>1</td>
<td>1.56%</td>
<td>0</td>
<td>0.00%</td>
<td></td>
</tr>
</tbody>
</table>

Table 11 reflects the second question to show a negative improvement score. The improvement decreased by more than 17%. The International Dateline was thoroughly
reviewed in the second class meeting. The students were asked what day it is in China when it is noon on Tuesday in our time zone.

Table 11: International Dateline

<table>
<thead>
<tr>
<th></th>
<th>Pre-No.</th>
<th>Pre- %</th>
<th>Post-No.</th>
<th>Post- %</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>14</td>
<td>21.88%</td>
<td>24</td>
<td>37.50%</td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td>5</td>
<td>7.81%</td>
<td>7</td>
<td>10.94%</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>44</td>
<td>68.75%</td>
<td>33</td>
<td>51.56%</td>
<td>-17.19%</td>
</tr>
<tr>
<td>no answer</td>
<td>1</td>
<td>1.56%</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

Students were asked to indicate the direction a ship would be traveling if leaving from Japan and traveling to Australia. Only 54% were able to indicate “south” on the pre-course survey (Table 12). This number improved by less than 8% by the post-course survey.

Table 12 Direction

<table>
<thead>
<tr>
<th></th>
<th>Pre-No.</th>
<th>Pre- %</th>
<th>Post-No.</th>
<th>Post- %</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>south</td>
<td>35</td>
<td>54.69%</td>
<td>40</td>
<td>62.50%</td>
<td>7.81%</td>
</tr>
</tbody>
</table>

When asked which country was closest to the United States, besides Canada and Mexico, many students forgot about Alaska’s proximity to Russia. Russia came in third on the pre-course survey, with only 12 of the 64 votes, and behind Jamaica and British Columbia (which is not a country but a Canadian Province) (Table 13). The number of students choosing Russia in the post-course survey did double, but still only tallied to a dismal 39% of correct answers.
Table 13: Closest to the U.S.

<table>
<thead>
<tr>
<th></th>
<th>Pre-No.</th>
<th>Pre-%</th>
<th>Post-No.</th>
<th>Post-%</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>12</td>
<td>18.75%</td>
<td>25</td>
<td>39.06%</td>
<td>20.31%</td>
</tr>
<tr>
<td>Greenland</td>
<td>7</td>
<td>10.94%</td>
<td>10</td>
<td>15.62%</td>
<td></td>
</tr>
<tr>
<td>Jamaica</td>
<td>22</td>
<td>34.38%</td>
<td>20</td>
<td>31.00%</td>
<td></td>
</tr>
<tr>
<td>British Columbia</td>
<td>20</td>
<td>31.25%</td>
<td>6</td>
<td>9.38%</td>
<td></td>
</tr>
<tr>
<td>no answer</td>
<td>3</td>
<td>4.69%</td>
<td>3</td>
<td>4.69%</td>
<td></td>
</tr>
</tbody>
</table>

Seventy-five percent of the students surveyed were able to correctly label Puerto Rico as a U.S. Territory, and this number increased to over 81% on the post-course survey (Table 14).

Table 14: What is Puerto Rico?

<table>
<thead>
<tr>
<th></th>
<th>Pre-No.</th>
<th>Pre-%</th>
<th>Post-No.</th>
<th>Post-%</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Territory</td>
<td>48</td>
<td>75.00%</td>
<td>52</td>
<td>81.25%</td>
<td>6.25%</td>
</tr>
<tr>
<td>Sovereign country</td>
<td>6</td>
<td>9.38%</td>
<td>8</td>
<td>12.50%</td>
<td></td>
</tr>
<tr>
<td>US State</td>
<td>0</td>
<td>0.00%</td>
<td>0</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>Province</td>
<td>8</td>
<td>12.50%</td>
<td>4</td>
<td>6.25%</td>
<td></td>
</tr>
<tr>
<td>no answer</td>
<td>2</td>
<td>3.13%</td>
<td>0</td>
<td>0.00%</td>
<td></td>
</tr>
</tbody>
</table>

A matching question asked students to match the North Pole or South Pole with either ocean or land, based on which is located there. Only slightly more than half could answer correctly, and the number only increased to 68% (Table 15). It is important to note that the students studied Antarctica and human activity there during the last class period.

Table 15: What is at the poles?

<table>
<thead>
<tr>
<th></th>
<th>Pre-No.</th>
<th>Pre-%</th>
<th>Post-No.</th>
<th>Post-%</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>correct</td>
<td>36</td>
<td>56.25%</td>
<td>44</td>
<td>68.75%</td>
<td>12.50%</td>
</tr>
</tbody>
</table>
Students were given a blank map of the United States and asked to locate four states – Kentucky, Louisiana, New York and California. Kentucky and California turned out to be easy answers on both surveys, coming out at 100%; Kentucky for the obvious reasons and California possibly because it is an easily recognizable state and a majority of current popular culture originates in California – which is appealing to college students (Table 16). Louisiana, surprisingly, was better known than New York state. The proximity to Kentucky and the news stories since Hurricane Katrina may explain the larger numbers who were able to locate it correctly. Again, surprisingly, New York state had only 75% correct in the first survey. Many who answered incorrectly were labeling New York further north around Boston and even into Maine. This survey returned much higher results for this question than the Roper survey in both the pre- and post-course surveys. Roper scores were California 92%, New York 50%, and Louisiana 67%.

Table 16: U.S. locations

<table>
<thead>
<tr>
<th>Location</th>
<th>Pre-No.</th>
<th>Pre-%</th>
<th>Post-No.</th>
<th>Post-%</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kentucky</td>
<td>64</td>
<td>100.00%</td>
<td>64</td>
<td>100.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Louisiana</td>
<td>52</td>
<td>81.25%</td>
<td>59</td>
<td>92.19%</td>
<td>10.94%</td>
</tr>
<tr>
<td>New York</td>
<td>48</td>
<td>75.00%</td>
<td>53</td>
<td>82.81%</td>
<td>7.81%</td>
</tr>
<tr>
<td>California</td>
<td>64</td>
<td>100.00%</td>
<td>64</td>
<td>100.00%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

The last section of the survey was a world map with five locations to identify. Unlike the Roper survey that found a few respondents locating the United States in the wrong place, this study found that all 64 participants were able to correctly label the U.S. (Table 17). The other four locations had correct percentages of 59%-67% and all improved by 17%-28% by the post-course survey. Among interesting points of note, 84% of the class could correctly identify Iraq, which is higher than the Roper and
important as the U.S. is engaged in combat there. Also interesting is the fact the location
with the lowest score was Great Britain, one of the U.S. most significant allies. On their
maps, many students labeled Great Britain as being in Canada. By comparison, the
Roper survey found that only 36% could find Great Britain and only 49% could find
Japan. In the context of this study, map quizzes were given throughout the semester and
probably assisted learning.

Table 17: International Locations

<table>
<thead>
<tr>
<th></th>
<th>Pre-No.</th>
<th>Pre- %</th>
<th>Post-No.</th>
<th>Post- %</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great Britain</td>
<td>38</td>
<td>59.38%</td>
<td>49</td>
<td>76.56%</td>
<td>17.18%</td>
</tr>
<tr>
<td>United States</td>
<td>64</td>
<td>100.00%</td>
<td>64</td>
<td>100.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Japan</td>
<td>41</td>
<td>64.06%</td>
<td>54</td>
<td>84.38%</td>
<td>20.32%</td>
</tr>
<tr>
<td>Iraq</td>
<td>43</td>
<td>67.19%</td>
<td>54</td>
<td>84.38%</td>
<td>17.19%</td>
</tr>
<tr>
<td>Sahara Desert</td>
<td>42</td>
<td>65.63%</td>
<td>60</td>
<td>93.75%</td>
<td>28.12%</td>
</tr>
</tbody>
</table>

Five Themes rubric

Eight assignments were given over the course of the semester. The students were
presented with the rubric of the Five Themes of geography in the first class period. Each
theme was examined with examples. The assignments consisted of watching short films
or reading articles. The students were then instructed to analyze the film or article by
breaking it down by the Five Themes: Location, Place, Human Environment Interaction,
Movement, and Region. Students were given credit for the assignments to encourage the
work being completed. For the purpose of this study a percentage score was generated
for each student and that score should be responsible for the improvement percentages
increase between surveys if the hypothesis was correct.
What did the surveys show? Table 18 depicts all the average scores for the study group. The average score for the pre-course survey for the class was 63.34%. This was a full nine percent higher than the Roper survey (Figure 2). Roper’s 2006 survey included high school graduates who continued in secondary education and those who did not. Clearly everyone in this study was continuing with higher education and could account for the nine percent higher score. Still, the average score was a dismally low D for high school graduates enrolled in college. It was hypothesized that the average score would increase by 30%, bringing geographic knowledge up to 84% and a B average by the post-course survey.

Table 18: Average Scores

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Roper Survey</td>
<td>54.00%</td>
</tr>
<tr>
<td>Pre-Course Survey</td>
<td>63.34%</td>
</tr>
<tr>
<td>Post-Course Survey</td>
<td>78.37%</td>
</tr>
<tr>
<td>Improvement Percentage</td>
<td>15.18%</td>
</tr>
<tr>
<td>Final Grade in Class</td>
<td>78.19%</td>
</tr>
<tr>
<td>Five Themes Assignments</td>
<td>79.00%</td>
</tr>
</tbody>
</table>

Figure 2: Average Survey Scores
The average score for the post course survey was 78%, almost a B, but the average improvement was roughly only 15%. Of the 64 surveyed only one student scored 3.85% lower on the post survey. This student, with a D as a final grade in the course, had a poor attendance record. Three students showed zero improvement between the surveys. For these three students their pre-course surveys actually scored above the class average and all finished the semester with either an A or a B in the course. There were 21 students who improved by 19% or higher and in fact three students that improved by almost 40% between the surveys

A Paired-t test was used to look for the difference of mean between the two survey average scores. A significant difference of means was identified with a p-value of zero, therefore the null hypothesis was rejected at the 0.05 significance level. Though the study group did register improvement between the surveys, the hypothesis predicted 30% improvement, and was therefore rejected.

Though the hypothesis is rejected there is still an average 15% improvement between the surveys. Did the Five Themes rubric influence the improvement scores between surveys? The average score for the Five Themes assignments was 79%. Spearman’s rank correlation coefficient was used to measure the strength of association between the total improvement scores with the Five Themes grade. A monotonic relationship exists between these variables in that if the scores of the Five Themes assignments increase, the improvement score should also increase. This test returned an r score of .0435, indicating no significant relationship between the variables.

To further examine whether the Five Themes rubric influenced the improvement scores the population was divided into two groups, those who scored above the average
(79%) on the Five Themes assignments and those who scored below. The average score, on the assignments, for those scoring higher than the average was 96% compared to the average assignment score for the group below average at 38. 74%.

Looking at the statistical averages side by side, there is a difference between the two groups (Figure 3). Measuring the difference of means between the variables: pre-course survey score, post-course survey score, improvement scores, five themes assignments grade, and final grade in the course, helped to determine if a significant difference of means existed. Those scoring above average outperformed the below average group in the pre-, post-, assignments, and final grades. The t test and Wilcoxon test both show remarkable significance difference of means (Table 19) in those four variables but did scoring higher on the assignments increase the improvement scores between the surveys? Both test generated a higher p value of 1, (Table 19) indicating no difference of means between the two groups, and showing that good student performance on the Five Themes assignments did not influence their improvement scores between the surveys.

Figure 3: Score Averages for Above- and Below-Average groups
Table 19: Average on assignments

<table>
<thead>
<tr>
<th></th>
<th>t-test p-value</th>
<th>Wilcoxon p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pre-course</td>
<td>0.0280</td>
<td>0.0265</td>
</tr>
<tr>
<td>post-course</td>
<td>0.0143</td>
<td>0.0359</td>
</tr>
<tr>
<td>improvement %</td>
<td>0.9637</td>
<td>1</td>
</tr>
<tr>
<td>Five Themes assign.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>final grades</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Looking at the improvement scores a little more closely, the population was again divided into two groups – those improving above the average of 15% and those improving below average (Figure 4). The average improvement score for this group was 13% higher than the other group, but pre-course survey scores were actually 14% lower than the below average group. The t-test and Wilcoxon test show there is little difference between the post-course survey and final grades (Table 20). The Five Themes assignments for these groups also does not appear to have generated any significant difference between the means – further evidence that the Five Themes did not influence the improvement scores in the study.

Figure 4: Improvement Averages for Above- and Below-Average Groups
Table 20: Average improvement percentage

<table>
<thead>
<tr>
<th></th>
<th>t-test p-value</th>
<th>Wilcoxon p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pre-course</td>
<td>0.0005</td>
<td>0.0008</td>
</tr>
<tr>
<td>post-course</td>
<td>0.7031</td>
<td>0.6768</td>
</tr>
<tr>
<td>improvement %</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Five Themes assign.</td>
<td>0.9339</td>
<td>0.9112</td>
</tr>
<tr>
<td>final grades</td>
<td>0.943</td>
<td>0.678</td>
</tr>
</tbody>
</table>

Those who scored higher on the assignments were more than likely better students, which enabled them to score better on the two surveys as well as in the final grade of the course. Curiously, the students that had higher improvement percentages were slightly the underdogs on the first survey and had more room for improvement. If the Five Themes rubric wasn’t the prime factor that influenced improvement, was it simply the fact that these students were all enrolled in a geography course that played a larger role in improvement scores?

Over the semester course, and among those completing the two surveys, 14 students earned an A grade. These students improved by over 17% with pre-course grades averaged at 73.7% post-course grades at 90.71% (Table 21). Twenty-three students earned Bs. Their average improvement was 15.89%, with pre-course survey grades at 61% and post-survey scores averaging 76.9%. Sixteen students earned a C, with an average improvement of 15.18% with scores of 61.68% and finishing with 75.75%. Six D marks were earned, with an improvement of 13.16% scores of 58.66% and 70.16%. Five F grades were earned and these students only improved by 12.8%, with scores of 51.2% and 65% on the surveys. There is a gradual decline from one group to the next, which is to be expected as those earning the higher grades typically put more effort into the course; but improvement was seen in all categories, and for 94% of the
students surveyed. Spearman’s test, used to show a relationship between final grades and improvement percentages, generated an $r$ score of 0.14. This score, close to zero, shows no relationship between those factors again an indication that all students showed improvement.

Table 21: Improvement in relation to final course grade

<table>
<thead>
<tr>
<th>Final grade for course</th>
<th>Pre-course average</th>
<th>Post-course average</th>
<th>Letter grade on surveys</th>
<th>Average improvement percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>73.70%</td>
<td>90.71%</td>
<td>C to A</td>
<td>17.00%</td>
</tr>
<tr>
<td>B</td>
<td>61.00%</td>
<td>76.90%</td>
<td>D to C</td>
<td>15.89%</td>
</tr>
<tr>
<td>C</td>
<td>61.68%</td>
<td>75.75%</td>
<td>D to C</td>
<td>15.18%</td>
</tr>
<tr>
<td>D</td>
<td>58.66%</td>
<td>70.16%</td>
<td>F to C</td>
<td>13.16%</td>
</tr>
<tr>
<td>F</td>
<td>51.20%</td>
<td>65.00%</td>
<td>F to D</td>
<td>12.80%</td>
</tr>
</tbody>
</table>

In searching for other possible explanations to explain the varying degree of improvement percentages – once it became evident that the Five Themes rubric did not influence the scores – three possibilities stood out. Looking at the group based on gender, age, and whether the students had had a geography course prior to starting their college career suggested possibilities that might depict trends within the improvement scores.

The 2006 Roper survey found that males scored higher than females and had a higher confidence level in their geographic knowledge. (32% compared to 23% of females). Was that found here?

Males, making up 45% of those surveyed, scored an average score of 70.58% on the pre course survey which is over 7% higher that the pool average (Figure 5). Females, 55% of those surveyed, scored an average of 56.65% over 6% less than the pool
There is a disparity of almost 14% with males scoring higher. A t-test generated, comparing the two group's pre-course surveys, shows a p value of .0007 showing a significant difference of means between these groups (Table 22).

The post-course survey analysis continues to show differences with males still remaining higher by 10%, scoring an average score of 83.62%, about 4.5% above the average, while females came in at 73.51%, about 4.5% below the average. The p value
for the comparison of post-course survey scores is .0064. Interestingly the females, though scoring lower, did improve by 16.86% while the male's improvement was more than 3% less than the females.

When looking at student's class averages for the semester, it was the females that came out slightly on top with an average grade of 79.86% and males at 75.41%. Males were 65% of the D's and Fs received in the course. Males and females split the A's and C's right down the middle but males only made up a third of the B's. Though the p value generated comparing the final grade averages does not show a significant difference of means. On the Five Themes assignments it was again the females on top with an average grade of 85.86% and males with an average grade of 70.72%.

When surveyed the students were asked how they would rate their geographic knowledge compared to other people as being more, same or less, 66% of the males said they knew more while only 29% of the females ranked themselves as knowing more. Having them rank their knowledge on a scale of one to ten with one being the lowest the males averaged a score of 5.4 and the females averaged a score of 4.6.

Does age play a role? The Roper survey had two classes of 18-20 and 21-24 and found no major differences between these groups. Their survey was limited to 18-24 year olds but because nontraditional students are enrolled in these targeted class there are two distinct age groups. Looking at just the two age groups for comparison, those similar to the Roper poll and those older than the Roper survey, show some interesting characteristics. For class grades, the older students did better. Only one F was given in the oldest age groups of 25+. The surveys did show that the older someone is the higher their improvement between the two surveys (Figure 6). The younger group scored
65.64% on pre-course survey which was over 7% higher than the nontraditional students at 57.89%. The post-course survey scores revealed that the nontraditional students had improved their grades by an average of 18.63% increasing their final post-course survey score average to 76.53%. Though the younger group had a higher average score of 79.15% they only increased their averages by 13.73%.

Figure 6: Score Averages for Nontraditional and Younger student-groups

Running a variety of t-tests on the variables within these groups of males versus females or the younger versus the nontraditional students revealed that there are *p*-values showing a significant difference of means between the groups, though no strong correlations were detected between these groups and no regression analysis was run (Table 23). Though the students in the younger group appear to have scored higher, on the surveys, they did not improve as much as the nontraditional students, similar to the males having higher scores but improving at a lower percentage.
Table 23: Age

<table>
<thead>
<tr>
<th></th>
<th>$t$-test p value</th>
<th>Wilcoxon p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pre-course</td>
<td>0.0929</td>
<td>0.0899</td>
</tr>
<tr>
<td>post-course</td>
<td>0.5217</td>
<td>0.5695</td>
</tr>
<tr>
<td>improvement %</td>
<td>0.0498</td>
<td>0.1502</td>
</tr>
<tr>
<td>Five Themes assignments</td>
<td>0.2448</td>
<td>0.3946</td>
</tr>
<tr>
<td>final grades</td>
<td>0.8070</td>
<td>0.7911</td>
</tr>
</tbody>
</table>

One last possibility to examine was to see if having a geography course in middle or high school would significantly impact the student’s geographic knowledge. The survey asked the students if they had taken a course that was called “geography” before college, and if so, in which year of school. Slightly more than half, 33 out of 64, reported having had a course of geography before graduation (Figure 7). The average grade level at which this course was taken was approximately 9th grade. The t-test and Wilcoxon tests only show a real significant difference of means in the Five Themes assignment grades with those having a geography course scoring better (Table 24). No significant difference of means was found in the other four tests especially note worthy the improvement percentages and the final grades in the course.

Figure 7: Score Averages for groups with or without a prior geography course
Table 24: With or without a geography class

<table>
<thead>
<tr>
<th></th>
<th><em>t</em>-test p-value</th>
<th>Wilcoxon p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pre-course</td>
<td>0.4266</td>
<td>0.6908</td>
</tr>
<tr>
<td>post-course</td>
<td>0.4266</td>
<td>0.4334</td>
</tr>
<tr>
<td>improvement %</td>
<td>0.7031</td>
<td>0.9240</td>
</tr>
<tr>
<td>Five Themes assignments</td>
<td>0.0701</td>
<td>0.1332</td>
</tr>
<tr>
<td>final grades</td>
<td>0.9454</td>
<td>0.9196</td>
</tr>
</tbody>
</table>
Conclusion

It was hypothesized that the geographic literacy among this study group would improve by 30% over the course of the semester with the aid of the Five Themes assignments. There was improvement, but only by 15%, and the Five Themes assignments had no statistical impact as a factor in that improvement. The average score for the pre-course survey was hypothesized to be 54%, like the Roper survey, but in reality was 63%, and the average score increased to 78% by the end of the semester. By the end of the course only five of the 64 students scored below the 54% benchmark – a great improvement, as 25 students scored below the benchmark in the pre-course survey.

The projection of a 30% improvement was predicated on an assumption that the application of the Five Themes rubric, specifically, would enable the students to acquire more geographic knowledge than they would have done without the rubric. With only 15% improvement the hypothesis was rejected. The improvement, it seems, may have had more to do with the simple fact that the students were introduced to the material during the semester, which makes a strong argument for putting more geography in the earlier years of education so that a strong knowledge base can begin earlier. A single geography course in the 9th grade, perhaps coupled with just one additional college course like cultural or world regional geography, may not be enough to allow them to grasp concepts and make conclusions about the world in a geographical context.

Though the Five Themes analysis did not appear instrumental in improving geographic knowledge during the course of a semester, the concept warrants further investigation as a pedagogical methodology. It would benefit this study to have followed these same students for years to come in the future – possibly three, five, or
even ten years down the road to see if thinking geographically of the world, along the
lines of the Five Themes, has allowed them to critically think about the world around
them. The study should not be interpreted to imply that the Five Themes are not critical
for understanding geographic content, but rather that the time frame for the analysis of
this rubric was too limited. The Five Themes are a great foundation to geographic
understanding and inquiry and future investigations could rework the Five Themes
assignments to work within a semester time frame.

Clearly, the evidence of the study shows that the benefit of a single high-school
freshman-level geography course is negligible. But what if that course were only the
beginning point of a middle-school/high-school curriculum that emphasized geography
on a par with other core subjects? If the subject matter were re-emphasized each year,
like math, reading, and sciences, then later classes could build upon the foundation of
earlier material

College instructors of 100-level geography courses should collect this type of data
on a regular basis. Only when a large data set is available to accurately quantify this
country’s dearth of geographic knowledge – and then demonstrate the benefits of having
that knowledge to the country, state, and local communities – can there be hope for
change in state requirements. Until those state requirements change, college instructors
may continue to be the first encounter students have with the subject matter.

State core content writers and university requirements could make a difference by
making geography classes mandatory. Universities could stress the importance of these
types of classes and require the subject as a prerequisite for university admission. At the
least, this study shows that completing a world regional college geography course can
improve geographic knowledge by an average of 15% – and that is encouraging – but if a college course in geography became mandatory for all college students, one could expect widespread improvement across the student body. This could be a great benefit to society as this awareness radiates outward in domestic and international relationships.

The literature indicates that students who take advance placement geography courses available to them reap benefits during their college careers. Advance placement in human geography is still in its infancy in the state of Kentucky. Interestingly, according to Figure 8, advance placement in human geography is available just on the outskirts of the general area that this study population derives from. Organizations, like the Kentucky Geographic Alliance, hope to spread the program and should bring its availability closer to WKU. In turn bringing future improved geographic literacy to the local area. Further analysis of the students who have taken advance placement human geography beyond high school and college would probably display the benefits of having had access to this type of information.
Although this study, as designed, produced inconclusive results, it unexpectedly revealed evidence that factors of age and gender may strongly affect geographic learning, raising questions about adopting any one-size-fits-all approach to geography education. Do the nontraditional students retain information better? Do they comprehend geographic concepts better within the context of greater life experience? Many of the older students are married with children and work full time; consequently they may use their study time more efficiently. Why do the males score so much higher on the surveys than the females but not on the course work? Do the genders approach course work differently? Are females more driven to improve but need to work harder than their male counterparts? Further investigation may determine the implications of these factors, not only in geography courses but also between other disciplines.

The Roper poll warns that the United States risks being left behind in this globally connected world. Further demonstration of this risk is necessary to inspire the
improvement of the education system towards shaping a more globally knowledgeable society. This investigation has shown not only that geographical study can improve that knowledge, but also that a single class during a student's educational career does not suffice. This is the touchstone from which to begin – educating teachers during their pre-service years, and persuading career educators of the importance of spreading this knowledge. Educators have to start bridging the pedagogical gap in order to increase global knowledge, and this study has aimed at beginning that trend.
**Bibliography**


Appendix A
Geography 110 Pre-course Evaluation

Name________________________

1. The crust of the earth consists of great slabs of solid material that move called:
   a) Continental drift
   b) Tectonic plates
   c) Transition Zones
   d) Geomorphology

2. Tsunamis are a big concern in:
   a) Japan
   b) Pakistan
   c) Brazil
   d) Nigeria

3. What country did we invade, after 9/11 to dismantle the Taliban?

4. What are the three major world religions (most adherents)?

5. What body of water does the rain water in Kentucky run to?
   a) Atlantic Ocean
   b) Pacific Ocean
   c) Gulf of Mexico
   d) Caribbean Sea

6. What is the major mountain chain in South America?

7. What percent of the American population is employed in Agriculture?
   a) 15%
   b) 10%
   c) 5%
   d) Less than 2%

8. What European country most recently practiced ethnic cleansing?
   a) Germany
   b) Norway
   c) Turkey
   d) Yugoslavia
   e) Iraq

9. Which of the following reflect the meaning of the term “Carrying Capacity:”
   a) The maximum number of people a territory can support sustainably.
   b) Minimum size an economy must be to support a given population.
   c) Minimum amount of food a household needs to survive a season.
   d) Maximum amount of land a society can cultivate to support itself and trade.
   e) Maximum amount of firewood (fuel) a person can carry on their head.
10. The current population of the United States is roughly:
   a) 300 million  
   b) 700 million  
   c) 3 billion  
   d) 7 billion  

11. If it is 12 noon on Tuesday in Bowling Green, Kentucky, what day is it in Beijing, China?  
   a) Monday  
   b) Tuesday  
   c) Wednesday  

12. If a ship were traveling from Japan to Australia, which direction would it travel?  

13. Which countries are closest to the United States?  
   a) Canada, Mexico, Russia  
   b) Canada, Mexico, Greenland  
   c) Canada, Mexico, Jamaica  
   d) Canada, Mexico, British Columbia  

14. Puerto Rico is a:  
   a) US Territory  
   b) Sovereign country  
   c) US State  
   d) Province  

15. Matching: (draw a line). What would you find at these locations.  
   North Pole land  
   South Pole ocean  

16. Using the attached blank World map with 10 locations labeled a-j, indicate which letter is associated with these 5 locations:  
   1) Great Britain  
   2) The United States  
   3) Japan  
   4) Iraq  
   5) Sahara Desert  

17. On the attached USA state map, circle the following:  
   1) Kentucky  
   2) Louisiana  
   3) New York  
   4) California  

Bonus: Name and label as many states as you can that surround Kentucky.
Appendix B

Survey
1. Your news source:
   a) TV
   b) On-line source
   c) Newspaper
   d) Radio
   e) Do not keep up with news

2. Which side do you feel most affiliated with
   a) Tendencies towards liberal viewpoints
   b) Tendencies towards conservative viewpoints

3. Which religious group do you feel most affiliated with?
   a) Jewish
   b) Islam
   c) Catholic
   d) Protestant Christian (for example: Baptist, Methodist)
   e) Other ________________________________

4. What year in college are you?
   a) Freshman
   b) Sophomore
   c) Junior
   d) Senior

5. What is your gender?
   a) Male
   b) Female

6. What age group are you in?
   a) 18-20
   b) 21-24
   c) 25-35
   d) 36 and over

7. What high school did you graduate from ________________________________

8. In Middle School or High School, did you have a class that was called Geography? (not Social Studies). If yes, what grade ________________________.

9. On a scale of 1 to 10, with 1 being lowest, how would you rate your knowledge of Geography? ___________
10. How would you compare your current Geographic knowledge with the average person?
   a) more
   b) less
   c) same

11. How often do you go on-line?
   a) everyday
   b) every couple of days
   c) once a week
   d) once a month

12. Which places do you have access to the internet?
   a) home
   b) school
   c) work
   d) Cell phone, Blackberry, or wireless-enabled laptop

13. Rank each type of site you tend to visit on a scale of 1-7, with 1 being the most often. Enter 0 if you don’t visit.
   _____ Entertainment, (music, film…”other”)
   _____ Email
   _____ News
   _____ MySpace, Facebook, or similar site
   _____ Online dating site
   _____ Online forum
   _____ Blog site
   _____ Political
   _____ Environmental
   _____ Religious
   _____ Commercial/Shopping

14. List your 3 most favorite sites on the internet
   1. __________________________________________
   2. __________________________________________
   3. __________________________________________

15. Circle any of the following that you own.
   a) Maps
   b) Atlas
   c) Globe
   d) GPS unit (hand held or in your vehicle)
16. What generation are you as an American citizen
   a) first generation (one or more of your parents born outside country)
   b) second generation
   c) third generation
   d) Fourth or more generations
   e) I am not an American citizen

17. Do you know your ethnic background? Circle all that apply.
   a) Native American
   b) European
   c) Hispanic
   d) African
   e) Asia
   f) Other
   g) Not sure

18. Is there a second language spoken in your home?
   a) Yes
   b) No

19. List the language(s) you have learned and the number of years you had instruction. (note if it was High school or college level)

20. What category would you say your family falls in?
   a) high income
   b) middle income
   c) low income

21. In 2006, name one of the two cities that MTV’s the Real World was shot in.

22. Have you travel abroad? If yes, where

23. Do you have a passport?

24. How often do you travel outside of Kentucky?
   a) weekly
   b) monthly
   c) yearly
   d) never

25. If you could travel anywhere in the World (US or outside) where would you go?