The GlobalEd Project:
A study of Self Efficacy and Learning in a Multimedia Enhanced
Problem Based Learning Environment

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Abstract

GlobalEd is a problem-based learning simulation on the web for middle school students to engage in negotiations on a variety of international policy issues such as human rights and international economics. The six-week simulation is embedded in the social studies curriculum of 10 schools across the country. The purpose of this study was to investigate the effectiveness of multimedia in promoting student self-efficacy and learning, compared to text-based instruction. Data from 97 participants provided no evidence that multimedia-based instruction is more effective in promoting student self-efficacy related to the social studies class and the use of technology. Student self-efficacy, actually dropped from pre to post testing; however a pre to post quiz demonstrated significant gains in social studies knowledge.
Introduction

In the American education system, negative attitudes of K-12 students can be noticed in the area of social studies, as documented in many articles (Pahl, 1994; Shaughnessy & Haladya, 1985; VanSickle, 1990). Many students feel that social studies classes are dull, boring, and irrelevant to their lives. They consider this subject as less interesting and less important than other school subjects (Stodolsky, Salk, & Glaessner, 1991; Wolters & Pintrich, 1998).

Self-efficacy is one of the most common approaches to understanding student motivation to learn (Schunk, 1991). Peoples’ level of efficacy impacts their interest, motivation, attitudes, and behavior (Bandura, 1997; Bandura & Schunk, 1981; Zimmerman, 1989). A number of researchers agree that multimedia is beneficial for learning (Mayer’s Cognitive Theory of Multimedia Learning, 2001), and that it is motivating and engaging to use (Astleitner & Wiesner, 2004; Najjar, 1996). In most studies, positive attitudes towards the learning activity are reported following multimedia-based instruction (Liao, 1999). Within this theoretical framework, the study sought to investigate whether incorporating multimedia in social studies class may improve students’ self efficacy levels and performances.

The investigation was set in the GlobalEd Project at the University of Connecticut, a problem-based learning simulation of international negotiations embedded in the social studies curriculum at several schools across the country. Middle school students (N=198) participated forming a multimedia-group (receive multimedia-based instruction), and a text-group (receive text-based instruction). The study looked for group differences in self- efficacy levels and knowledge gains across time, based on
participants’ responses in pre and post tests. The investigation focused on three research questions:

- **RQ1:** Are there significant differences in social studies self-efficacy across time, between students receiving multimedia instruction and students receiving text-based instruction?

- **RQ2:** Are there significant differences in technology self-efficacy across time, between students receiving multimedia instruction and students receiving text-based instruction?

- **RQ3:** Are there significant differences in knowledge across time, between students receiving multimedia instruction and students receiving text-based instruction?

### Theoretical Framework

**Self Efficacy**

Bandura (1986) defined self-efficacy as “People’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned, not with the skills one has, but with judgments of what one can do, with whatever skills one possesses” (p. 391). Bandura (1977) argues that perceived self-efficacy influences one’s choice of activities, motivation, effort expenditure, and persistence to accomplishing them. Individuals make daily decisions that are determined by their personal efficacy judgments. According to Bandura (1994), “people with high assurance in their capabilities approach difficult tasks as challenges to be mastered rather than as threats to be avoided” (p. 1). Setting goals, being increasing motivated and interested, being strongly committed, carrying positive attitudes,
sustaining effort, being willing to accept challenges, quickly recovering from failure, and reducing/controlling stress are characteristics of people who present a high level of self-efficacy. On the other hand, people with low self-efficacy doubt their capabilities, have low aspirations, weak commitment, give up quickly when facing obstacles or adverse outcomes, and slow to recover from failures (Bandura 1977, 1986, 1997; Zimmerman, 1989). People may perform poorly not because they lack the skills, but because they lack the sense of efficacy to use the skills well (Bandura, 1993).

The most effective way to create a strong sense of efficacy is through mastery experiences (Bandura, 1982; Pintrich & Schunk, 1996). Successful performance reinforce one’s self-efficacy, whereas failures weaken it. Also, observing social models succeed by sustained effort raises observer’s beliefs that he/she can too perform well in comparable activities. In contrast, observing others fail despite persistent effort lowers one’s efficacy (Bandura, 1994).

Studying self-efficacy is important, as research has demonstrated that it can be a reliable and valid predictor of performance outcomes, including academic achievement and behavior (Bandura, 1993; Schunk, 1996; Zimmerman & Bandura, 1994). It has been proven to strongly impact student performance in academic settings, and to predict many diverse outcomes, including academic achievement (Silver, Smith, & Greene, 1999). In the recent years, self-efficacy receives considerable attention in the domain of technology/computer literacy (Debowsk]. Wood, & Bandura, 2000; Ertmer, Evenbeck, Cennamo, & Lehman, 1994). Bandura (1995) asserted that new technologies are transforming the way people think and learn. In this “accelerated pace of informational and technological change … [p]eople’s beliefs in their capabilities play a paramount role
in how well they organize, create and manage the circumstances that affect their life course” (p. 35). According to Bandura (2002) learners with low technology self-efficacy levels are less likely to engage in and succeed in technology-based tasks. Technology self-efficacy is positively correlated with willingness to choose and participate in computer activities, expectations of success, persistence when faced with computer-related difficulties, and computer related performance (Karsten & Roth, 1998).

**Multimedia Learning**

The term *multimedia* has emerged and been used for quite a while, by researchers in both industry and academia, to describe the presentation of information multiple forms. Mayer (2001) defined multimedia as the presentation of material using both *words* (spoken or printed) and *pictures* (e.g., maps, graphics, animation, diagrams, and videos).

Multimedia holds a great deal of promise for enhancing education. Najjar (1996) reviewed empirical studies on multimedia from a wide variety of fields (including biology, chemistry, foreign languages, and electronic equipment operation) and reported that multimedia may help people to learn more information in less time than traditional classroom lectures. Liao (1999), reported the positive effects of multimedia instruction over non-multimedia instruction, based on a meta-analysis conducted on 46 studies from 1996 to 1998.

Mayer’s investigation of multimedia is one of the main sources of scientific evidence supporting learning from multiple media (Mayer, 1997, 1999, 2001; Mayer & Anderson, 1992; Mayer, Bove, Bryman, Mars, & Tapango, 1996; Mayer & Heiser, & Lonn, 2001; Mayer & Moreno, 1998; Mayer, Moreno, Boire, & Vagge, 1999; Moreno, & Mayer, 1999, 2000, 2001). Mayer’s work includes more than 20 empirical studies on
learning from multimedia, where he and his colleagues consistently found evidence for
effectiveness of multimedia instruction. His research over the past fifteen years provides
a theoretically grounded framework (Cognitive Theory of Multimedia Learning, 2001)
that allows one to draw conclusions relative to the learner and multimedia.

Central to the Mayer’s Cognitive Theory of Multimedia Learning (CTML) is the
premise that multimedia should be designed in light of how the human mind works in
order to present information in a meaningful way. CTML is based on the following three
assumptions (Mayer, 2001, p.189):

1. People have separate visual and auditory channels;
2. These channels are limited in capacity;
3. Meaningful learning involves actively selecting, organizing, and integrating
incoming visual and auditory information

Based on the CTML, Mayer explained the multimedia effect. His investigations
were based on two dependent measures: transfer and retention. He determined whether
multimedia helps learners (a) use the material presented to solve new problems (transfer-
test), and (b) remember the important verbal material presented (retention-test). The
results provided clear and consistent evidence that multimedia works; that is “students
who learn from words and pictures perform better on transfer and retention tests than
students who learn from words alone” (Mayer, 2001, p.186).

Technology/Multimedia in Social Studies Class

Previous studies have shown that using technology in social studies class
promotes student motivation (Berson, 1996; Martorella, 1997; White, 1999).
Students’ familiarity with the technology increase enjoyment in learning; consequently, social studies class becomes more attractive when computers used as teaching tools (Cassutto, 2000; Heafner, 2004). Janda (1992) examined the use of multimedia instruction in an introductory college-level political science course. While no significant learning gains were found, more positive attitudes were reported by participants in the multimedia group compared to the traditional lecture group. Cradler and Cradler (1999) also reported that student’s motivation for class assignments and interest in the content was increased when multimedia was incorporated into classroom instruction.

In this framework, the present study investigated whether using multimedia may help GlobalEd participants to develop greater levels of self efficacy and knowledge than do text-based presentations of information.

**Methods and Procedures**

The GlobalEd project

GlobalEd (Brown et al., 2003) is a six-week online simulation in which students negotiate treaties involving current world issues while taking the perspective of the country they are representing. The simulation is embedded in the social studies curriculum at several schools across the country. Prior to the simulation, each class is assigned a real-world country (e.g., France, Nigeria, China) to represent during the simulation. Within each class (country team) students are placed in groups (5 issue groups) to research one of five topic areas: Conflict and Cooperation, International Economics, Global Environment, Human Rights, and a Special Topic (e.g. Immigration, World Health). Students research their countries and topics in the weeks leading up to the simulation. They are provided with online instructional materials, but they can also use
the Internet for research and exploration. During the simulation, they interact (through synchronous “live chat” conferences and via email) with participants from different countries who are focused on the same topic area. Each country team tries to negotiate a treaty with at least one other country in the simulation. Evaluation of the simulation takes place in the form of surveys, content knowledge assessments, and performance tasks given prior to and at the end of the simulation.

Participants and Groups

Middle school students (N=198) from 10 schools in five states (CA, CT, NE, NH, PA) participated in GlobalEd during the winter of 2005-2006. Participants included a balanced proportion of boys (51%) and girls. White students (61%) made up the majority of the sample. Eighth graders (61%) comprised the majority of the participants, followed by 7th graders (27%), 6th graders (9%), and 5th graders (3%).

The study focused on the online instructional materials for the Global Environment issue area, designed in two different versions: multimedia-based and text-based. The two versions included the same variety of information; the only difference is the way this information was presented. Approximately half of the participants were randomly assigned to the Multimedia Group (MG), and the rest of them formed the Text Group (TG). Students (and teachers) had online access to the instructional materials about two months prior to the start of the simulation. The two versions of the Global Environment materials were password protected. At the end of the simulation, the participants were asked to rank how often they had used the instructional material for the Global Environment, on the 5-point Likert scale (Almost Never to Almost all the Time).
The study examined only 101 students who reported that they had used the instructional material for the Global Environment “At least Some Times” (Likert #3).

Instrumentation

Students completed the assessment instruments online several weeks before the simulation began and two weeks after the simulation had concluded. The study focused on pre- and post-assessments for self-efficacy and verbal knowledge. The Social Studies Self efficacy scale (6 items; $\alpha = .79$ for pre and .82 for post) assessed how confident students were that they could meet the expectations of the class; for example, “How confident are you that you can complete all the work that is assigned in this class?” (see Appendix A). The Technology Self efficacy scale (6 items; $\alpha = .85$ for pre and .80 for post) assessed how confident students were working with computers; for example, “How confident are you that you can learn very difficult skills on computers?” (see Appendix B). The Social Studies Knowledge Quiz assessed students’ knowledge on the issues discussed in the simulation, asking 5-6 questions on each topic. The study focused on the six items related to the Global Environment issue (see Appendix C); a Global Environment Quiz Score was computed for each participant calculating the present correct from the six items.

Results

Research Question 1

To investigate RQ1, a Repeated Measures Analysis of Variances (RM-ANOVA) was used, with social studies self-efficacy score as the within subject variable, and group (TG vs. MG) as the between subjects variable. The matched (pre-post) data set revealed 36 cases in MG and 61 cases in TG. The analysis revealed a significant Group by Testing
interactive effect ($F[1, 95] = 5.0, p = .028, \text{partial } \eta^2=.05$), indicating that the two groups scored significantly differently on *social studies self-efficacy scale* from pre to post testing. A careful consideration of the means showed that over time, *social studies self-efficacy* scores of students in the text group were (on average) significantly lower than the scores of students in the multimedia group (see Table 1, Table 2). The difference was found in the post-test; the TG mean was lower in the post-test than in the pre-test, and it was also lower than the MG post-test mean (see Figure 3). The researchers conducted Paired-Samples-T-Tests, separately for each group. The analysis indicated that students in the TG scored significantly lower in the *social studies self-efficacy* post-test than in the pre-test (mean-diff = .287, $t (61)= 3.67, p=.001$), whereas students in the MG scored nearly the same, across time.

| Table 1: Repeated Measures Analysis of Variance for Social Studies Efficacy |
|-----------------|-------|-----|---------|
| Source          | df    | F   | Significance |
| Within Subjects |       |     |            |
| Testing         | 1     | 5.6 | .02       |
| Testing x Group | 1     | 5.0 | .03       |
| Error           | 95    |     |            |
| Group           | 1     | 2.1 | .15       |

| Table 2: Social Studies Self Efficacy Mean Scores, by Group |
|-----------------|---------|---------|---------|---------|
|                 | Pre Test| Std. Deviation | Post Test | Std. Deviation |
| MG Mean Score   | 3.843   | .504     | 3.833   | .640     |
| TG Mean Score   | 3.814   | .589     | 3.527   | .696     |
| N (matched cases)| 97     | 97       |         |          |
Research Question 2

Similarly, a RMANOVA was used to address RQ2, using technology self-efficacy score as the within subject variable, and group as the between subjects variable. For a matched data set of 36 MG cases and 60 TG cases, the analysis revealed no significant main effects or interactions. A careful consideration of the means (see Table 1) showed that the mean technology self-efficacy score remained almost stable for both groups from pre to post testing (see Table 3, Table 4, and Figure 2).
Table 3: Repeated Measures Analysis of Variance for Technology Self Efficacy

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within Subjects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Testing</td>
<td>1</td>
<td>.42</td>
<td>.52</td>
</tr>
<tr>
<td>Testing x Group</td>
<td>1</td>
<td>.20</td>
<td>.66</td>
</tr>
<tr>
<td>Error</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Between Subjects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>1.3</td>
<td>.27</td>
</tr>
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</table>

Table 4: Technology Self Efficacy Mean Scores, by Group

<table>
<thead>
<tr>
<th></th>
<th>Pre Test</th>
<th>Std. Deviation</th>
<th>Post Test</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MG Mean Score</td>
<td>4.046</td>
<td>.687</td>
<td>4.036</td>
<td>.865</td>
</tr>
<tr>
<td>TG Mean Score</td>
<td>3.911</td>
<td>.706</td>
<td>3.853</td>
<td>.661</td>
</tr>
<tr>
<td>N (matched cases)</td>
<td>96</td>
<td></td>
<td>96</td>
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</table>

Technology Self Efficacy from Pre to Post Testing for MG and TG

Figure 2: Mean Technology Self Efficacy Scores across Time, for MG and TG
To investigate RQ3, a Repeated Measures Analysis of Variances (RM-ANOVA) was used, with global environment quiz score as the within subject variable, and group as the between subjects variable. The matched (pre-post) data set yielded 37 cases in MG and 47 cases in TG. The analysis revealed a significant Testing main effect ($F[1, 81] = 16.11, p < .001, \eta^2 = .17$), indicating that there was a statistically significant difference in global environment quiz mean score across time. A careful consideration of the means showed that student global environment quiz mean score increased from pre to post testing (see Table 5, Table 6, and Figure 3).

**Table 5: Repeated Measures Analysis of Variance for Global Environment Quiz**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>Significance</th>
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<td><strong>Within Subjects</strong></td>
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<td></td>
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<tr>
<td>Testing</td>
<td>1</td>
<td>16.11</td>
<td>.000</td>
</tr>
<tr>
<td>Testing x Group</td>
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<td>.67</td>
<td>.41</td>
</tr>
<tr>
<td>Error</td>
<td>81</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Between Subjects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>1.37</td>
<td>.25</td>
</tr>
</tbody>
</table>

**Table 6: Global Environment Quiz Mean Scores, by Group**

<table>
<thead>
<tr>
<th></th>
<th>Pre Test</th>
<th>Std. Deviation</th>
<th>Post Test</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MG Mean Score</td>
<td>60.19%</td>
<td>19.22</td>
<td>73.61%</td>
<td>21.59</td>
</tr>
<tr>
<td>TG Mean Score</td>
<td>57.80%</td>
<td>21.38</td>
<td>66.67%</td>
<td>24.57</td>
</tr>
<tr>
<td>N (matched cases)</td>
<td>81</td>
<td>81</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Discussion and Conclusions

Discussion of RQ1:

Students in the TG scored significantly lower in the social studies self-efficacy post-test than in the pre-test, whereas students in the MG scored nearly the same, across time (significant interaction). There are a couple of possible explanations for this result:

In contrast with research suggesting that students are not highly motivated in Social Studies (e.g., Stodolsky, Salk, & Glaessner, 1991; Wolters & Pintrich, 1998), the entry level of social studies self-efficacy was (on average) high for both groups. On a 5-point Likert scale, ranged from “1: not at all confident” to “5: extremely confident”, the
pre social studies self-efficacy mean score was 3.84 for the MG and 3.81 for the TG. A ceiling effect may have taken place affecting the growth of students’ self-efficacy, which consequently limited the ability to detect any improvement across time.

On the other hand, students might have overestimated their capabilities on doing well in the social studies class in the first place; then when they actually faced the complexity of dealing with real world issues their self-efficacy dropped. It is also possible that the nature of the GlobalEd simulation (peer negotiations on international policy issues) is more challenging and demanding than students expected; hence led to student declined sense of capability.

Some researchers have argued that suggested that academic motivation and achievement declines considerably across the upper elementary and early secondary school years (e.g., Eccles et al., 1993, Eccles & Pintrich, 1996). Consistent with these findings, GlobalEd student self-efficacy (as a motivational construct) declined during the two months period from pre to post testing. The question is: Why did that happened just for the students in the text group? The finding that social studies self-efficacy dropped for the TG but not for the MG, may suggest that the multimedia instruction had a stronger positive effect on students’ motivation, and consequently self-efficacy, than did text-based instruction. Such a hypothesis would be consistent with previous research on multimedia and motivation (e.g., Astleitner & Wiesner, 2004; Cradler & Cradler, 1999; Janda, 1992; Liao, 1999, Najjar, 1996). More research needs to be conducted (both qualitative and quantitative) to further investigate these possibilities.
Discussion of RQ2:

The results provide no evidence that multimedia-based instruction is more effective in promoting students’ technology self-efficacy, compared to traditional text-based instruction. Students in both groups rated their technology self-efficacy pretty height (mean of about 4.0 on a 5-point Likert scale) and their scores remained almost stable by the end of the simulation (see Table 2).

Discussion of RQ3:

Over time, significant gains in verbal knowledge occurred regarding the global environment issue area (testing main effect). There were no significant differences between the multimedia and text groups in knowledge gains (no interaction). The results provide no evidence that multimedia-based instruction is more effective in promoting students’ learning, compared to traditional text-based instruction. Clark’s claim that “media are mere vehicles that deliver instruction but do no influence student achievement” (Clark, 1983, p. 445), sounds relevant here. The instructional method rather than the choice of medium influences learning (Clark, 1983, 1994). Both multimedia and text based instructional material led to increased student knowledge scores from pre to post testing.

However, given the mean difference, the two groups did not score equivalently higher in the post test. Although not statistically significantly, the means may support that students in the multimedia group presented, on average, larger gains in knowledge across time, than did student in the text group (see Table 6). Therefore, multimedia instruction may have had a stronger positive effect on student achievement compared to text-based
instruction, which is also consistent with the literature (e.g., Liao, 1999, Mayer 2001, Najjar, 1996). It is possible that the statistical analysis might have failed to reveal statistically significant differences between the groups due to limitations of the study such inadequate measure of knowledge.

**Future Directions**

The authors believe that there were limitations in the measurement of the constructs of *social studies self-efficacy* and *global environment knowledge*. Many researchers argue that *self-efficacy* is not only domain-specific but also *task-specific* construct, and that attempts to measure self-efficacy at the domain level often results in ambiguous or uninterruptible results (Bandura, 1986; Pajares & Miller, 1994c, 1995). This study assessed *social studies self-efficacy* globally; that is participants were asked to report their confidence with regards to the social studies class (domain level). However GlobalEd is just a module of the social studies curriculum in these classes, which also include modules in history, geography and other content. Instead the researchers could measure self-efficacy on the specific performance task; that is asking the participants to report their confidence with regards to learning about global environment and negotiating on the issue. In future studies, the researchers should measure self-efficacy more appropriately focusing on the *task* (task-specific). Moreover, conducting student interviews (qualitative analysis), or collecting data at different phases of the simulation (multiple qualitative analyses) may revile interesting explanations of *why* self efficacy declines and *why* it changes differently for the two groups over time.
The *global environment quiz* was composed of six questions on the global environment issue. The small number of questions may did not sufficiently assess students’ knowledge on the issue. Moreover, the quiz only examined students’ ability to recall verbal information from what they had read in the instructional materials (retention). It lacked the ability to assess students’ comprehension of the issue, as well as their ability to apply the new knowledge learned (transfer). Mayer (2001) investigated the ability of multimedia to promote better understanding, retention, and transfer. In future studies, the researchers should attempt to examine the simulation messages that students exchange, and to look for evidence of whether the information learned (using the instructional material) supports students as they discuss on real world issues to negotiate treaties. The present study could have revealed different patterns in students’ learning, if knowledge was assessed extensively and adequately.

The results of the present study should be interpreted and evaluated with caution. The findings are only generalizable to those who share similar traits with the participants involved in this study; specifically, middle school students in grades 5-8 who might have participated in previous GlobalEd simulations or might be going to participate in the near future.
References


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differences in a problem-based learning environment of international negotiations.

Instructional Science, 31 (4-5) 255-276.


Ioannou, Brown, Gehlbach, Boyer, Niv-Solomon, & Janik


Appendix A

Social Studies Self Efficacy Scale

<table>
<thead>
<tr>
<th>not at all confident</th>
<th>slightly confident</th>
<th>moderately confident</th>
<th>quite confident</th>
<th>extremely confident</th>
</tr>
</thead>
</table>

1. How confident are you that you can learn all the material presented in this class?
2. How confident are you that you can do the hardest work that is assigned in this class?
3. If you had to explain what you learned in class to a younger student, how confident are you that you could help this student understand the material?
4. When complicated ideas are presented in this class, how confident are you that you can understand them?
5. How confident are you that you can complete all the work that is assigned in this class?
6. How confident are you that you will remember what you learned in this class next year?

Appendix B

Technology Self Efficacy Scale

<table>
<thead>
<tr>
<th>not at all confident</th>
<th>slightly confident</th>
<th>moderately confident</th>
<th>quite confident</th>
<th>extremely confident</th>
</tr>
</thead>
</table>

1. How confident do you feel when you are working on computers?
2. How confident are you that you can find most kinds of information on the Internet?
3. If you see a new type of computer program, how confident are you that you can figure it out?
4. How confident are you that you can understand most of the computer terms that you see?
5. How confident are you that you can learn very difficult skills on computers?
6. When you are doing research on the computer, how confident are you that you can learn lots of information?
Appendix C

Global Environment Knowledge Quiz

1. The Kyoto Protocol addresses which of the following issues:
   - Border security
   - **Greenhouse gas emissions**
   - International labor
   - Famine and poverty in less developed countries

6. The phrase “clean energy” refers to energy sources that are:
   - Producers of pollutant byproducts
   - **Renewable**
   - Mostly fossil fuels
   - Negatively affecting climate change

10. Which of the following countries has the largest population and is biggest food consumer in the world:
    - India
    - Nigeria
    - **China**
    - Russia

12. Which is not a Renewable Energy Source (RES)?
    - Hydropower
    - Solar power
    - **Natural Gas**
    - Biomass

16. Global warming is most often blamed on:
    - Industrialization byproducts
    - Deforestation
    - **The burning of fossil fuels**
    - All of the above

23. OPEC is:
    - The organization of countries who are major oil producers, in charge of coordinating prices and supply
    - A type of a highly efficient renewable energy source
    - An international NGO dedicated to the environmental
    - An international agency coordinating the global effort against HIV/AIDS