

# **Global Challenge Award**

External Evaluation

Year 1

2006 - 2007

Douglas Harris  
Penny Nolte

<b>Part 1: Executive Summary</b> .....	3
<b>Introduction</b> .....	3
<b>Evaluation Team</b> .....	3
<b>Project Goals</b> .....	4
<b>Design Considerations</b> .....	5
<b>Sources, Types of Data and Methods – Year 1</b> .....	6
<b>Year 1 Findings and Recommendations for Year 2</b> .....	10
<b>Sources, Types of Data and Methods – Year 2 and Beyond</b> .....	12
<b>Summary of Findings from GCA Evaluation Technical Reports</b> .....	13
<i>Additional Findings: Issues of Time, Relevance, and other Student Suggestions</i> ..	28
<b>Technical Report #1 – Responses to the Global Challenge Adult Advisor Post</b>	
<b>Survey Spring 2007</b> .....	31
<b>Technical Report #2 – Responses to the Global Challenge SCANS Survey</b> .....	46
<b>Technical Report #3 – Responses to the Global Challenge Student Post Survey</b>	
<b>Spring 2007</b> .....	62
<b>Technical Report #4 – Further Details from Responses to the Global Challenge</b>	
<b>Student Post Survey Spring 2007</b> .....	90
<b>Appendix A</b> .....	100
<b>Evaluator Vita</b> .....	101

**Global Challenge Award  
External Evaluation  
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**Final Report**

Prepared by Douglas Harris, Executive Director, The Vermont Institutes and Penny Nolte, Evaluation Specialist, The Vermont Institutes

**Part 1: Executive Summary**

**Introduction**

During the 2006-2007 academic year the Vermont Institutes conducted an independent external audit of the Global Challenge Awards (GCA). VI worked with GCA Leadership to plan multi-year a comprehensive evaluation design.

The goals of the evaluation are 1) to document key project activities and processes; 2) to provide formative feedback to project leadership for program improvement and 3) to provide summative recommendations for decision makers, including project staff, Board, and supporters.

**Evaluation Team**

**Summary of Qualifications**

**Dr. Douglas Harris, Executive Director, The Vermont Institutes** Harris is presently and formerly PI, PD, Co-PI, and program evaluator on several corporate, NSF and U.S. Department of Education projects, including the Intel Mathematics Initiative, GrowLab, 21<sup>st</sup> Century Schools, Teacher Quality Enhancement, the Ongoing Assessment Project, Vermont's Statewide Systemic Initiative, and the Vermont Mathematics Partnership. As an evaluator, he has been involved in development of research and evaluation protocols, analysis instruments and collaboration tools for education interventions, and systemic change with partners such as Measured Progress, EDC, the Dana Center, University of Texas, the Connecticut Academy, and the National Initiative for Community Innovations. He has served on the Validation Panel for the *Student Evaluation Standards* developed by the Joint Committee on Standards for Educational Evaluation and approved by the American National Standards Institute (ANSI). He also served on the Executive Council of the Association for Supervision and Curriculum Development (ASCD).

Harris's doctorate in special education administration, with a specialization in gifted-talented education, experience as a teacher, principal, and superintendent, and experience in program evaluation provide a deep experience base for this evaluation.

## **Penny Nolte, Evaluation Specialist, The Vermont Institutes**

Penny holds a BFA from Syracuse University and an MS in Management Systems from Clarkson University. She is currently completing an Ed D. in Leadership and Policy Studies at the University of Vermont. Her areas of particular research interest are technology and program evaluation topics: survey design, qualitative design, NVivo qualitative software, organizational systems theory, staff evaluation, and using data for school reform.

Penny recently presented her research at the annual MSP NSF Evaluation Summit, and is lead author with Doug Harris on a paper discussing the qualitative methodology used in their evaluation of the Vermont Mathematics Partnership – an MSP funded by the NSF and USDOE. She is also an adjunct faculty member at Woodbury College, teaching evaluation and assessment in the undergraduate program, and research methods in the graduate school. This fall she was selected as a peer reviewer by the American Educational Research Association for conference papers in both their science teaching and learning, and program evaluation in school settings strands.

Prior to joining the Vermont Institutes Evaluation Center Penny served as grant-writer and PI for numerous regional and state-wide arts, women's, teacher training, and technology projects in Vermont, New York, and Colorado. She has taught online technology applications and lead research workshops in local and national teacher and librarian training programs for more than ten years.

Vita included in Appendix A.

### **Project Goals**

Global Challenge Awards has established five project goals that serve as the underlying organizer of this evaluation.

Goal 1: Intensively develop future science, engineering, and mathematics (STEM) professionals by engaging high school students for up to three years in a series of content experiences and challenging hands-on projects.

Goal 2: Focus on access and encouragement for underrepresented populations being prepared for and entering STEM majors.

Goal 3: Develop a pipeline for admissions to higher education in which successful GCA participants have facilitated access to and admission support into the University of Vermont College of Engineering and Mathematical Sciences.

Goal 4: Offer substantial privately raised scholarships and other incentives to participants.

Goal 5: Provide ongoing mentoring expertise and personal support for students to become STEM majors

Goal 6: Involve STEM majors and graduates, parents, and STEM experts as mentors in GCA.

Goal 7: Enhance teacher skills in STEM related disciplines and in using technology and project-based learning to achieve better student outcomes.

### **Design Considerations**

The evaluation required an array of program evaluation methods (a mixed methods evaluation plan). This plan enables the evaluators and project staff to continually monitor and adjust implementation of the product design and program components. It also assesses impact in the areas of the program goals.

The guiding framework for the evaluation of the Global Challenge Award Project is a logic model (Carr and Harris, 2005; adapted from Chen, 1990, Julian, et al., 1995, Patton, 1997) for developing exemplary models and systems. The logic model is used to document project achievements, organize data, and define any variance between the planned program and the actual program.

## Logic Model:

*Resources/Inputs – Activities – Outputs – Outcomes – Impact*

While the application of this logic model is recursive rather than linear, the evaluation documents the sequence of actions leading from resources/inputs through impact.

**Resources/Inputs** – What are the human, fiscal, organizational, and community resources (materials, time, money, people, expertise, conceptual model) available to build and implement the Global Challenge Award Project?

**Activities** – What are the processes, tools, and events, technology, and actions planned for and actually delivered?

**Outputs** – What are the direct products and results of the implementation of the Project? What are the types, levels, and targets of services provided to Participants? What are the student results?

**Outcomes** – What are the specific changes in participants' behavior, knowledge, skills, status, and levels of functioning?

**Impact** – What fundamental intended and/or unintended changes occurred as a result of the Global Challenge Award?

The specific evaluation questions also directly impact project goals as shown in the charts below.

The Logic Model elicits a series of causal questions related to the impact of the project on participants, including students, their parents, their teachers, their mentors, and project staff. These causal questions formed the basis of the evaluation report's findings and recommendations.

### **Sources, Types of Data and Methods – Year 1**

The design for the evaluation incorporates the overarching questions from the Logic Model, above, and responds to the elements and components of the project goals:

In Year 1 evaluators utilized four primary types of data:

Three Surveys, each administered in the Fall and Spring:

- An Advisor Survey
- A Participant Survey

- A survey for both advisors and participants related to key workforce skills identified by the SCANs survey

Interviews

- Project Staff
- Participants
- Mentors

A Focus Group with Participants at the July Vermont Governor's Institute on Engineering at the College of Engineering and Mathematical Sciences

Review of STEM Explorations and related participant work

Review of Team Projects

<b>Overarching Questions:</b> Formative evaluation questions addressed included the following questions:	Surveys	Interviews	Focus Group	STEM Explorations	Team Projects
To what extent has the project met its stated goals to date?	X	X	X	X	X
Which components of each program are most effective? Least effective? Need improvement?	X	X	X	X	X
What contextual factors are important in meeting the goal? Which appear to be creating or reinforcing barriers?	X	X	X	X	
What were the roles of stakeholders in meeting the goals, including participants, parents, teachers, mentors, and STEM staff ?	X	X	X	X	

<b>Goal 1:</b> Intensively develop future science, engineering, and mathematics (STEM) professionals by engaging high school students for up to three years in a series of content experiences and challenging hands-on projects.	Surveys	Interviews	Focus Group	STEM Explorations	Team Projects
How do participants divide their time among STEM explorations, team projects, and other project-related STEM activities?	X	X	X	X	X
To what degree do the STEM explorations provide rigorous STEM challenges to participants?		X	X	X	
To what degree does the development of the Team Project provide rigorous STEM challenges to participants?		X	X		X
To what degree do the business planning aspects of the Team Projects provide rigorous challenges to participants?		X			X
To what degree does the on-line meeting space provide valued added in terms of participants' use of communication technology in team settings?		X	X		X

<b>Goal 2:</b> Focus on access and encouragement for underrepresented populations being prepared for and entering STEM majors.	Surveys	Interviews	Focus Group	STEM Explorations	Team Projects
How does the Global Challenge Award Project actively seek participants from underrepresented populations?	X	X			
What are the actual numbers and percentages of participants from underrepresented populations?	X				
What is the continuation rate for participants from underrepresented populations?	X				
Why do participants from underrepresented populations choose not to continue in the project?		X			

<b>Goal 3:</b> Develop a pipeline for admissions to higher education in which successful GCA participants have facilitated access to and admission support into the University of Vermont College of Engineering and Mathematical Sciences.	Surveys	Interviews	Focus Group	STEM Explorations	Team Projects
What programs are planned or in place to provide facilitated access and admission support to GCA participants?		X			
To what extent do GCA participants pursue higher education opportunities in the University of Vermont College of Engineering and Mathematical Sciences?	X	X	X		

<b>Goal 4:</b> Offer substantial privately raised scholarships and other incentives to participants	Surveys	Interviews	Focus Group	STEM Explorations	Team Projects
What processes are or will be in place to fund scholarships and incentives for participants?		X			
To what extent do scholarships and incentives influence participants' decisions to pursue STEM studies?		X	X		

<b>Goal 5:</b> Provide ongoing mentoring expertise and personal support for students to become STEM majors and  <b>Goal 6:</b> Involve STEM majors and graduates, parents, and STEM experts as mentors in GCA.	Surveys	Interviews	Focus Group	STEM Explorations	Team Projects
To what extent does ongoing access to expertise and personal support from parents and mentors impact participants?		X	X	X	X
To what extent does ongoing access to expertise and personal support from teachers as mentors impact participants?		X	X	X	X
To what extent does ongoing access to expertise and personal support from undergraduate STEM majors impact participants?		X	X	X	X
To what extent does ongoing access to expertise and personal support from project staff as mentors impact participants?		X	X	X	

<b>Goal 7</b> Enhance teacher skills in STEM related disciplines and in using technology and project-based learning to achieve better student outcomes.	Surveys	Interviews	Focus Group	STEM Explorations	Team Projects
In what ways has or will teacher support of participants impacted teachers' use of technology in the classroom?	X	X		X	X
In what ways has or will teacher support of participants impacted teachers' use of virtual space to support learning outside the classroom setting?		X	X		
In what ways has support of participants augmented teachers' STEM content knowledge?		X	X	X	

## Year 1 Findings and Recommendations for Year 2

The chart below summarizes major findings for each of the evaluation the seven goals. The chart also summarizes plans for data collection in Year 2.

The information in this summary is augmented by that incorporated in the Technical Reports that comprise Part 2 of this evaluation.

<b>Goal</b>	<b>Findings</b>	<b>Recommendations</b>
<b>Goal 1:</b> Intensively develop future science, engineering, and mathematics (STEM) professionals by engaging high school students for up to three years in a series of content experiences and challenging hands-on projects.	<p>1.1 Both the STEM Explorations and the Team Projects provided highly rigorous opportunities for participants to learn STEM content and to apply that content in real world situations.</p> <p>1.2 The online meeting space evolved through Year 1, based on feedback from users and emerging needs evident to staff. The on-line space proved capable of supporting participants at various levels of intensity.</p> <p>1.3 Staff and mentor support proved to be key factors in the success of participants, especially those completing the team project.</p> <p>1.4 Of 454 students who devoted 10 hours or more, 53.7% completed at level 3 (60-150) or level 4 (151-300)</p>	<p>I.i Clearly identify roles, responsibilities, and expectations for participants at each tier.</p> <p>I.ii Clearly identify roles, responsibilities, and expectations for mentors and staff based on analysis of needs of participants at each tier. Based on this analysis determine feasibility of providing this support and match the number of participants at each level with the available support.</p> <p>I.iii Develop pre-post assessments for the STEM experiences that have been completed and utilized in Year 1. Refine experiences based on student performance and feedback.</p> <p>I.iv Develop a pre-post assessment of STEM content and concepts mastery.</p> <p>I.iv Develop reward structures at each tier, commensurate with expectations and demands at each level.</p>

<b>Goal</b>	<b>Findings</b>	<b>Recommendations</b>
<b>Goal 2:</b> Focus on access and encouragement for underrepresented populations being prepared for and entering STEM majors.	2.1 GCA recruited significant numbers of females and non-white participants in Year 1. Socio-economic status data is not available in Year 1.	II.i Refine the registration process to collect and compile information related to socio-economic status as well as gender and ethnicity data.  II.ii There is a need for an articulated plan for recruiting and retaining female, minority, and low SES participants and mentors.
<b>Goal 3:</b> Develop a pipeline for admissions to higher education in which successful GCA participants have facilitated access to and admission support into the University of Vermont College of Engineering and Mathematical Sciences.	3.1 While the “pipeline” envisioned is not yet in place project staff members Sally O’Rourke and David Gibson provided significant levels of support to participants including college counseling, letters of recommendation, and general support in navigating the college admissions process.	III.i GCA is working closely with leadership at the University of Vermont and Vermont Governor’s Institute to completely revamp the recruitment and college connection processes. Part of this plan calls for direct targeting of high minority districts.
<b>Goal 4:</b> Offer substantial privately raised scholarships and other incentives to participants.	4.1 Fund raising yielded approximately \$55,000, exceeding the goal of \$40,000.	IV.i One of the ancillary uses of evaluation results is to provide context and key information for use in development activities. Evaluators and staff should collaborate to that end.
<b>Goal 5:</b> Provide ongoing mentoring expertise and personal support for students to become STEM majors and  <b>Goal 6:</b> Involve STEM majors and graduates, parents, and STEM experts as mentors in GCA.	5/6.1 GCA successfully recruited minority undergraduate mentors. These mentors were deemed to be very influential by participants, parents, and staff.  5/6.2 Mentoring expertise was also provided by adult mentors including parent, teachers, and STEM professionals. For the most part students report that these adult mentors were of great help, especially as related to aspects of business planning, their participants’ prior knowledge tended to be least developed.  5/6.3 Staff members also provided ongoing support to participants. Participants were highly complimentary of this staff support, especially as provided by Sally O’Rourke and David Gibson.  5/6.4 Personal support was also	V/VI.i Develop clear expectations for communications between mentors and project staff and mentors and participants at each tier.  V/VI.ii Consider developing a mentor guide for GCA.  V/VI.iii Continue to explore potential partnership with Microsoft to develop an optimal 3-D online space for GCA.

Goal	Findings	Recommendations
	offered via interactive, 3-D online space. GCA undertook feasibility study for use of two spaces, Created Reality Group and Active Worlds. Second Life will be piloted in Year 2.	
<b>Goal 7</b> Enhance teacher skills in STEM related disciplines and in using technology and project-based learning to achieve better student outcomes.	<p>7.1 Other than support for teachers serving as mentors Goal 7 was not an emphasis in Year 1.</p> <p>7.2 Student experiences with teachers other than mentors were mixed. Some reported that their STEM teachers were highly supportive while others report active opposition from teachers; Many report that they did not mention GCA to their STEM teachers until after the fact.</p>	<p>VII.i Develop communication protocols for STEM teachers of GCA participants.</p> <p>VII.ii Consider ways to involve teachers in professional development in support of this goal.</p>

### Sources, Types of Data and Methods – Year 2 and Beyond

In planning for the Year 2 evaluation, the five data types utilized in Year 1 – surveys, interviews, focus groups, review of STEM Explorations, and review of Team Projects will be continued. In addition, the following evaluation tools are completed or in development:

- Participant pre-post scores on assessments of STEM Explorations.
- Participant pre-post scores on assessments of STEM content and concepts, independent of the STEM explorations
- Participant data as to gender and ethnicity, as in Year 1, and socio-economic status.
- Follow-up with Year 1 participants as to higher education majors and choices.
- Review protocols for potentially emerging GCA products, such as mentoring support materials, teacher communication protocols, and support materials for private fundraising.

## Part 2: Technical Reports

### Summary of Findings from GCA Evaluation Technical Reports<sup>1</sup>

Findings in this section are organized around the areas posed, and the data sources available to answer the question. Whenever possible, students' own words are used to tell the story of their experiences in the 2006-2007 Global Challenge Award. Full-text technical reports of the data also follow this summary.

Areas	Data Source Yr 1	Data Source Yr 2
1) Students' knowledge in the STEM disciplines.	Student Post Survey Student Interviews	Student Post Survey Student Interviews Pre-Post Content Assessment Pre-Post STEM EXP Assessment Yr 1 to Yr 2 comparisons
2) Students' knowledge of "global perspective elements," e.g. trends in globalization, the global economy, et.al.	Student Post Survey Student Interviews Student Business Plans GCA "in the news" SCANS Pre-Post Survey -- (TR #2)	Student Post Survey Student Business Plans SCANS Pre-Post Survey STEM Pre-Post Survey Student Interviews GCA "in the news" Pre-Post Content Assessment Pre-Post STEM EXP Assessment Yr 1 to Yr 2 comparisons
3) Students' ability to collaborate in global teams.	Student Post Survey Student Interviews Student Business Plans GCA "in the news" SCANS Pre-Post Survey -- (TR #2)	Student Post Survey SCANS Pre-Post Survey STEM Pre-Post Survey Student Business Plans Student Interviews GCA "in the news" Yr 1 to Yr 2 comparisons
4) Students' awareness of and interest in solving problems associated with climate change.	Student Post Survey Student Interviews Student Business Plans GCA "in the news"	Student Post Survey Student Business Plans Student Interviews GCA "in the news" Yr 1 to Yr 2 comparisons
5) Students' interest in pursuing STEM disciplines at the college level.	Student Post Survey Student Interviews Student Business Plans GCA "in the news"	Student Post Survey Student Business Plans Student Interviews GCA "in the news" Yr 1 to Yr 2 comparisons GI Students' "Technocratic Oaths"

<sup>1</sup> Previously reported to GC design team on 7/18/07 as part of a planning meeting held in Stowe.

In addition to the above questions, students' growth and skills as a result of GCA may also be measured by data collected through the Governor's Institute on Engineering at the College of Engineering and Mathematical Sciences – further qualitative and quantitative measures will be possible as a result:

<b>Question</b>	<b>Data Source Yr 2</b>
What are the actual numbers and percentages of participants from underrepresented populations?	Analysis of Updated Registration Database  Analysis of Project Meetings and Documents
What is the continuation rate for participants from underrepresented populations?	Analysis of Registration Database  Analysis of Project Meetings and Documents
What programs are planned or in place to provide facilitated access and admission support to GCA participants?	Analysis of Project Meetings And Documents  Interviews with Students, Mentors, Counselors and Advisors  Students Surveys

Areas	Data Source Yr 1	Data Source Yr 2
1) Students' knowledge in the STEM disciplines.	Student Post Survey Student Interviews	Student Post Survey Student Interviews Pre-Post Content Assessment Pre-Post STEM EXP Assessment Yr 1 to Yr 2 comparisons

*“It was harder than we had thought, but it was also much more enriching than we'd have imagined.”*

### Student Post Survey

Q4 - Was your experience with the Global Challenge different than you thought it would be?

- Once we got into the project, we realized that there was a lot more detail involved than we had thought there would be!
- I didn't realize all of the work that it would entail. I also didn't realize how much I would get out of the experience
- It was a lot more of an academic project than I was expecting
- Yes, really. It was initially much difficult than I had ever thought, and it also posed a challenge to us in terms of the language of English.
- Yes. It was more than I thought, in the best of the experiences. I expected group work and difficult months ahead, but never planned it to be so exciting!

Q18 - Since taking part in Global Challenge, have you taken or are you thinking of taking additional higher level math, science, or technology courses? If so, which ones?

- I don't think that Global Challenge has altered the level of courses that I plan to take in math, science, and technology, mainly because I am already taking some of the most advanced courses my school offers.
- Yes - Calculus (Book No. 2) (teaching myself).
- I think that I have always been planning on taking higher math and science courses. Partly because of GC, I have enrolled in Environmental Science next year and I very much look forward to it.
- Nope. I was planning on taking the highest of these courses anyway

- I think it has encouraged me to begin already! These include physics, calculus, and even chemistry.

### **Student Interviews**

**Finding:** Students ask for clearer information about the scope and depth of GC -- up front.

Impact on Planning for 2007/2008:

Now there are 12 benchmarks, drawn from the suggestions made by winning teams and also the judges' comments. The rules page is "very clear," with 6 rules each of which has its own separate web page & calendar. About the business plan, STEM, and teamwork.

Students who did more work with the STEM experiences produced better business plans and had a higher overall performance. A team-building component has been added after observing that the students had difficulty with that aspect of the challenge.

**Finding:** Younger students found STEM very helpful, older students may have already had expertise in those areas and so would not take part in them.

Impact on Planning for 2007/2008:

Consider asking students to "test out" of the STEM so as not to be penalized

Make the "team" message clearer, that not everyone on the team needs to complete the STEM experiences, but that everyone should complete as many as they can to receive an "overall" team score.

### **Statements from Student Business Plans**

- During the days I was working with the project, I didn't set my school work aside. Contrary, I kept learning like usual days. I had looked up so much knowledge on light. When my physic teacher told the class that we would have an exam, [my teammate] and I were worried about ourselves. But to our surprise, both of us got a high mark! We also achieved a lot in English. But it isn't easy to be increased; it needs a long time for accumulation. All in all, we had a good harvest in this project, much more than these I have written.
- Because my professor is our geography teacher, after I had finished the project, I have got a good relation ship between him and I. Apart from that, my physics also get to a high level. Before finishing the project, I was physics monitor in the class, the project give me a lot of new things such as solar panels and vacuum insulated panels also light is the new thing I have never seen in the book, my teacher was surprised with the new knowledge.

- My perception of the sciences greatly changed over this process since I am now excelling in my chemistry and math classes. Before I found Humanities and World Studies easier, but because of Global challenge, I find Math and Chemistry much more interesting. Before I only scored a B in my Math class, but now I am also able to score much better grades. Also, chemistry is much easier since I understand how solar panels and vacuum insulated panels work as we talked about it in class and I can understand and answer all of the questions posed by my teacher.

Area	Data Source Yr 1	Data Source Yr 2
2) Students' knowledge of "global perspective elements," e.g. trends in globalization, the global economy, et.al.	Student Interviews Student Business Plans GCA "in the news" Student Post Survey SCANS Pre-Post Survey -- (TR #2)	Student Post Survey Student Business Plans SCANS Pre-Post Survey STEM Pre-Post Survey Student Interviews GCA "in the news" Pre-Post Content Assessment Pre-Post STEM EXP Assessment Yr 1 to Yr 2 comparisons

*“[GC] was an international contest with a topic that I was interested in: engineering, and global warming”*

### Statements from Student Business Plans

- I learned how to co-operate with people at the same age of mine but from contrasting cultural backgrounds. Plus, I know how a Business Plan should be written. It was really much harder than I expected, I never know that I have to take so many into account in order to draft some parts of the BP before taking part in Global Challenge Award.
- Global Challenge has not only helped me become more knowledgeable about the global economy, but also helped me to give back to the society. Because of Global Challenge, I understand how things work and I now have a passion to grasp everything that I can possibly learn. Global Challenge has been an amazing experience for me since I not only have gained knowledge through the process and leadership qualities that are essential in society today, but also new friends from different countries whom I would never normally meet. A strength that I have recognized about myself is my ability to do exactly what I am assigned. I find that I can, without breaking the boundaries, add my insight to the work that I do.

- (Adult Team Member) I am so impressed with the organization and support provided through the Global Challenge Program. It has been wonderful to see how these kids who have never met work over the internet as equal partners, transcending cultural differences to create a project that just may help us curb climate change!
- This is the first time I have worked on a project on such a large scale. It made me realize the importance of commitment, responsibility and hard work towards any project. Apart from allowing me to work on such a wonderful project, the Global Challenge Program also enabled me to communicate with two intelligent students in a foreign part of the world. Working on my favorite subject, science, for an amazing cause, not only gave me a rich educational and cultural experience, but also brought me in contact with amazing (and even frightening!) information and facts about climate change and instilled a confidence in me that will help me face all issues in the future.
- (Adult Team Member) Global Challenge plays a crucial role in improving living standards throughout the world, and they have the potential to ensure sustainable development in the 21st century. I believe that competitions like this definitely mould today's generation for the future.
- (Undergraduate STEM Mentor) Global Challenge Award is the opportunity that I was waiting for. I can see the next generation working as a team for a goal of the world. This program is not only giving younger folks a chance to be creative, open-minded but to learn what teamwork means and how it is applied by supporting one another. Global Challenge Award can be defined as different students, from different places who have different perspectives on global climate issues and they use this to their advantage for a common goal.
- Past experiences that helped prepare me for this project stemmed mostly from school. High school courses provided most of the background information that I had in the science and math areas. For example, my understanding of global warming came from an ecology course while the underlying science came from both math and physics courses. While I feel like I have a strong science and math background, my main focus for the Global Challenge was on the social issues and economics of a solution. Since I have always been interested in economics and corporations, I helped to develop the business side of our product.

### **GCA “in the news”**

“Team Innovatech [is] the 2007 Global Challenge overall winner. They had a major ah-ha moment when they were looking for a project to pursue in Global Challenge. It seemed to them that industry was always pitted against the environment, and one has to lose. ‘Everything we saw,’ says the team in their final project summary, ‘had at very best, only *reduced* pollution. We wanted something that could potentially be a solution to

global warming by working *with* the system rather than against it. That is exactly what we found in the GreenFuel Emissions-to-Biofuels<sup>TM</sup> process.’ ”<sup>2</sup>

“The Global Challenge, founded in 2005, is a problem-solving competition that requires student teams to work on a science-related issue, which is evaluated at every stage on four counts: STEM applications (Science, Technology, Engineering and Math), business plan, group diversity and overall outlook.

What makes Global Challenge particularly tricky is the business plan. This requires teams to ‘place’ their projects in three countries and to elucidate on the financial and political feasibility of setting up such a project.”<sup>3</sup>

### **Student Post Survey**

Q11 - How do your local teachers feel about your work with the Global Challenge?

- They consider it excellent.
- Never told any of them
- They seem to be impressed/proud
- I don't think my teachers were aware of the degree of involvement necessary for this project to take place successfully. Our school is a very small one, where our teachers are very close to us at a personal level. I didn't inform school that I was taking part in this project, and I suspect they would not be happy, considering that our priority this year was expected to be national level public exams. They would have been happy with my involvement with a project such as this, it is the timing that they would definitely object to.
- They encouraged it, and were happy that I engaged in extra work, but would have been happier if the project clashed less final exams.
- They feel that it is a very interesting project and it is something that is good to participate in.
- They are proud of me for taking on the challenge
- "It is a very innovative idea to contribute with a global concern" they said.

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<sup>2</sup> <http://www.cogito.org/Interviews/InterviewsDetail.aspx?ContentID=16791>

<sup>3</sup> <http://www.hindu.com/mp/2007/06/19/stories/2007061950260100.htm>

## Student Interviews

**Finding:** Students were least familiar with the business planning aspects of the Challenge, having had more experience with the science and math content as part of their local curriculum.

Impact on 2007/2008 planning: Conduct a pre-post assessment of students' growth in each academic area during the course of the Challenge – math and science as well as global business planning content.

Area	Data Source Yr 1	Data Source Yr 2
3) Students' ability to collaborate in global teams	Student Post Survey Student Interviews Student Business Plans GCA "in the news" SCANS Pre-Post Survey -- (TR #2)	Student Post Survey SCANS Pre-Post Survey STEM Pre-Post Survey Student Business Plans Student Interviews GCA "in the news" Yr 1 to Yr 2 comparisons

*“[GC] was a way to work with other students around the world to address global warming.”*

## Student Post Survey

- In terms of working as a team, I feel that I have learned to listen to others' ideas and take it upon myself to do work when it needed to be done.
- Find out how devoted your partners are before start doing the project with them.
- We had expected the project to be a lot less complicated that it turned out to be. Every time we'd finalize a section, one of us would find a new interesting bit that we just had to include. We needed more than my expected amount of editing and compromise. It was also harder than I'd have thought to coordinate with our American counterparts. The experience was harder than we'd expected, but just as enriching as we had hoped!
- One of the greatest barriers we faced was the difficulty in maintaining communication with our American counterparts. We faced trouble because of exams over here, and they faced trouble due to technical difficulty and illnesses. It worked out just fine, but it did pose a challenge, and slowed us down in the middle for a while.
- Communication, and decision making was difficult on an international scale, but that was what the project was all about.

- It was initially much [more] difficult than I had ever thought, and it also posed a challenge to us in terms of the language of English.
- It emphasizes more on communications and writing skills than I thought.
- Get involved early; give yourself plenty of time to do things. Be sure to communicate with your potential teammates before deciding to join with them. It mainly comes down to communication with the rest of your team, both before deciding to join with them and during the challenge.
- My advice to future participants would be to establish regular communication as soon as possible with all concerned. It is important to distribute work quickly so that there is ample time to trouble shoot and do editing. I also realized the hard way that sections like bibliography and appendix take longer than one would expect, so we would advice to target to finish the project at least a week before the actual deadline - somehow there is ALWAYS something more to do!
- I would advise to start dividing up sections of work quickly. It is important to finish research and set an idea quick so that more specific research can be done individually depending on the section that is being handled.
- Pace yourselves, or you'll be quiet gloomy when the due day comes.
- I would suggest that you start working as early as possible. I didn't realize how much work we had to put in until it was too late. At the beginning at least start out by doing STEM challenges and try to follow along on the calendar.
- Manage your time well, and use an instant, or "live" messaging program. Schedule meetings when everyone will go online and talk real time.
- Start as soon as possible, never leave any details behind. Form a good relationship between the group members, it's the key to the project's success.

### **Student Interviews**

***Finding:*** Students say they found that an early e-folio orientation would have been very helpful.

Impact on Planning for 2007/2008: Extensive team building exercises this year will take place in the e-folio. Other topics that will be discussed during the team building are decision making, conflict resolution, and consensus building.

***Finding:*** access to David, Sally, and Susan was seen by the students as having a great impact on their success in the GC

Impact on Planning for 2007/2008: In order to “scale up” it will be important to train the mentors to receive and “filter” the staff’s messages and provide a lot of the individual assistance for students.

***Finding:*** Unintended consequences of global team formation -- some of the students, even those who did not submit a final project, have kept in touch with each other both in the US and abroad. The students who traveled to GI got together in Boston afterwards. There is also a Face Book community that the GC students formed spontaneously on their own.

Impact on Planning for 2007/2008: Continue to check in with past participants and report GC related impact and outcomes for both for groups of students who finished, or did not finish, the Challenge.

### **Statements from Student Business Plans**

- If you ask me what is the most useful thing I had got in this subject, I will tell you without hesitation, that’s cooperation. In [my country], because of the politics, most of us are only child. So it is not important to do things with team, we lack team working. But in this subject we have to communicate with the USA students, to make friends with them, to communicate with them, and also work with them. We have problems in language, time and a lot of areas. But finally we overcome them. As a result, I would like to say that my new greatest strength is cooperation. What is cooperation, I think it’s not only the team working but also the communication between two teams, that’s what the most important have got in this subject.
- Global Challenge caught my attention because not only did I want an extra place to apply my math and science knowledge, but it also served as a way in which I could improve my leadership abilities (by leading an international team). Global Challenge has been amazingly fun and it has opened my eyes to a major problem that still requires a solution. Even if our team does not win the final competition, I am grateful for all of the experiences that I have had during the time that our team has been working on this project. Through this project, I have recognized my strength of leadership, a strength that has been developing throughout the process of this competition. I now trust myself, and have confidence that I can lead any team to victory!
- A team [is] based on cooperation, teamwork and equality. We did not have a team leader; instead we collaborated on the different aspects of the project together. Everyone took part in the research so that we could all have a full understanding of what we were working with. We all pooled our research and understanding together for the technical analysis. Team discussions and organized distribution of work were the key factors of our mode of operation. Input from each one was discussed, considered and incorporated when appropriate. Everyone learned a lot about the science of global warming, and about how different technologies work.

We learned how companies are built, and how products are made from cradle to grave. We also realized how important it is to stay organized and in communication with each other.

**GCA “in the news”**

“The Global Challenge is an international science competition that invites proposals to solve global warming through projects using concepts of science, math, and business management. The project is submitted by a team of international students made up of two American citizens and two from anywhere else in the world. The competition for 2007 had over 2,600 participants from over 50 countries. I was part of the team that won the overall top score in 2007's Global Challenge, and my teammates and I were given scholarships of \$1,350 and an all-expense-paid trip to the University of Vermont to attend the Governor's Institute of Vermont (GIV) Engineering Summer Institute.

In the course of this project and the week I spent at GIV, I realized just how important communication is where science is concerned. Merely understanding our project as a bunch of “science geeks” wasn't good enough; we needed to put it across in a way that the lay public could understand. A person who has never studied chemistry wouldn't understand the equations that lead to release of greenhouse gases, but it isn't any less important for her to understand why they are bad for the environment and what she can do to help. For me, this realization was a lot more than a passing thought.”<sup>4</sup>

Area	Data Source Yr 1	Data Source Yr 2
4) Students’ awareness of and interest in solving problems associated with climate change	Student Post Survey Student Interviews Student Business Plans GCA “in the news”	Student Post Survey Student Business Plans Student Interviews GCA “in the news” Yr 1 to Yr 2 comparisons GI Students’ “Technocratic Oaths”

*“What made it attractive to me was the fact that our project was to be on something so relevant, and to be done in a way completely different from anything I've done before.”*

**Student Post Survey**

Q1 - Initially, why was the Global Challenge interesting to you?

<sup>4</sup> <http://www.cogito.org/Articles/ArticleDetail.aspx?ContentID=16864>

- Because of the fact that it was a wholly new experience and promised the potential to provide a whole new level of learning and global experience.
- It promised a chance to do some real research during while still in High School.
- What made the Global Challenge interesting, apart from the amazing learning experience it would be, was the fact that it was unlike any other project I had ever engaged in. We were to deal with a lot more than a mere accumulation of information, but were expected to understand it, discuss it, find a way to implement it and potentially solve a pressing environmental problem! I felt that it would make us feel involved in a field of science I have always wanted to be a part of, and that was what made me want to sign up.
- It was a way to work with other students around the world to address global warming.
- It was an international contest with a topic that I was interested in: engineering, and global warming.
- I agree with a common expression that "the future is in our hands," therefore, being able to collaborate in a meaningful project such as this one provided me with an opportunity to help.

### **Student Interviews**

***Finding:*** GC students who took part in the GI each wrote their own "Technocratic Oath" as part of that program. The GC students were among the top students at the GI.

Impact on 2007/2008 planning: Attempt to gather the TO's written this summer and put in place a mechanism for obtaining these important documents from the GI in future years.

### **Statements from Student Business Plans**

- This was a very big project that took a lot of effort. I had always known that global warming was an issue, but this project has opened my eyes to the many aspects and the extremity. I have gained a lot of knowledge and I will walk away from this project knowing that I have helped to make a difference in our world
- Through my involvement in the Global Challenge, I have gained knowledge, team and leadership skills, and friendship. I have worked with my team members to educate, share, and research new information and technology regarding global climate change. This has been the largest and most important project that I have ever been involved in and I now feel prepared to take on any task.

- We learnt just how much of an effect small alterations and newer additions to existing technology and design can have on ensuring sustainable development and minimizing environmental damage. This project was instrumental in our gaining a deeper understanding of Global Warming as a dangerous problem, and the innovative solutions to help counter it.
- With my teacher and my friend's suggestion, I joined in the team with [another student]. In the first two months, my lessons were delayed. But I didn't give up, and continue to study and discuss. After about 3 months work, we have a rough method. Although my schoolwork became worse, I really got a lot of knowledge, idea[s], and so on. On one hand, my chemistry scores went up. On the other hand, I am up on solving a problem with friends through a thorough discussion. Teachers also help us a lot, especially our chemistry teacher. But, the most important thing which I have got[ten] is I realize that children can also change the world. This in itself is my greatest strength.
- I realized that working as an individual is an extremely hard challenge when working on a project to end a global issue. I also realized that sometimes you cannot always depend on people to do certain things and in this case that was the problem. I had thought that this was a great opportunity to expand my knowledge about global environmental issues and find ways to come up with solutions to these problems. I took that opportunity and stuck with it the whole way and didn't quit. There were times where I got frustrated because I didn't have any team members to help me, but that didn't stop me from not continuing the project.
- I have learnt a lot, look forward to generate awareness on the concerned issues of climate change. The Global Challenge Program exposes one to global issues about our mother earth and provides them the opportunity to contribute at his own level of knowledge and at such an early stage. This really encourages students to be concerned for nature

### **GCA “in the news”<sup>5</sup>**

(GC 2006/2007 winners, Team Innovatech) Being educated youth, we know that it is in our hands to protect our planet; and I'm sure this sense of responsibility is developed or steadily developing all over the world. Initiatives such as the GCA serve to unite like-minded students from all over the world, and I certainly hope its work continues. Regarding my future, I am deeply interested in electronics and engineering. I am sure that one day I will have the opportunity to develop new technology that will help in our efforts to develop a carbon-neutral society.

I've always felt really passionate about environmental issues, which was the reason I wanted to participate in this. I wanted to help make a difference. Global warming is an

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<sup>5</sup> <http://www.cogito.org/Interviews/InterviewsDetail.aspx?ContentID=16791>

issue that concerns everyone, so it was great working with another team internationally. Since I'm just 16, I'm not quite sure what I'd like to do yet, but it's very possible I'll continue in this field.

Yes, I would say that I had an interest in global issues before this work – particularly with respect to environmental protection, but honestly, this interest was quite theoretical. Global Challenge made me realize that I'm not too small to change that theoretical interest to an active one, and actually DO something about global warming.

Area	Data Source Yr 1	Data Source Yr 2
5) Students' interest in pursuing STEM disciplines at the college level	Student Post Survey Student Interviews GCA "in the news"	Student Post Survey Student Business Plans Student Interviews GCA "in the news" Yr 1 to Yr 2 comparisons

*“Global Challenge gave us the opportunity to exercise a set of skills in fields of science, presentation and reasoning.”*

### Student Post Survey

Q18 - Since taking part in Global Challenge, have you taken or are you thinking of taking additional higher level math, science, or technology courses? If so, which ones?

- I may go to college for math, science, or technology courses.
- Yes, I plan on taking AP calculus.
- I plan on doing a Bachelor's in Science with electives of Chemistry, Zoology and Microbiology/Environmental Sciences.
- I plan on pursuing an engineering degree.
- [No] but I think that I have learned the most math, not through my high school courses, but through The Art of Problem Solving Foundation. In science courses, I have taken Honors Chemistry and Biology. In fact, it was from my chemistry teacher that I first became interested in quantum physics. I plan to take A.P. Physics next year.

Q10 - Are your career goals any different now, as a result of taking part in Global Challenge?

- Yes, I begin to love challenges, so I tend to be a manager or a businessman in the future.
- Thinking about Applied Mathematics
- Not really, except a shift into the "green" industry.
- Not significantly.
- Through Global Challenge, I realized that my strength is really in communication, presentations and writing - while my interest was still in science. I am now very seriously targeting Science Journalism, with a Bachelor's degree in Science, and a Master's degree in Mass Communications.
- Software Engineer.
- They are still similar but I have become a lot more interested in the issue of global warming
- Nope!
- No, this experience has encouraged me to pursue my goal even more.

### **Student Interviews**

***Finding:*** Students who took part in the GC as seniors have been accepted in a wide variety of majors including math, science, environmental and management majors at many different prestigious colleges for the 2007/2008 freshman year.

Impact on planning for 2007/2008: A “pipeline” into STEM for undergrads has been created, their progress through college will be followed and ways to involve them in the GC as mentors in future rounds is being explored.

### **GCA “in the news”**

*(Lights Out!* by Meghna Das, Team Innovatech member) I joined the Global Challenge thinking I'd get some valuable experience in research science, and that I'd have something impressive to put on a college application. I definitely got that ... and in the process had loads of fun doing the project! Because it dealt not only with science, but with business planning, my teammates and I realized that we weren't just doing some high school project on a topic our teachers gave us. We were getting involved in discussing ideas that could actually make a difference, and communicating those ideas to our peer group and

beyond. The experience highlighted the need for engineering solutions to environmental problems, but it also demonstrated the need to communicate these ideas effectively.<sup>6</sup>

**Additional Findings:** Issues of Time, Relevance, and other Student Suggestions

*“My parents were very happy with my involvement in this project, saw it as an enriching experience and supported my team mate and I through the whole thing. However, they helped make sure that we didn't compromise school work in the process.”*

### **Students' Advice for Participants Next Year:**

- Try to make the challenges at all levels. Have some challenges that are easy enough that students who are weak in that area can still perform, but also make some that are challenging enough to maintain the interests of the strongest students, and teach them new ideas that they can then apply.
- Let the team choose their own STEMs. Because some the STEMs given to teams are not relevant to their BP. On the other hand, whenever a team confronts something new, the members can do a STEM just for the problem. This way the teams always get right what they are looking for.
- It'll be better if the topic's not just limited to global warming. If possible, more prizes too.

### **Student Interviews**

**Finding:** The timing of the students', particularly the international students', high stakes tests conflicted with the finale of the GC.

Many international students say they did not tell their teachers, and that they believe that if they had their teachers would not have supported their participation in GC and would have seen it as a distraction to their local test preparations. Some who did tell their teachers said that their teachers were “not impressed” with it until after the students had won. Parents however were very helpful.

Impact on Planning for 2007/2008: The timing of GC and getting up to speed in using the e-folio were definitely seen as barriers by the students. The biggest supports were seen by students to be their access to and interaction with GC staff and mentors. Additional student support from mentors is planned for this year, in addition to the investigation of a “video tour” of the GC teams' e-folio workspace.

Make it clear that the GC can be submitted early, teams need not wait until the deadline to submit. This year the student teams will be building their own common calendar.

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<sup>6</sup> <http://www.cogito.org/Articles/ArticleDetail.aspx?ContentID=16864>

After the patent office post that is due in January they may complete the challenge at any time.

### Statements from Student Business Plans

- Through this project, I have learned lots of new knowledge relating to optics and chemistry. However, surprisingly, I don't think that this knowledge was very important when compared to the new attitude I developed towards science. For one of the first times, I was able to USE some of the science knowledge I learned outside of class (and not some kind of test). This experience has helped me change my attitude from someone who learns math and science for school, to somebody who knows how to use and apply their knowledge. With this new attitude, I look forward to applying the knowledge that I learn elsewhere in the future.

### Estimates of Students' and Adults' Time Spent on GC

Table 1 shows the Average and Range of responses that the 10 students and 12 adults who completed the online post surveys gave to questions asking about the amount of time per week that students had spent on the GC, and whether their time on the project increased during the final months of March and April.

**Table 1**

	Students n=10	Adults' responses estimating Students' Hours n=12
Hours Weekly	Average 3.8 Range 1 - 8	Average 5.7 Data Range 0 – 48*
Hours Weekly – March/April	Average 10 Data Range [left blank] – 30*	Average 9.4 Data Range [left blank] – 52*

Table 2 provides the same information about “time spent” on the project, but in greater detail. While students estimate they spent between 1 and 8 hours a week, with an average of 3.8 hours per week, during most of the GC, the adult mentors/advisors estimated that their students had spent an average of nearly 2 hours more, or 5.7 hours more, on it per week.

The range of hours that students spent per week during March and April was estimated higher by the adults than by the students themselves, however the average hours that students spent during the final months of the project are estimated as between 9.4 and 10 by both groups.

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\* These intervals are based on those which respondents used. A range of 0-26 was used for purposes of computing the average, in order to correct for skewness of the actual ranges reported.

While the number of students and adults who responded to the survey is too low to make any statements with certainty about the amount of time that students actually spent on their GC projects, these data suggest that students spent an average of between 3 – 6 hours on the GC weekly during most of the project, while spending approximately twice that much time on it during the final 2 months. Some students spent much more of their time on it, with an upper range of between 30-52 hours each week.

**Table 2**

	Students n=10	Students Final Weeks n=10	Adults Estimate Student Hours n=12	Adults Estimate Student Hours Final Weeks n=12
0			1	
1-2	5		2	
3-6	3	3	3	2
7-10	2	1	3	3
11-15		2		
16-25				
26+		2	1	3
[left blank]		2	2	4

In addition to this survey data, GCA staff have calculated from e-folio data that 210 US students organized themselves onto teams of any level, and 188 of those students spent over 120 hours on the project. Fifty six spent from 150 to 300 hours. The US attrition from multi-national teams (only 2 students from one country) was 10.5%.

### **SCANS Survey Results**

A pre SCANS survey was administered during Oct. through Dec. 2006. (see TR#2) Ninety-one students took part in the pre survey, and 7 took part in the post administered in May-June 2007. While pre/post statistical analysis is not valid from these data, results are informative for designing a robust SCANS survey strategy for use in 2007/2008.

Impact on 2007-2008 planning: Administer the survey as an integral part of the project, not as an added-on or optional evaluation piece.

## Technical Report #1 – Responses to the Global Challenge Adult Advisor Post Survey Spring 2007

69 participants match the search criteria, 12 people completed the survey. Their responses to the narrative questions posed by the survey follow, with initial coding shown in red text.<sup>7</sup> [due to many spelling irregularities, the text of these responses has been edited to represent US/English format]

### 1 - Initially, why was the Global Challenge interesting to you?

Interacting with others globally

Global warming is a **real issue**. I also like to teach by having students address real world problems. The **international potential** was really interesting.

**provides students in isolated rural schools and opportunity to work outside their boundaries**

The **collaboration** with students from other countries

chance for students to work with an **international team**, **select interesting STEM topics** to learn about, **apply knowledge** toward the **creation** of a business plan

It was good to see student involvement in something **so important**. Also, the fact that it had to be an **implemental idea**, was interesting.

The concept of **motivating teenagers** in a theme that affects us daily.

Because I think it is important for young people to **focus on solutions** to global warming.

I find this is the most **important issue** for our planet at present

Working with **students from different countries** was interesting. Also a **serious, non-curricular project** that has kids thinking out worldwide things is good.

Because I can give a chance to **students to apply their knowledge** for real world problem solving

**Engaging young people to solve an important problem**

### 2 - What was your role in the Global Challenge?

Advisor = 4

Mentor = 3

<sup>7</sup> This coding was compared with coding from the student surveys in TR #3.

Other = 5

I kept trying to get my students interested in working with students from other countries.

Mostly to encourage them to plan and manage their time and attention for the global challenge project as well as school work. Also to act as a sounding board for their ideas.

I helped supervise.

I entered as the adult supervisor of the local team

Adult Team Advisor of country and International team

### **3 - How do you think the students you worked with feel about their work with the Global Challenge?**

Interesting, challenging, new experience.

They got very frustrated with the language barriers and the rubric. They wanted to do the project but not conform to the guidelines. They ended up doing the project their way and made the new york times, boston globe etc. with their work.

I think at times they were frustrated, confused, worried and yet they worked through all of it to feel knowledgeable, competent, motivated.

Our students are very proud of their work (with good reason!) They also feel like it was a lot of work.

they are proud of what they learned and have achieved. They believe that it is a valuable experience for interested students - they hope that there will be students from our school who will participate next year.

They were energized by the project and over the last few months, the issue of global warming has grown to a passion!

I think they feel satisfied with the ideas I could bring to them for improving their project or calling their attention in a problem.

I think they were excited to research ideas to get involved in but a little disappointed that they could not completely finish the whole project due to the busy lives they lead.

my son was extremely interested but the involvement of the other students from Italy and from the group in California was less regular and so at a certain point the thing was dropped

It was a lot of work - more than they expected. At times, they got very discouraged - often because of the perception that the other students in China

were **not pulling their fair share**. That probably had to do with different academic schedules (exams at different times etc). But **having completed it, they are very pleased with themselves**.

I think they are **very interesting to work with students abroad by email and skype**. Also, they are **proud of their role to solve problem** of our world.

**Disappointed** - I could only contact one team member. The rest of his team never responded or participated.

#### **4 - How do you feel their knowledge and understanding of STEM subject content has changed?**

Can **interact with others** in sharing the experience and knowledge acquired.

The project **deepened their commitment to working in STEM and using their STEM knowledge to change the world**.

Amazing **learning curve from zero to 100 with a few bumps along the way** but all very useful

Our students **learned about solar power and environmental issues**. They also **learned to work together**.

I'm not sure - I will need to ask. We **encouraged the team to connect directly with industry experts and alumnae from the school who work in the field**. They definitely **learned how to collect more expert information by seeking out and contacting experts**.

The two students I worked with are very involved in science to begin with. This project only **helped channel their thirst for learning**.

the knowledge of the team were increasing in the measurement that project was passing, **motivated by the research to be able to give answer** to the necessities that they had.

They have learned a lot which **will help them as they enter college**.

N/A

I'm **not sure their understanding of STEM increased much**, except in a few limited ways specific to their proposal. They **did learn a lot about outsourcing, supply chains, etc**.

I think their **knowledge on the STEM would be more authentic** and their **attitude on the study has changed toward a sense of purpose**.

**Only slightly**. His **project could not get off the ground without team support**.

## 5 - What advice for participating in future competitions would you give student teams?

To **work together** closely, consistent, and share work.

**Don't let the rubric get in the way** of doing what you need to do to change the world.

**Start ASAP! Use mentors** more.

It really is **a lot of work**. **Keeping that in mind and planning** for this type of effort is crucial

**-Pace yourself well** - don't leave anything to the last minute -It takes time to find the **right team** - put the work into finding the best match team for you **-Create a plan with your international team** on how you will **work together in an equal way**

It is important to **plan and organize** the projects **well in advance**. **Communication, technology and articulating your team objective** proves to be difficult and needs to be addressed quickly. Also, it is **important not to get lost in research and gathering information**. Start **your own work soon**, even if you want to read up more.

That they always must in mind **finish what they initiated**, that **is not discouraged in the process of the project** since in the end they **will feel a great satisfaction**, they are already winning single for that reason, **winners by the shared knowledge** and the new ones acquired in this experience.

**To start early**, before college admissions work takes over!

to **choose partners** both in their team and in the counterpart more accurately, so that **communication** can be easier and **work can be distributed evenly**, also to consider in the choice the **time zones**, it's quite difficult to keep in touch with 9-10 hours difference

**Don't wait for deadlines** - get your work done as early as possible. **Plan for periods when team members will be unavailable** due to exams, etc.

If they want to be happy and precede the project well, I hope they should **enjoy** it and **interact with each other**.

Make sure you **have willing team members**, with whom you can **communicate effectively**. **Start early** so you have the option to change group members.

## 6 - What advice for participating in future competitions would you give advisors?

First timer- be ready **for openness, sharing and willingness to participate**.

**Watch out for language skills** in finding over seas team members.

NA

Same

(left blank)

Perhaps a **plan of action with deadlines** could become a part of team e-folios?

That they **encourage the team**, there are difficult moments at which need a little **direction to follow ahead**.

To try to **contact the international students more often**.

(left blank)

**Keep encouraging them** - it's easy to get discouraged and drop out after putting in a lot of work. Tell the kids about the fact **they will have learned a lot about the world - and even if they don't win anything**, it will be a **great story to tell** (and **put on their resume when applying for college**). Make sure they know they need to **do a good job with their proposal but it does not have to be (cannot be) perfect**.

It would be better that advisor can **contact their students more easily** such as real life meeting, phone, email, and skype as well as other country team member.

**Push the kids early to define a direction. Keep them focused on goal oriented tasks.**

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### **7 - What advice for participating in future competitions would you give mentors?**

**Set aside time, be patient, be willing to research.**

(left blank)

**Ask to see drafts, provide prompts**, through in **some humor**, help kids understand **differences in cultures may be misinterpreted** in emails.

The interface with Global Challenge is not as user friendly as it could be. **Students were often confused on what was require and when**. The **website was difficult to navigate**.

(left blank)

It may make sense for the **mentors to occasionally converse along with the students of a team**. That way we **avoid contradictory advice and guidance**.

The important thing is to **respect the idea that the team has**, to **guide them** where they can find the information that is need. To **raise different scenarios to them**, so that **they can select what they create but advisable for the project**.

n/a

(left blank)

same as above

I think **mentors should know the process, problem, obstacle** of the GC project because **they guide the teams** well.

(left blank)

**8 - What advice for designing future competitions would you give the designers of the Global Challenge?**

Not sure.

**Open up the rubric** so as not to frustrate the students. The ten flatteners were **seen by the students as an artificial rubric**. They could have used them but **felt it was forced**. Instead they opted out of the challenge.

Maybe have **some more significant benchmarks** such that it **prevents cramming at the end**. **Coordinating work across countries was a challenge** due to different exam and vacation schedules. **establish personal team calendars ASAP** when you form a team

Fixing the **problems with the web page** and **making the availability of mentors more universal - less east coast based** - would go a long way to improving the project

(left blank)

When asking each project to be integrated to concepts like **Cradle to Cradle or The World is Flat**, keep in mind that these ideas cannot be the mainstay of the presentation. It took quite a while for the students in my team to understand these two books and see the connection with their own project.

To **use Share Point Illuminate**, would be a great tool, could be opened a room to each team.

n/a

(left blank)

I think you need **more tangible, and more frequent rewards that are easy to achieve** for the students. It's a very long time to work on something for **no tangible reward and a high risk that you will not win anything**. That is very **dispiriting and demotivating**. If you make sure to have frequent rewards, it would help.

**English at the website should be more easy** for students and advisor who use English as a second language to understand the steps of GC project.

**9 - What were the greatest barriers that you encountered in your work with Global Challenge?**

Email sometimes not as direct.

Language barriers and communication with over seas partners.

Keeping up with the emails and somewhat confusing using efolio.

Communication with Global Challenge and the other students

-I found the website and the platform slow. because content took more time than I expected to load, I didn't access the website as much as I should have.

Communicating with the American half and getting work done quickly and efficiently.

To connect more often with the students from Shangha...

the lack of time especially of students here who had a lot to study and could dedicate much energy to the program

It's such a large project that it is daunting at the beginning. Then, towards the end it became hard to keep going. There was a point when they were about to give up. Motivating them to continue was the hardest part.

The speed of the GC website need more be up, because students usually are not patient with waiting for few second. I dearly wish that the change or upgrade of WEBSERVER of GC Website would be done.

Team communication

**10 - What was the most helpful support provided to you in the Global Challenge?**

Direct and quick response

(left blank)

fast response to questions, careful step by step instructions fro creating accounts, passwords, etc.

Emails were useful

individual attention given to us by Sally and David when we needed it most.

Regular correspondence with the Advisors and their gently reminders and promptings were very welcome.

To allow me to comprise of this challenge, to share knowledge with my daughter, besides to feel very proud of her and her teammates

the website, and Sally O'Rourke.

(left blank)

The advisors provided splendid support and helpful critique of the proposal at many stages. This was very impressive.

The interaction with Dr. Gibson through email and skype always give us a key help to do the GC project well.

(left blank)

**16 - How did you first hear of the Global Challenge scholarship?**

Did not hear.

through UVM

High School

(left blank)

Contact through our school

A representative met my neighbor who then contacted my daughter to do the project along with her son.

By my daughter

On UVM's website.

from my son

I can't remember

I heard it from Dr. Gibson.

From a student who wanted to start a team

**17 - On approximately what date was that?**

February 06 = 1

Summer 06 = 3

September 2006 = 2

Sept or Oct 2006 = 2

November 06 = 1

December 06 = 2

(left blank) = 2

**20 - How many years have you been using the internet?**

	8	9	10	11	12	15
Responses	1	1	2	1	2	2

Other responses:

(left blank)

since it started---when was that?

too many to remember

**21 - If asked, would you be a part of the Global Challenge again?**

Yes

maybe

Possibly, depends on who asks I think!

I am really not sure

yes

sure!

YES

yes, with my younger daughter.

yes

yes

Yes

maybe

**22 - On average during the Challenge, how many hours a week would you say that each student spent working on it?**

Not sure because of distance

10

5

5 - 10

1-2 hours/week. toward the end, it was 5+ hours

about 7 to 8 hours a week (about 1 hr a day)

About 48 hours

2-3

(left blank)

2 - but hard to say because I did not keep track

3-4

0

**23 - How many hours a week did you spend with students who were working on it?**

1

4

1

1

45 minutes/week

Initially once a fortnight, then about twice or thrice a week and then, when the project idea was accepted by all members and the team started working, about once a month.

Approximately 4 hours

1-2

(left blank)

<1

2-3

less than 1

**26 - If the time that students spent on the Challenge increased during the months of March and April, how many hours a week would you guess that each student spent on it during that time?**

(left blank)

It was their life

10

Many - I can not guess

5-10 hours, but I would need to ask for a specific number

Each student spent nearly 30 hours a week in the last 3 to 4 weeks before the deadline.

Approximately 52 hours

3-4 hours

(left blank)

3 - 6, but hard to say for sure as I did not keep track

7-8

(left blank)

**27 - If the time that you spent with students on the Challenge increased during the months of March and April, how many hours a week did you spend on it during that time?**

(left blank)

It was my life

na

(left blank)

(left blank)

The students in my team did not need me much once they were on the roll. They used me as a sounding board after the project was completed.

Not increased

2-3 hours

(left blank)

No more than one hour. It was a pretty independent group.

3-4

(left blank)

**28 - What is your relationship to the student participants in Global Challenge? Are you a teacher, a college professor, a parent of one of the students, or a sibling of a student, etc.?**

(left blank) = 8

Other responses:

parent of a student

parent

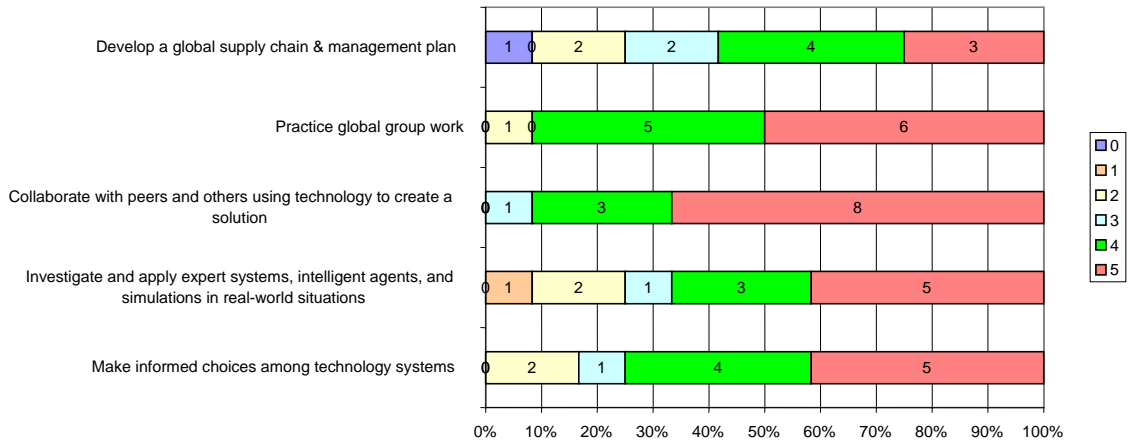
Teacher

I am a graduate student who served as a career mentor to one of the team members

**Questions 11-15:**

Adults as well as students were asked to complete the following survey questions, and to rate on a scale of 5, with 0 being not at all, and 5 being most, how “important” it was for student team members to have the learning experiences described.

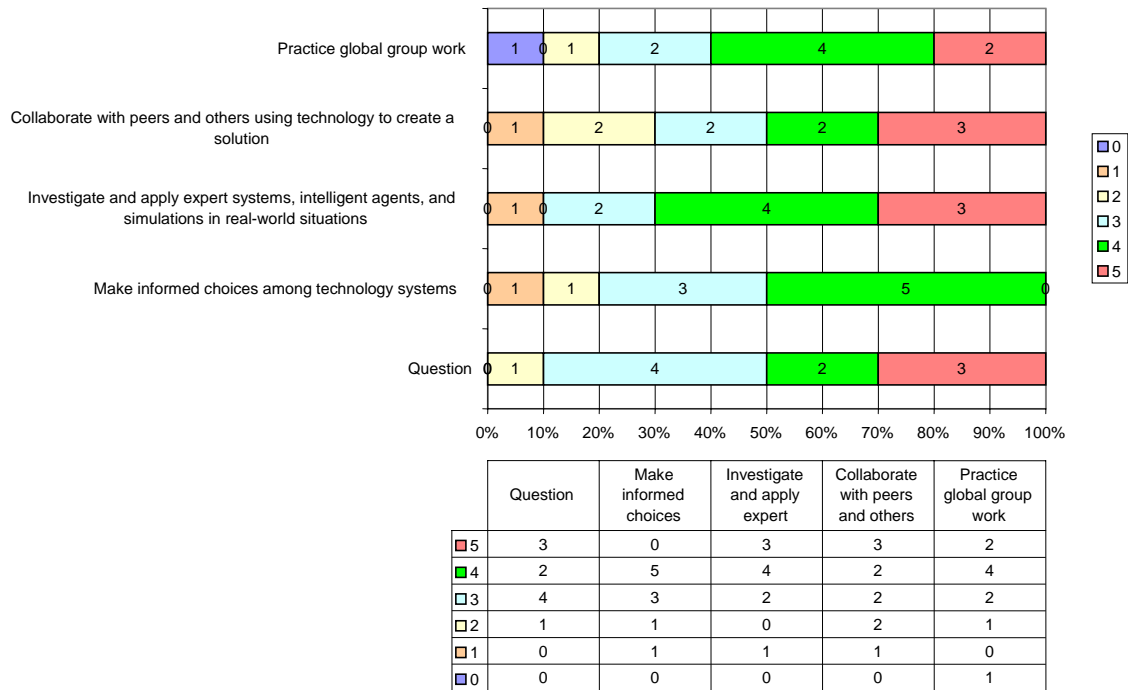
**Adult Responses, Spring 2007 N=12**



	Make informed choices	Investigate and apply expert	Collaborate with peers and others	Practice global group work	Develop a global supply chain &
5	5	5	8	6	3
4	4	3	3	5	4
3	1	1	1	0	2
2	2	2	0	1	2
1	0	1	0	0	0
0	0	0	0	0	1

Students were then asked to rate the same questions on the 5 point scale, but to rate the frequency, with 0 representing no opportunities and 5 abundant opportunities, which they were provided to take part in the described activities.

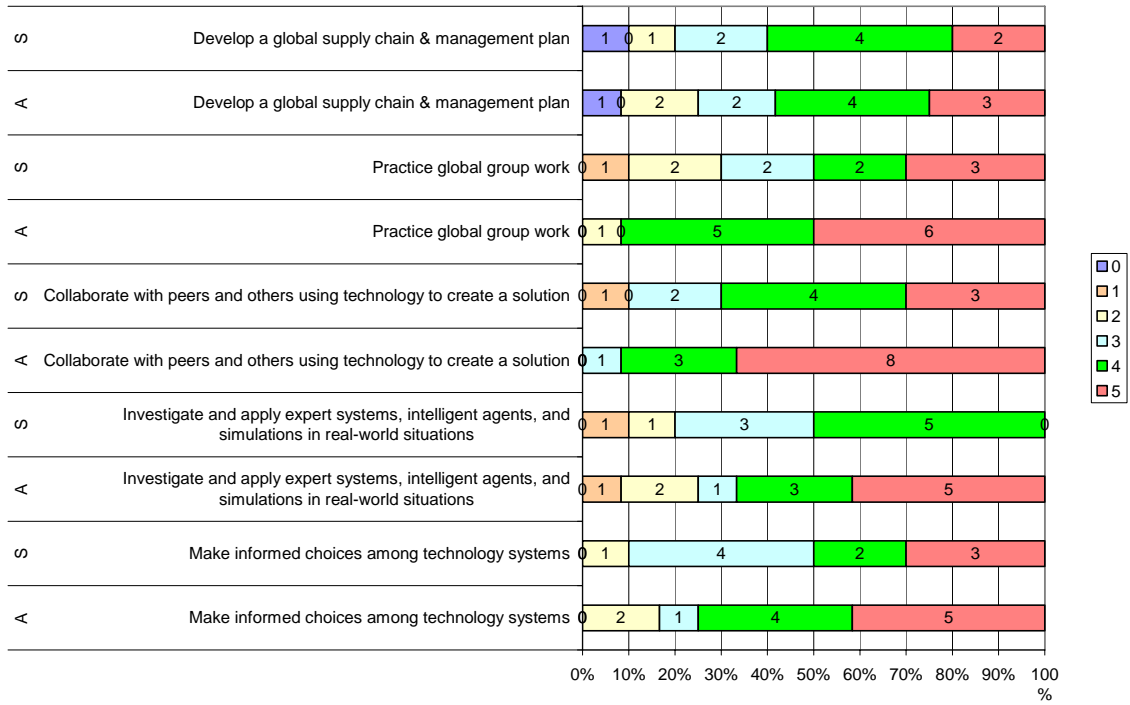
**Students Responses, Spring 2007 N=10**



Comparison of the two sets of responses shows similarities and differences between the importance that the adult advisors place on particular aspects of the Global Challenge opportunities, and the frequency with which students report having had an opportunity to engage in those activities.

While developing a global supply chain and management plan was seen as a similarly important (from the adults’ perspective) and frequent (by students report) activity, the other four questions show they have different perceptions of this importance-to-opportunity measure. Most strikingly, the students do not say that they have had abundant opportunities to investigate and apply expert systems, intelligent agents, and simulations in real-world situations. This is a somewhat surprising finding, given the technology-rich environment in which the Global Challenge is conducted. Of course obviously with such a small number (10) students completing the survey at this time, it may be that this view is not shared by the majority of those engaged in the project.

### Adult Responses Compared to Students



## **Technical Report #2 – Responses to the Global Challenge SCANS Survey Students Pre (fall/winter 2006) & Post (spring 2007)**

Global Challenge's Pre and Post Scans Surveys asked nearly identical questions. A few of the Post questions were reworked, from the feedback of adult GC advisors and GC staff, to help make them clearer for the students. Several minor spelling corrections were also made to the Pre Survey text in the Spring. The Pre Survey was completed in part by 91 students during the fall and early winter of 2006. While 91 students' names appear on the survey response report, no more than 56 students answered any one question. (see table 1) Seven students responded to the Post Scans Survey in the spring of 2007, and only 1 student "opted out" of a question, question 20.

On the Pre survey, the lowest response to a question was also number 20, with 15% of the 91 students choosing to answer it. Followed by question 19 (17%), question 31 (28%).

***Finding/recommendation 1:*** Low spring survey response may have been due to the timing of the survey, during the same timeframe as the final project submission. It would also be helpful in promoting student response to both the fall and spring survey to build the survey process into the final project itself, as a required step for completing the GCA.

Some of those who completed the fall Scans survey suggested that the scale be made clearer for students, with narrative description beyond that for only the high and low choices. As a result, the spring survey appeared with all 5 choices defined: 1=not important, 2=least important, 3=somewhat less important, 4=average importance, 5=somewhat more important, 6=most important.

***Finding/recommendation 2:*** In the fall, no choices of 3, 4, or 5 on the scale were made and the vast majority of students (from 60 to 98% of all respondents) made selection 6=most important for all questions. In the spring no selections of the lower end responses, 1 and 2 on the scale, were made and a wider range of selections across the upper portion of the scale was made by the 7 students who took the survey. With the change in scale it is not possible to say that participation in the project alone is the cause for the students' greater differentiation in responses across the survey. Comparison of Y1 pre with Y2 pre results, and Y2 pre to Y2 post results, will help to clarify this result.

Because of the change in scale, low N, and inability to match student pre to their post scores in the spring, significance of gain across the two surveys is not an appropriate measure at this time. However, administering the survey Pre & Post has provided a trial of the Pre/Post method, as well as some insights into the students' changing perceptions of the skills needed and built by their participation in the project.

***Finding/recommendation 3:*** It is recommended that next time the Pre Post surveys are given, answers be collected in a way that makes it possible to match the Pre to Post responses of individual students. Students' participation in the survey will be better

tracked, and their answers can be analyzed for significance of individual gain, a robust measure. Tracking of individual student responses by some method, not necessarily by their names, could also make it possible to compare the surveys of students who complete the project with those who drop, or of students across different regions, etc. in order to learn more from their responses.

Table 1: Percent and Number of Responses to the Fall 2006 & Spring 2007 Student Scans Surveys.

idion	pre							pst								
	not	least	somewhat	average	somewhat	most	total	N	not	least	somewhat	average	somewhat	most	total	N
1	3.33	6.67	0.00	0.00	0.00	90.00	100	30	0.00	0.00	0.00	0.00	57.14	42.86	100	
2	0.00	8.82	0.00	0.00	0.00	91.18	100	34	0.00	0.00	0.00	14.29	28.57	57.14	100	
3	10.00	30.00	0.00	0.00	0.00	60.00	100	20	0.00	0.00	14.29	28.57	28.57	28.57	100	
4	6.90	10.34	0.00	0.00	0.00	82.76	100	29	0.00	0.00	14.29	42.86	28.57	14.29	100	
5	2.33	16.28	0.00	0.00	0.00	81.40	100	43	0.00	0.00	14.29	28.57	42.86	14.29	100	
6	0.00	15.38	0.00	0.00	0.00	84.62	100	39	0.00	0.00	14.29	14.29	42.86	28.57	100	
7	0.00	7.14	0.00	0.00	0.00	92.86	100	56	0.00	0.00	0.00	0.00	28.57	71.43	100	
8	0.00	7.14	0.00	0.00	0.00	92.86	100	42	0.00	0.00	0.00	28.57	28.57	42.86	100	
9	2.50	2.50	0.00	0.00	0.00	95.00	100	40	0.00	0.00	0.00	0.00	85.71	14.29	100	
10	4.35	8.70	0.00	0.00	0.00	86.96	100	23	0.00	0.00	0.00	14.29	71.43	14.29	100	
11	0.00	6.45	0.00	0.00	0.00	93.55	100	31	0.00	0.00	0.00	14.29	57.14	28.57	100	
12	3.13	6.25	0.00	0.00	0.00	90.63	100	32	0.00	0.00	0.00	28.57	57.14	14.29	100	
13	1.79	1.79	0.00	0.00	0.00	96.43	100	56	0.00	0.00	0.00	0.00	14.29	85.71	100	
14	7.41	11.11	0.00	0.00	0.00	81.48	100	27	0.00	0.00	14.29	42.86	28.57	14.29	100	
15	4.00	8.00	0.00	0.00	0.00	88.00	100	25	0.00	0.00	14.29	28.57	28.57	28.57	100	
16	0.00	6.90	0.00	0.00	0.00	93.10	100	29	0.00	0.00	14.29	14.29	42.86	28.57	100	
17	5.88	5.88	0.00	0.00	0.00	88.24	100	51	0.00	0.00	14.29	14.29	28.57	42.86	100	
18	0.00	5.41	0.00	0.00	0.00	94.59	100	37	0.00	0.00	0.00	28.57	28.57	42.86	100	
19	5.26	15.79	0.00	0.00	0.00	78.95	100	19	0.00	0.00	28.57	57.14	14.29	0.00	100	
20	6.25	6.25	0.00	0.00	0.00	87.50	100	16	0.00	0.00	16.67	50.00	16.67	16.67	100	
21	0.00	10.34	0.00	0.00	0.00	89.66	100	29	0.00	0.00	28.57	28.57	28.57	14.29	100	
22	0.00	4.00	0.00	0.00	0.00	96.00	100	50	0.00	0.00	0.00	0.00	42.86	57.14	100	
23	5.88	2.94	0.00	0.00	0.00	91.18	100	34	0.00	0.00	14.29	14.29	42.86	28.57	100	
24	0.00	10.00	0.00	0.00	0.00	90.00	100	30	0.00	0.00	14.29	42.86	14.29	28.57	100	
25	0.00	7.32	0.00	0.00	0.00	92.68	100	41	0.00	0.00	0.00	14.29	71.43	14.29	100	
26	2.86	2.86	0.00	0.00	0.00	94.29	100	35	0.00	0.00	0.00	14.29	71.43	14.29	100	
27	4.88	12.20	0.00	0.00	0.00	82.93	100	41	0.00	0.00	0.00	42.86	14.29	42.86	100	
28	0.00	3.85	0.00	0.00	0.00	96.15	100	26	0.00	0.00	0.00	14.29	42.86	42.86	100	
29	0.00	3.70	0.00	0.00	0.00	96.30	100	27	0.00	0.00	0.00	28.57	0.00	71.43	100	
30	0.00	5.88	0.00	0.00	0.00	94.12	100	34	0.00	0.00	0.00	14.29	28.57	57.14	100	
31	5.26	10.53	0.00	0.00	0.00	84.21	100	19	0.00	0.00	42.86	14.29	28.57	14.29	100	
32	8.70	4.35	0.00	0.00	0.00	86.96	100	23	0.00	0.00	0.00	28.57	71.43	0.00	100	
33	0.00	10.00	0.00	0.00	0.00	90.00	100	20	0.00	0.00	0.00	71.43	28.57	0.00	100	
34	0.00	8.70	0.00	0.00	0.00	91.30	100	23	0.00	0.00	0.00	28.57	71.43	0.00	100	
35	0.00	12.00	0.00	0.00	0.00	88.00	100	25	0.00	0.00	0.00	57.14	28.57	14.29	100	
36	0.00	11.11	0.00	0.00	0.00	88.89	100	27	0.00	0.00	0.00	28.57	42.86	28.57	100	
37	3.57	25.00	0.00	0.00	0.00	71.43	100	28	0.00	0.00	14.29	57.14	14.29	14.29	100	

While comparisons based upon individual student response are not possible from this data, comparison has been made of the range, mean, and standard deviation across the eight groups of questions, for both the Pre and Post Scans Surveys. The unit of measure is the percent of respondents answering each question and selection, drawn from Table 1:

**Descriptive Statistics**

level		N	Minimum	Maximum	Mean	Std. Deviation
Basic	pre not	6	.000	10.000	3.75924	3.982219
	pre least	6	6.667	30.000	14.58312	8.426213
	pre somewhat less	6	.000	.000	.00000	.000000
	pre average	6	.000	.000	.00000	.000000
	pre somewhat more	6	.000	.000	.00000	.000000
	pre most	6	60.000	91.177	81.65763	11.307399
	Valid N (listwise)	6				
Information	pre not	4	.000	5.263	1.31579	2.631580
	pre least	4	3.704	10.526	5.98963	3.183963
	pre somewhat less	4	.000	.000	.00000	.000000
	pre average	4	.000	.000	.00000	.000000
	pre somewhat more	4	.000	.000	.00000	.000000
	pre most	4	84.211	96.296	92.69455	5.742914
	Valid N (listwise)	4				
Interpersonal	pre not	6	.000	5.882	2.26959	2.670372
	pre least	6	2.857	12.195	6.55175	3.937546
	pre somewhat less	6	.000	.000	.00000	.000000
	pre average	6	.000	.000	.00000	.000000
	pre somewhat more	6	.000	.000	.00000	.000000
	pre most	6	82.927	96.000	91.17865	4.574805
	Valid N (listwise)	6				
Personal	pre not	5	.000	7.407	3.81509	2.995238
	pre least	5	1.786	11.111	6.73514	3.391130
	pre somewhat less	5	.000	.000	.00000	.000000
	pre average	5	.000	.000	.00000	.000000
	pre somewhat more	5	.000	.000	.00000	.000000
	pre most	5	81.482	96.429	89.44976	5.681619
	Valid N (listwise)	5				
Resources	pre not	4	.000	6.250	2.87829	3.347892
	pre least	4	5.405	15.790	9.44743	4.746529
	pre somewhat less	4	.000	.000	.00000	.000000
	pre average	4	.000	.000	.00000	.000000
	pre somewhat more	4	.000	.000	.00000	.000000
	pre most	4	78.947	94.595	87.67430	6.532067
			4			

level		N	Minimum	Maximum	Mean	Std. Deviation
Systems	Valid N (listwise)	4				
	pre not	3	.000	8.696	2.89855	5.020436
	pre least	3	4.348	10.000	7.68116	2.959501
	pre somewhat less	3	.000	.000	.00000	.000000
	pre average	3	.000	.000	.00000	.000000
	pre somewhat more	3	.000	.000	.00000	.000000
	pre most	3	86.957	91.304	89.42027	2.231123
Technology	Valid N (listwise)	3				
	pre not	3	.000	3.571	1.19048	2.061966
	pre least	3	11.111	25.000	16.03703	7.774871
	pre somewhat less	3	.000	.000	.00000	.000000
	pre average	3	.000	.000	.00000	.000000
	pre somewhat more	3	.000	.000	.00000	.000000
	pre most	3	71.429	88.889	82.77250	9.834154
Thinking	Valid N (listwise)	3				
	pre not	6	.000	4.348	1.66214	1.915360
	pre least	6	2.500	8.696	6.36383	2.078509
	pre somewhat less	6	.000	.000	.00000	.000000
	pre average	6	.000	.000	.00000	.000000
	pre somewhat more	6	.000	.000	.00000	.000000
	pre most	6	86.957	95.000	91.97402	2.835145
	Valid N (listwise)	6				

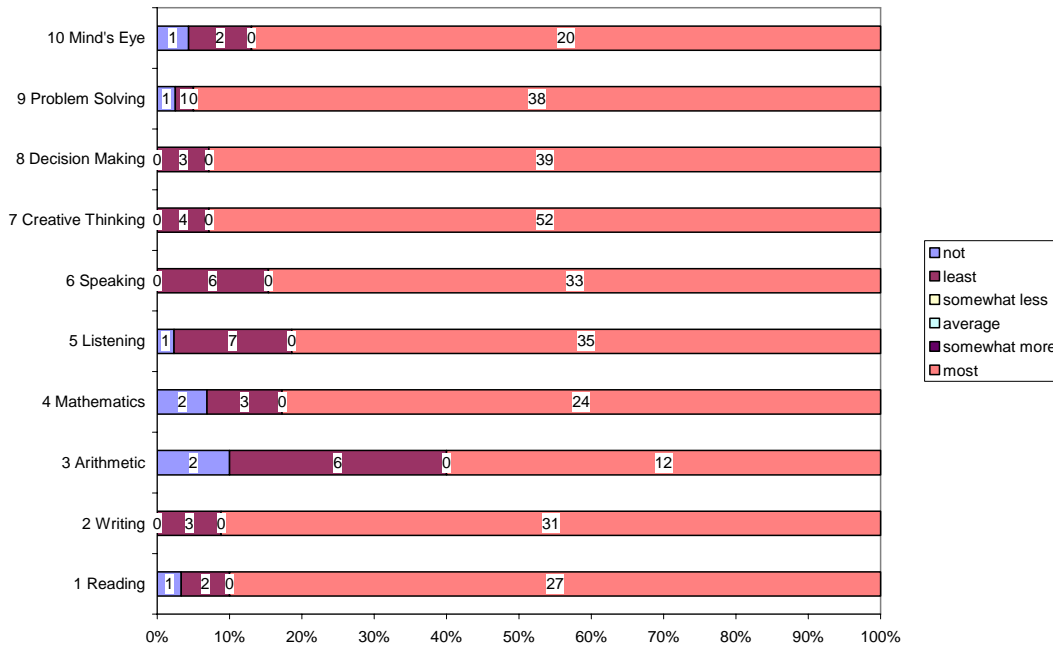
### Descriptive Statistics

level		N	Minimum	Maximum	Mean	Std. Deviation
Basic	pst not	6	.000	.000	.00000	.000000
	pst least	6	.000	.000	.00000	.000000
	pst somewhat less	6	.000	14.286	9.52380	7.377104
	pst average	6	.000	42.857	21.42855	14.982969
	pst somewhat more	6	28.571	57.143	38.09522	11.664258
	pst most	6	14.286	57.143	30.95238	16.700646
	Valid N (listwise)	6				
Information	pst not	4	.000	.000	.00000	.000000
	pst least	4	.000	.000	.00000	.000000
	pst somewhat less	4	.000	42.857	10.71428	21.428550
	pst average	4	14.286	28.571	17.85713	7.142850
	pst somewhat more	4	.000	42.857	24.99998	17.975778
	pst most	4	14.286	71.429	46.42857	24.397502
	Valid N (listwise)	4				
Interpersonal	pst not	6	.000	.000	.00000	.000000
	pst least	6	.000	.000	.00000	.000000

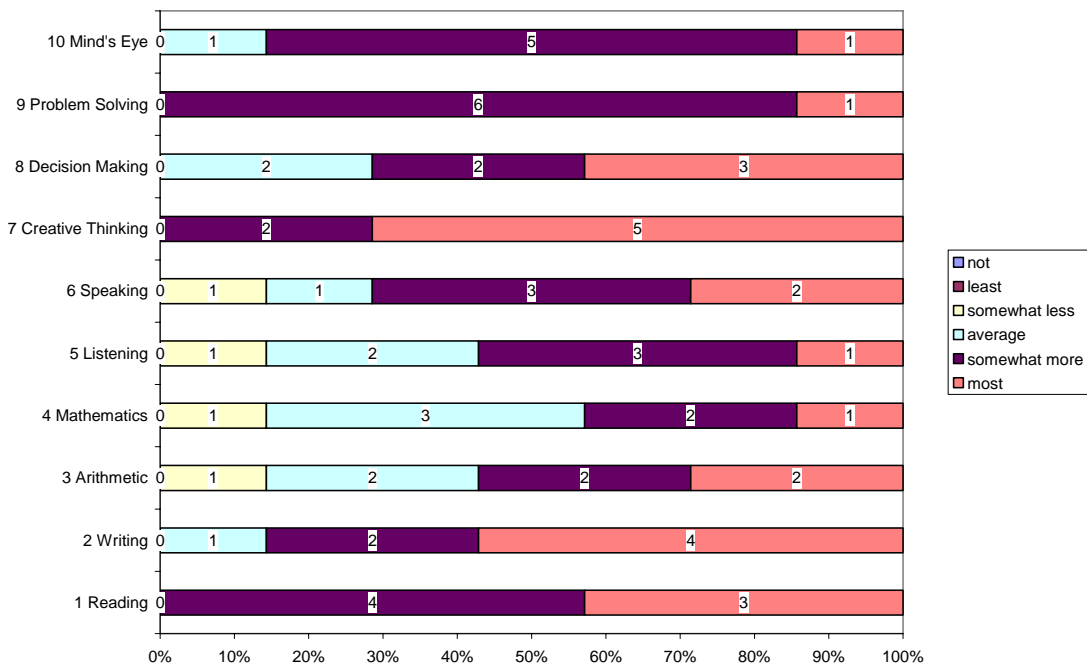
level		N	Minimum	Maximum	Mean	Std. Deviation
Personal	pst somewhat less	6	.000	14.286	4.76190	7.377104
	pst average	6	.000	42.857	21.42855	17.496338
	pst somewhat more	6	14.286	71.429	42.85713	25.555082
	pst most	6	14.286	57.143	30.95238	16.700646
	Valid N (listwise)	6				
	pst not	5	.000	.000	.00000	.000000
	pst least	5	.000	.000	.00000	.000000
	pst somewhat less	5	.000	14.286	11.42856	6.388759
	pst average	5	.000	42.857	19.99998	16.288204
	pst somewhat more	5	14.286	42.857	28.57140	10.101515
	pst most	5	14.286	85.714	40.00000	27.479120
Resources	Valid N (listwise)	5				
	pst not	4	.000	.000	.00000	.000000
	pst least	4	.000	.000	.00000	.000000
	pst somewhat less	4	.000	28.571	18.45238	13.521195
	pst average	4	28.571	57.143	41.07143	14.725409
	pst somewhat more	4	14.286	28.571	22.02380	7.622748
	pst most	4	.000	42.857	18.45238	17.857143
	Valid N (listwise)	4				
	pst not	3	.000	.000	.00000	.000000
	pst least	3	.000	.000	.00000	.000000
	pst somewhat less	3	.000	.000	.00000	.000000
Systems	pst average	3	28.571	71.429	42.85713	24.743616
	pst somewhat more	3	28.571	71.429	57.14287	24.743616
	pst most	3	.000	.000	.00000	.000000
	Valid N (listwise)	3				
	pst not	3	.000	.000	.00000	.000000
	pst least	3	.000	.000	.00000	.000000
	pst somewhat less	3	.000	14.286	4.76190	8.247853
	pst average	3	28.571	57.143	47.61907	16.495763
	pst somewhat more	3	14.286	42.857	28.57140	14.285700
	pst most	3	14.286	28.571	19.04762	8.247861
	Valid N (listwise)	3				
Technology	pst not	6	.000	.000	.00000	.000000
	pst least	6	.000	.000	.00000	.000000
	pst somewhat less	6	.000	.000	.00000	.000000
	pst average	6	.000	28.571	14.28570	12.777519
	pst somewhat more	6	28.571	85.714	54.76192	22.886908
	pst most	6	14.286	71.429	30.95238	22.886885
	Valid N (listwise)	6				
	pst not	6	.000	.000	.00000	.000000
	pst least	6	.000	.000	.00000	.000000
	pst somewhat less	6	.000	.000	.00000	.000000
	pst average	6	.000	28.571	14.28570	12.777519
Thinking	pst somewhat more	6	28.571	85.714	54.76192	22.886908
	pst most	6	14.286	71.429	30.95238	22.886885
	Valid N (listwise)	6				
	pst not	6	.000	.000	.00000	.000000
	pst least	6	.000	.000	.00000	.000000
	pst somewhat less	6	.000	.000	.00000	.000000
	pst average	6	.000	28.571	14.28570	12.777519
	pst somewhat more	6	28.571	85.714	54.76192	22.886908
	pst most	6	14.286	71.429	30.95238	22.886885
	Valid N (listwise)	6				

The following graphs provide a visual overview of students' responses to the Pre and Post Scans Surveys.<sup>8</sup>

**Pre Scans Survey -- N=56 responses by 91 Students, Q 1-10**



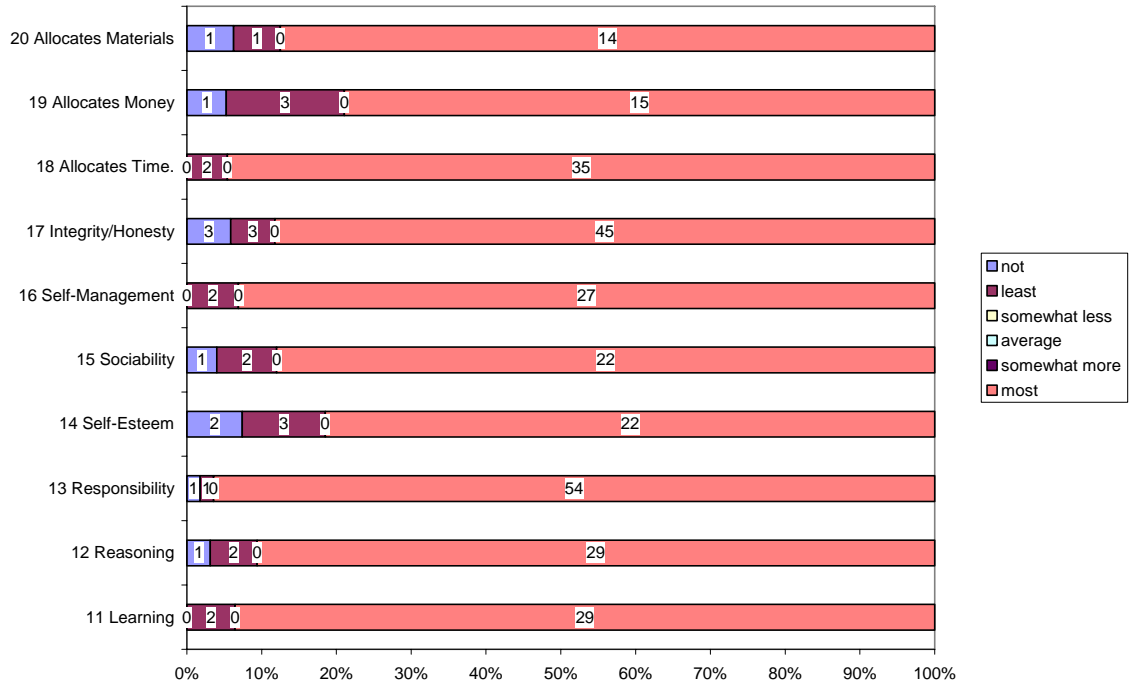
**Post Scans Survey -- N=7 Students, Q 1-10**



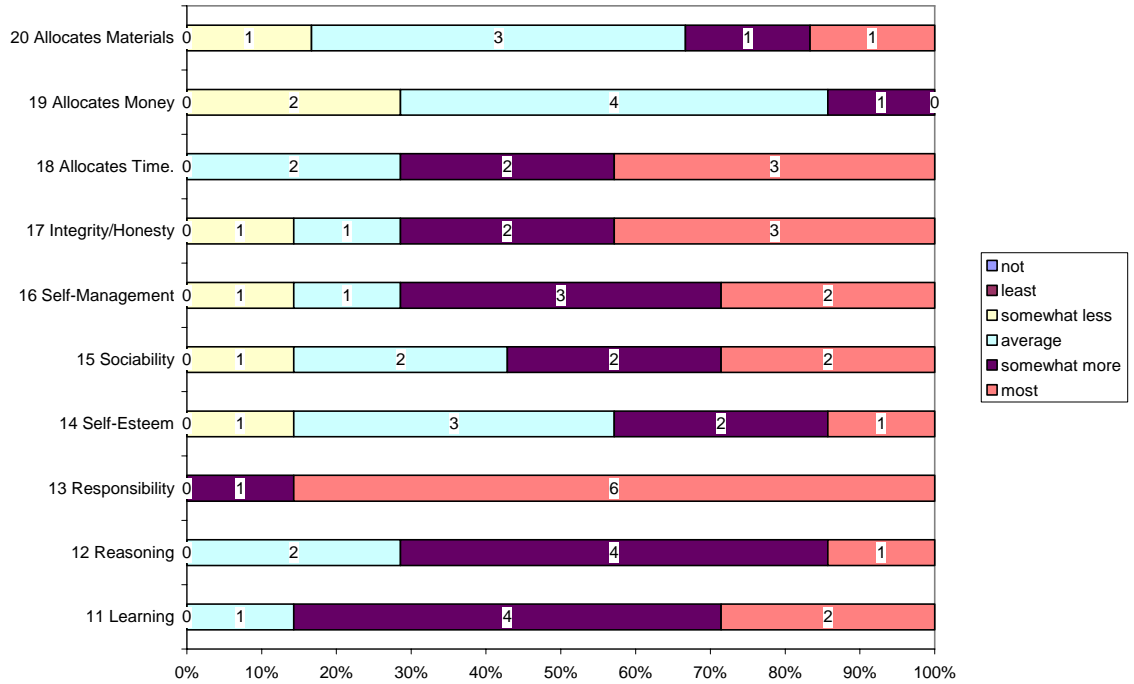
<sup>8</sup> See the final two pages of this TR#2 for a graph of the pre test results that represents the “no response” data.

1. Reading. Locates, understands, and interprets written information in prose and documents--including manuals, graphs, and schedules--to perform tasks; learns from text by determining the main idea or essential message; identifies relevant details, facts, and specifications; infers or locates the meaning of unknown or technical vocabulary; and judges the accuracy, appropriateness, style, and plausibility of reports, proposals, or theories of other writers.
2. Writing. Communicates thoughts, ideas, information, and messages in writing; records information completely and accurately; composes and creates documents such as letters, directions, manuals, reports, proposals, graphs, flow charts; uses language, style, organization, and format appropriate to the subject matter, purpose, and audience. Includes supporting documentation and attends to level of detail; checks, edits, and revises for correct information, appropriate emphasis, form, grammar, spelling, and punctuation.
3. Arithmetic. Performs basic computations; uses basic numerical concepts such as whole numbers and percentages in practical situations; makes reasonable estimates of arithmetic results without a calculator; and uses tables, graphs, diagrams, and charts to obtain or convey quantitative information.
4. Mathematics. Approaches practical problems by choosing appropriately from a variety of mathematical techniques; uses quantitative data to construct logical explanations for real world situations; expresses mathematical ideas and concepts orally and in writing; and understands the role of chance in the occurrence and prediction of events.
5. Listening. Receives, attends to, interprets, and responds to verbal messages and other cues such as body language in ways that are appropriate to the purpose; for example, to comprehend; to learn; to critically evaluate; to appreciate; or to support the speaker.
6. Speaking. Organizes ideas and communicates oral messages appropriate to listeners and situations; participates in conversation, discussion, and group presentations; selects an appropriate medium for conveying a message; uses verbal language and other cues such as body language appropriate in style, tone, and level of complexity to the audience and the occasion; speaks clearly and communicates a message; understands and responds to listener feedback; and asks questions when needed.
7. Creative Thinking. Uses imagination freely, combines ideas or information in new ways, makes connections between seemingly unrelated ideas, and reshapes goals in ways that reveal new possibilities.
8. Decision Making. Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternatives.
9. Problem Solving. Recognizes that a problem exists (i.e., there is a discrepancy between what is and what should or could be), identifies possible reasons for the discrepancy, and devises and implements a plan of action to resolve it. Evaluates and monitors progress, and revises plan as indicated by findings.
10. Seeing Things in the Mind's Eye. Organizes and processes symbols, pictures, graphs, objects or other information; for example, sees a building from a blueprint, a system's operation from schematics, the flow of work activities from narrative descriptions, or the taste of food from reading a recipe.

Pre Scans Survey -- N=56 responses by 91 Students, Q 11-20

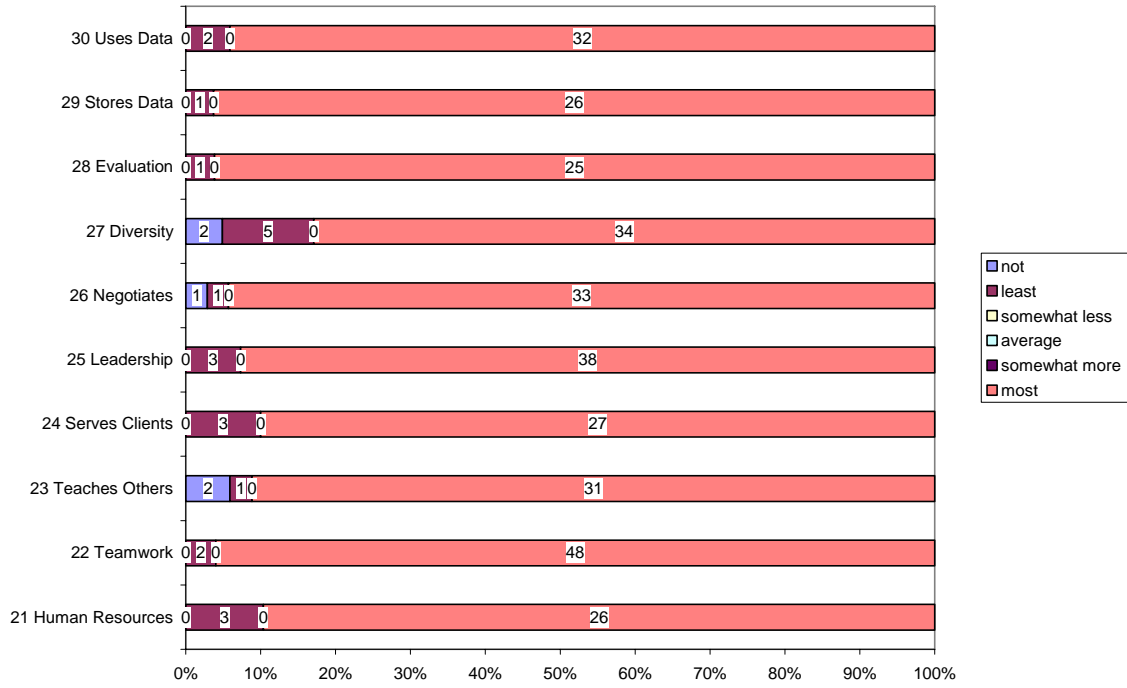


Post Scans Survey -- N=7 Students, Q 11-20

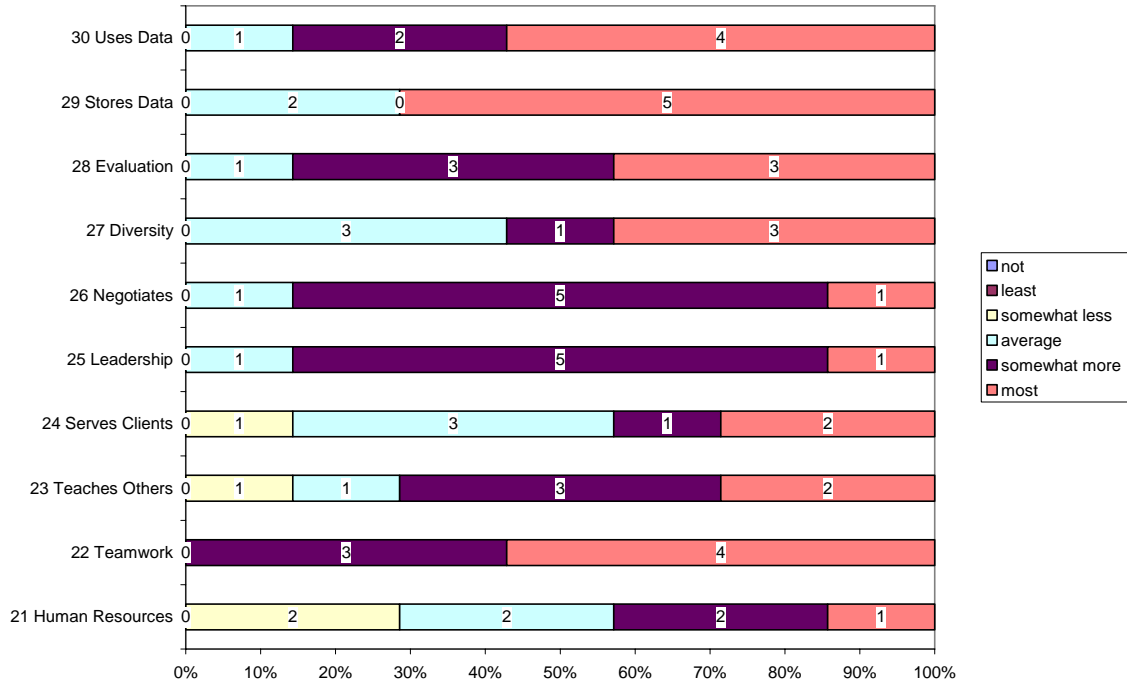


11. **Knowing How to Learn.** Recognizes and can use learning techniques to apply and adapt new knowledge and skills in both familiar and changing situations. Involves being aware of learning tools such as personal learning styles (visual, aural, etc.), formal learning strategies (notetaking or clustering items that share some characteristics), and informal learning strategies (awareness of unidentified false assumptions that may lead to faulty conclusions).
12. **Reasoning.** Discovers a rule or principle underlying the relationship between two or more objects and applies it in solving a problem. For example, uses logic to draw conclusions from available information, extracts rules or principles from a set of objects or written text; applies rules and principles to a new situation, or determines which conclusions are correct when given a set of facts and a set of conclusions.
13. **Responsibility.** Exerts a high level of effort and perseverance towards goal attainment. Works hard to become excellent at doing tasks by setting high standards, paying attention to details working well, and displaying a high level of concentration even when assigned an unpleasant task. Displays high standards of attendance punctuality, enthusiasm, vitality, and optimism in approaching and completing tasks.
14. **Self-Esteem.** Believes in own self worth and maintains a positive view of self; demonstrates knowledge of own skills and abilities; is aware of impact on others; and knows own emotional capacity and needs and how to address them.
15. **Sociability.** Demonstrates understanding friendliness, adaptability, empathy, and politeness in new and on-going group settings. Asserts self in familiar and unfamiliar social situations; relates well to others; responds appropriately as the situation requires; and takes an interest in what others say and do.
16. **Self-Management.** Assesses own knowledge, skills, and abilities accurately; sets well-defined and realistic personal goals; monitors progress toward goal attainment and motivates self through goal achievement; exhibits self-control and responds to feedback unemotionally and nondefensively; is a "self-starter."
17. **Integrity/Honesty.** Can be trusted. Recognizes when faced with making a decision or exhibiting behavior that may break with commonly held personal or societal values; understands the impact of violating these beliefs and codes on an organization, self, and others; and chooses an ethical course of action.
18. **Allocates Time.** Selects relevant, goal-related activities, ranks them in order of importance, allocates time to activities, and understands, prepares, and follows schedules.
19. **Allocates Money.** Uses or prepares budgets, including making cost and revenue forecasts, keeps detailed records to track budget performance, and makes appropriate adjustments.
20. **Allocates Material and Facility Resources.** Acquires, stores, and distributes materials, supplies, parts, equipment, space, or final products in order to make the best use of them.

Pre Scans Survey -- N=56 responses by 91 Students, Q 21-30

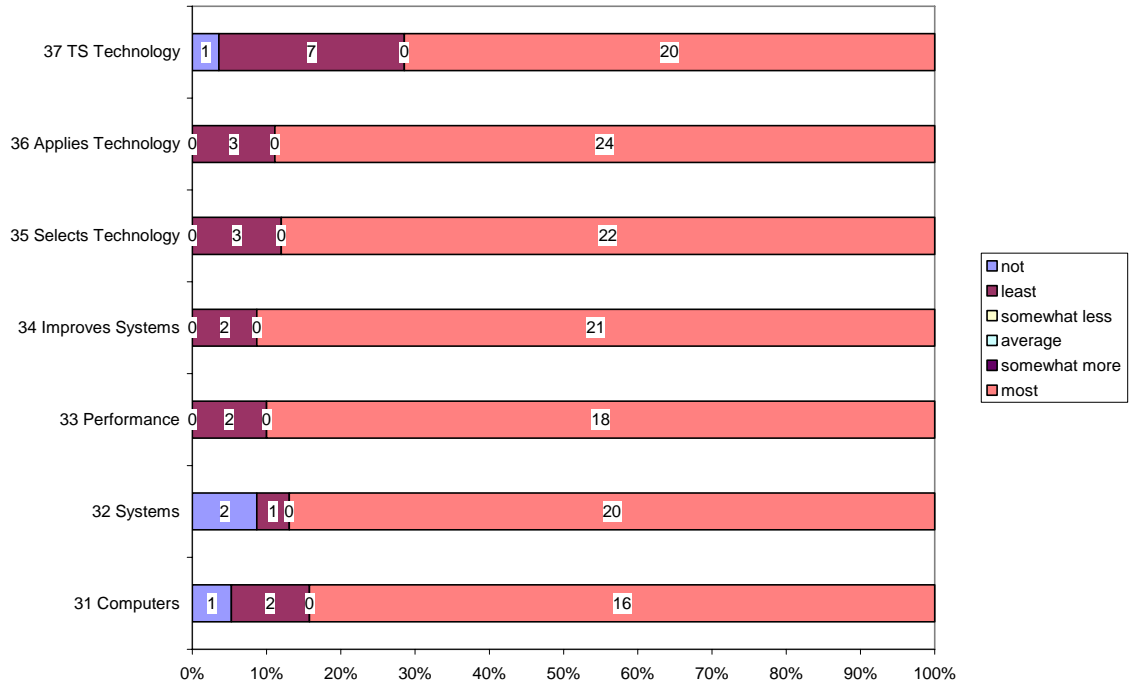


Post Scans Survey -- N=7 Students, Q 21-30

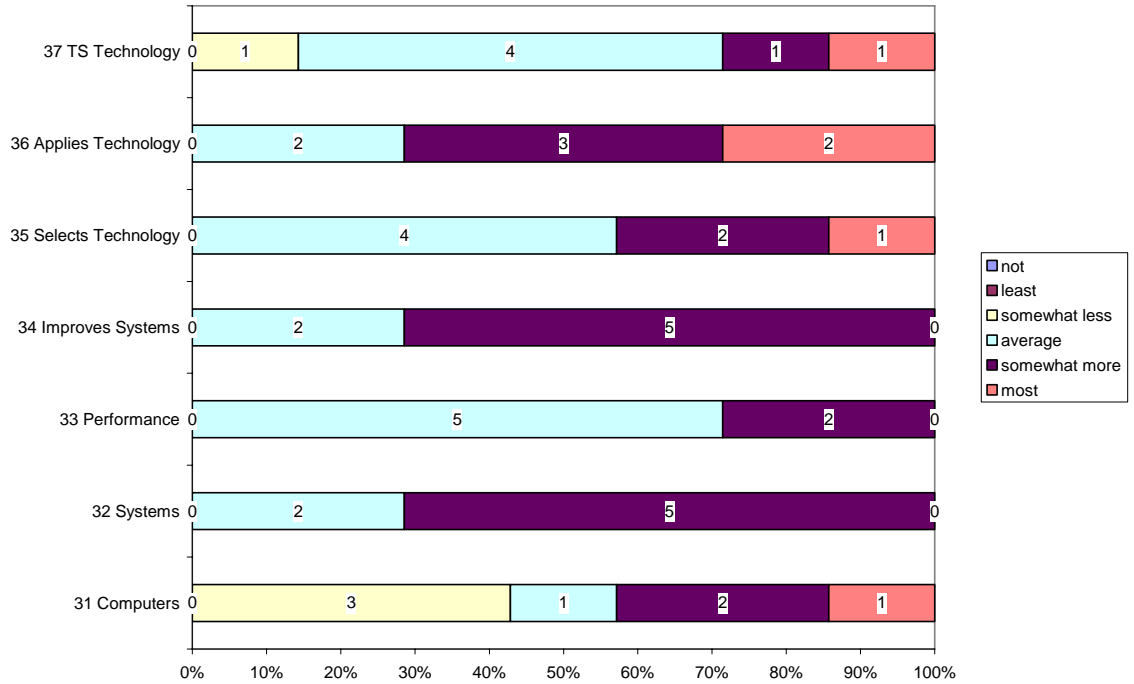


21. Allocates Human Resources. Assesses knowledge and skills and distributes work accordingly, evaluates performance, and provides feedback.
22. Participates as a Member of a Team. Works cooperatively with others and contributes to group with ideas, suggestions, and effort.
23. Teaches Others. Helps others learn.
24. Serves Clients/Customers. Works and communicates with clients and customers to satisfy their expectations.
25. Exercises Leadership. Communicates thoughts, feelings, and ideas to justify a position, encourages, persuades, convinces, or otherwise motivates an individual or groups, including responsibly challenging existing procedures, policies, or authority.
26. Negotiates. Works towards an agreement that may involve exchanging specific resources or resolving divergent interests.
27. Works with Cultural Diversity. Works well with men and women and with a variety of ethnic, social, or educational backgrounds.
28. Acquires and Evaluates Information. Identifies need for data, obtains it from existing sources or creates it, and evaluates its relevance and accuracy.
29. Organizes and Maintains Information. Organizes, processes, and maintains written or computerized records and other forms of information in a systematic fashion.
30. Interprets and Communicates Information. Selects and analyzes information and communicates the results to others using oral, written, graphic, pictorial, or multi-media methods.

Pre Scans Survey -- N=56 responses by 91 Students, Q 31-37

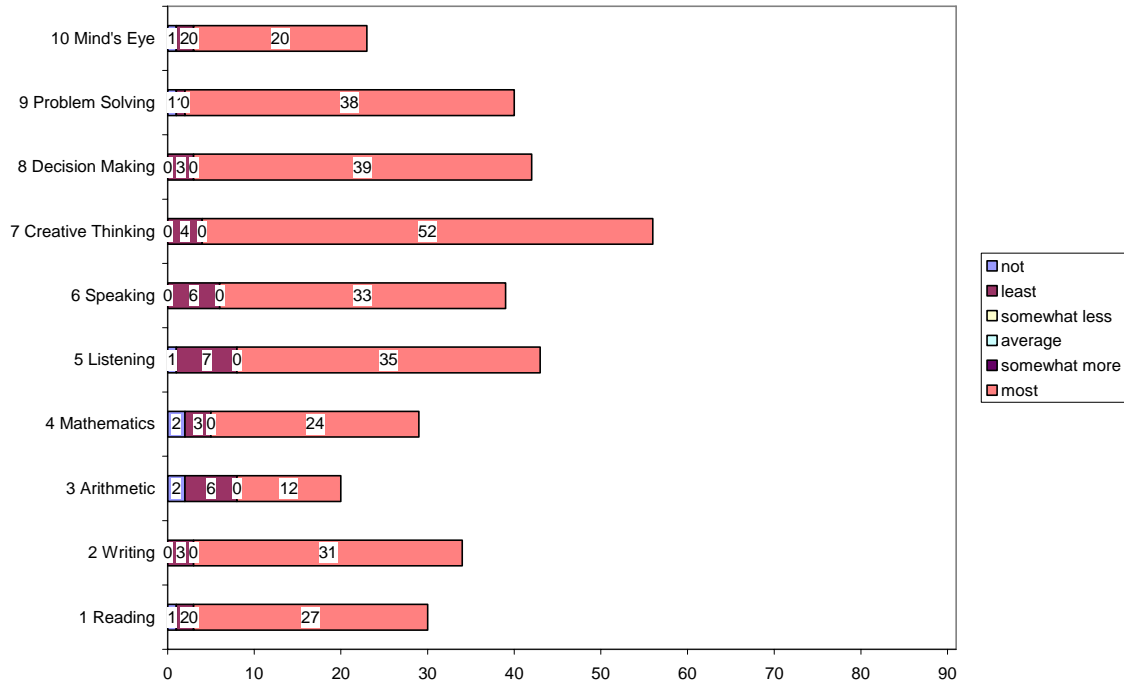


Post Scans Survey -- N=7 Students, Q 31-37

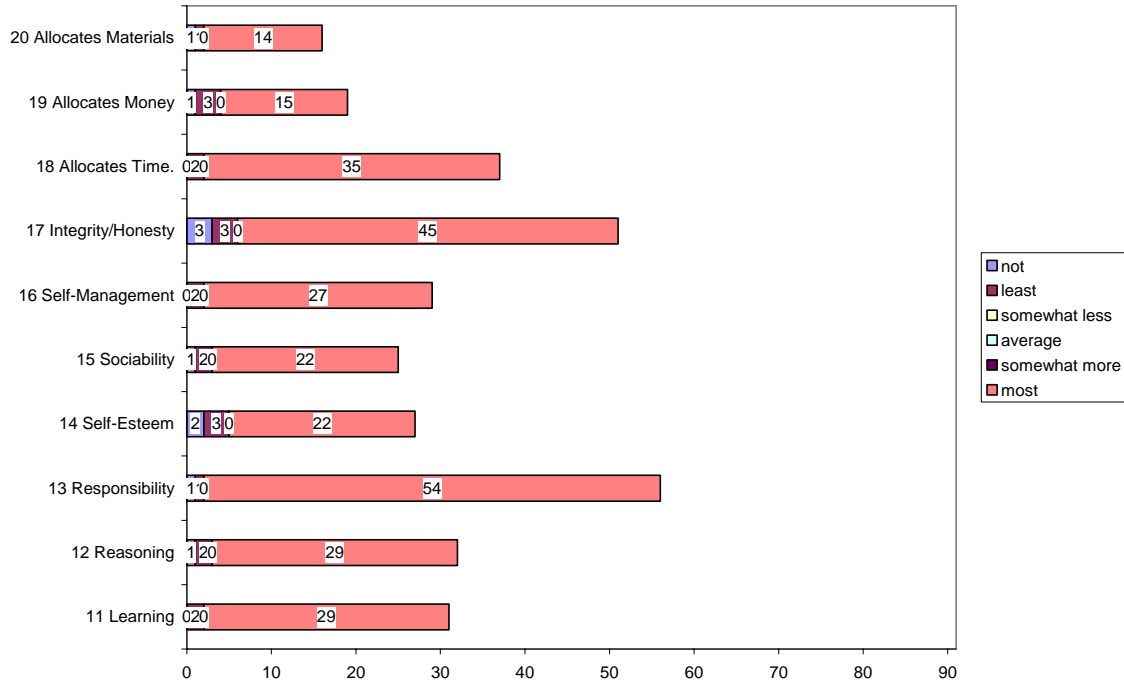


31. Uses Computers to Process Information. Employs computers to acquire, organize, analyze, and communicate information.
32. Understands Systems. Knows how social, organizational, and technological systems work and operates effectively within them.
33. Monitors and Corrects Performance. Distinguishes trends, predicts impact of actions on system operations, diagnoses deviations in the function of a system/ organization, and takes necessary action to correct performance.
34. Improves and Designs Systems. Makes suggestions to modify existing systems to improve products or services, and develops new or alternative systems.
35. Selects Technology. Judges which set of procedures, tools, or machines, including computers and their programs, will produce the desired results.
36. Applies Technology to Task. Understands the overall intent and the proper procedures for setting up and operating machines, including computers and their programming systems.
37. Maintains and Troubleshoots Technology. Prevents, identifies, or solves problems in machines, computers, and other technologies.

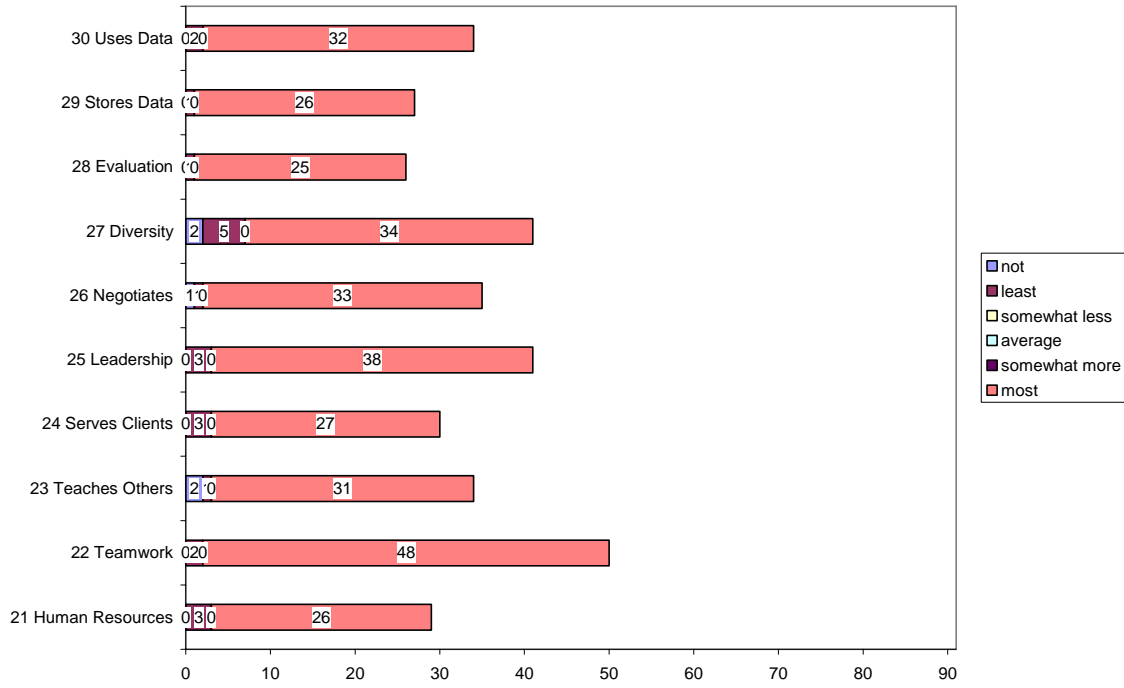
Pre Scans Survey -- N=56 responses by 91 Students, Q 1-10



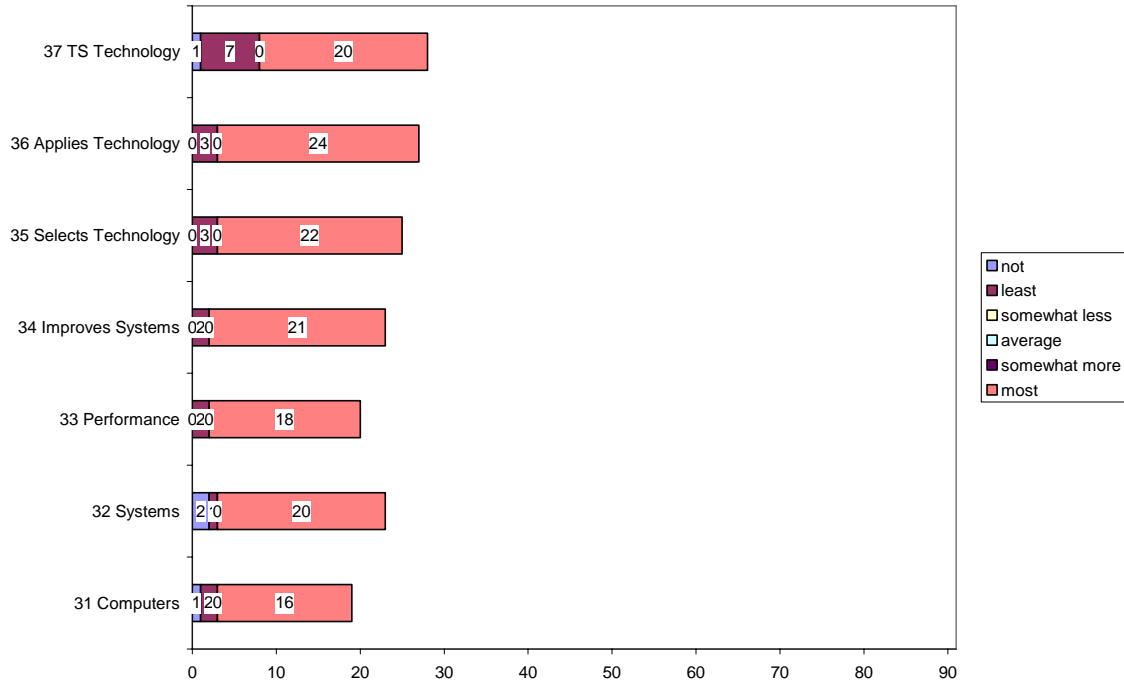
Pre Scans Survey -- N=56 responses by 91 Students, Q 11-20



Pre Scans Survey -- N=56 responses by 91 Students, Q 21-30



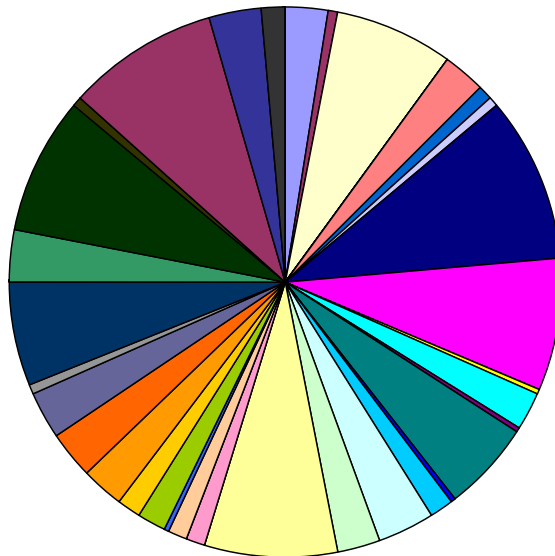
Pre Scans Survey -- N=56 responses by 91 Students, Q 31-37



# Technical Report #3 – Responses to the Global Challenge Student Post Survey Spring 2007

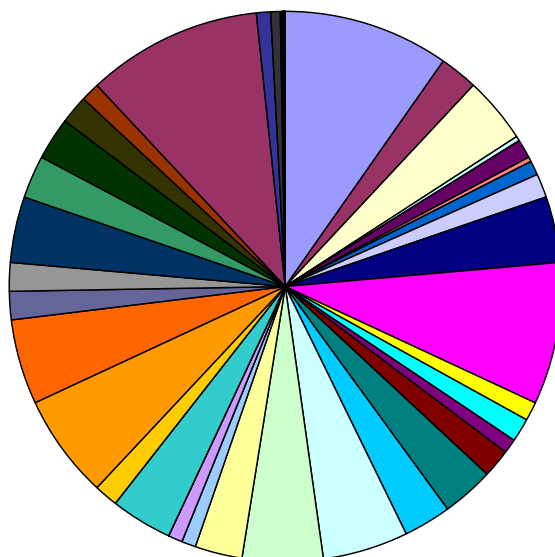
10 students and 12 adults completed the survey.

GC Students Spring 2007 Narrative Survey Coding Report



- -left blank-
- advisors
- amount of work
- be patient
- business plan
- calander
- challenging
- check our work
- collaborate
- communication
- confused
- contest
- different levels
- disappointed
- enthusiasm
- fun
- GC staff
- global experience
- Internet
- limited time
- make it fun
- Never told any of them
- non-curricular
- nothing
- parents
- plan & focus
- promise
- proud
- provide help
- real research
- relevant
- rubric
- schoolwork
- Start early
- STEM
- subject experts
- take time
- teammates
- unexpected outcomes
- unique

GC Adults Spring 2007 Narrative Survey Coding Report



- -left blank-
- advisors
- amount of work
- be patient
- business plan
- calander
- challenging
- check our work
- collaborate
- communication
- confused
- contest
- different levels
- disappointed
- enthusiasm
- fun
- GC staff
- global experience
- Internet
- limited time
- make it fun
- Never told any of them
- non-curricular
- nothing
- parents
- plan & focus
- promise
- proud
- provide help
- real research
- relevant
- rubric
- schoolwork
- Start early
- STEM
- subject experts
- take time
- teammates
- unexpected outcomes
- unique

For purposes of comparison, the Adult Survey responses are shown as well. Roughly the same percentage of Adults (12 of 69 eligible) as Students (10 of 67) completed the Post survey, which was nearly identical to the student survey thus prompting the same kinds of themes to rise from the data. Both surveys were coded with NVivo, with the student survey coded first, and additional themes which rose from the adult survey revisited for relevance in the student file. The unit of measure for the tables that follow is a coding occurrence, which may be a sentence, a partial sentence, or in the case of “left blank” and auto-fill which the software generates when no response is made. Codes which appear most often, those which are found in more than 5% of a document, are common to both groups in some cases. Other unique coding themes are found for both the adult and the student groups.

**Table 1 – Percent of Themes Rising Most Often**

Theme	Students	Adults
Collaborate	10%	
Teammates	9%	10%
Communication	8%	8%
STEM	8%	
Limited Time	8%	
Amount of Work	7%	
Schoolwork	6%	
Enthusiasm	5%	
Left Blank		10%
Provide Help		6%
Global Experience		5%
Internet		5%
Real Research		5%

The total numbers of coded passages for each data set are shown in Table 1.

**Table 2 – Total Number of Coded Passages**

	Students	Adults
Collaborate	26	11
Teammates	24	28
STEM	22	7
Communication	21	23
Limited Time	21	8
Amount Of Work	19	11
Schoolwork	17	11
Enthusiasm	14	8
Global Experience	9	14

	Students	Adults
Start Early	8	7
Relevant	8	5
Unexpected Outcomes	8	3
~Left Blank~	7	27
Provide Help	7	17
Real Research	7	14
Internet	7	13
Calendar	7	1
Contest	6	4
GC Staff	4	8
Proud	4	4
Unique	4	1
Promise	4	0
Never Told Any Of Them	3	0
Nothing	3	0
Subject Experts	2	5
Check Our Work	2	4
Challenging	2	2
Advisors	1	6
Rubric	1	4
Confused	1	3
Different Levels	1	2
Fun	1	0
Parents	1	0
Plan & Focus	0	10
Disappointed	0	5
Business Plan	0	3
Take Time	0	3
Make It Fun	0	2
Non-Curricular	0	2
Be Patient	0	1
Worried	0	1

Additional summarizing will take place to combine these themes into sets of explanatory coding. At this time, all of the answers to the specific questions asked in the surveys are accessible on the Personal Learning Plan administrators' website. The coding that appears below has "risen" from the three most often found themes, for students and adults. The high number of responses "left blank" in the adult survey (10% of the total coding) suggests that the questions may not have seemed as relevant to those participants as they did to the students, who left fewer questions unanswered.

Note that some of the passages coded for one theme (such as collaborate) may also be coded for another (communication, teamwork, etc.) and so one passage may contribute to the counts for multiple themes. [due to many spelling irregularities, the text of these responses has been edited to represent US/English format]

### **Collaborate & Students (10% of total coding)**

Document 'Student Survey spring 2007', 26 passages, 3851 characters.

Paragraph 12, 186 characters.

I agree with a common expression that "the future is in our hands", therefore, being able to collaborate in a meaningful project such as this one provided me with an opportunity to help.

Paragraph 14, 76 characters.

the support from our parents and the communication with my classmate (partner)

Paragraph 16, 196 characters.

The tireless help of Sally O'Rourke helping the team when it lost its international team and subsequently a local team member and the help of David Gibson to initially focus the team's mission.

Paragraph 17, 11 characters.

the e-folio

Paragraph 18, 98 characters.

In the initial stages, the guidance and gentle prodding of the organizers helped to keep us going.

Paragraph 18, 319 characters.

And once we were well into the project we were lucky to find many people - experts in their own fields - to help us with those aspects of the project that we could not discuss with authority on our own. The support of these subject experts who were willing to share knowledge and time with us were our greatest support.

Paragraph 19, 158 characters.

The most helpful support we got as a team was from the advisors we had - both from Global Challenge, as well as those we were lucky enough to find to help us.

Paragraph 21, 105 characters.

What I found most helpful were different people that helped us along with all of the research that we did

Paragraph 26, 77 characters.

it wasn't always easy to find time when both sides are available for meetings.

Paragraph 27, 24 characters.

local teammates who left

Paragraph 28, 268 characters.

Definitely communication. Forming a team under these circumstances is not difficult. The great difficulty lies in what happens after the team is formed. Our team had almost no communication, and, because of that, we foundered, and never managed to even create an idea.

Paragraph 30, 328 characters.

One of the greatest barriers we faced was the difficulty in maintaining communication with our American counterparts. We faced trouble because of exams over here, and they faced trouble due to technical difficulty and illnesses. It worked out just fine, but it did pose a challenge, and slowed us down in the middle for a while.

Paragraph 32, 171 characters.

it was difficult finding another team to work with and by the time that we did, we were already part way through the year and we had to work more quickly than we hoped to.

Paragraph 33, 120 characters.

communication, and decision making was difficult on a international scale... but that was what the project was all about

Paragraph 39, 155 characters.

I had expected a lot more. This is no fault of the administration. The main problem was that we never really came together as a team to work on the project.

Paragraph 40, 428 characters.

We had expected the project to be a lot less complicated than it turned out to be. Every time we'd finalize a section, one of us would find a new interesting bit that we just had to include. We needed more than my expected amount of editing and compromise. It was also harder than I'd have thought to coordinate with our American counterparts. The experience was harder than we'd expected, but just as enriching as we had hoped!

Paragraph 45, 154 characters.

Yes. It was more than I thought, in the best of the experiences. I expected group work and difficult months ahead, but never planned it to be so exciting!

Paragraph 51, 250 characters.

I also realized the hard way that sections like bibliography and appendix take longer than one would expect, so we would advise to target to finish the project at least a week before the actual deadline - somehow there is ALWAYS something more to do!

Paragraph 52, 61 characters.

I would advise to start dividing up sections of work quickly.

Paragraph 52, 160 characters.

It is important to finish research and set an idea quick so that more specific research can be done individually depending on the section that is being handled.

Paragraph 53, 66 characters.

Pace yourselves, or you'll be quiet gloomy when the due day comes.

Paragraph 55, 41 characters.

use an instant, or "live" messaging program

Paragraph 55, 66 characters.

schedule meetings when everyone will go online and talk real time.

Paragraph 56, 89 characters.

Form a good relationship between the group members, its the key to the project's success.

Paragraph 76, 88 characters.

I would tell mentors to try to be very involved in the project and again encourage work.

Paragraph 80, 156 characters.

If possible, hold several "paries" online for all the team members to let them communicate together and to gather fantastic ideas through online discussion.

### **Teammates & Students (8% of total coding)**

Paragraph 27, 45 characters.

International teammates who were unresponsive

Paragraph 27, 24 characters.

local teammates who left

Paragraph 28, 268 characters.

Definitely communication. Forming a team under these circumstances is not difficult. The great difficulty lies in what happens after the team is formed. Our team had almost no communication, and, because of that, we foundered, and never managed to even create an idea.

Paragraph 32, 122 characters.

I think the speed of communication was difficult since we were working with students in a completely different time zone.

Paragraph 32, 171 characters.

it was difficult finding another team to work with and by the time that we did, we were already part way through the year and we had to work more quickly than we hoped to.

Paragraph 39, 155 characters.

I had expected a lot more. This is no fault of the administration. The main problem was that we never really came together as a team to work on the project.

Paragraph 40, 428 characters.

We had expected the project to be a lot less complicated than it turned out to be. Every time we'd finalize a section, one of us would find a new interesting bit that we just had to include. We needed more than my expected amount of editing and compromise. It was also harder than I'd have thought to coordinate with our American counterparts. The experience was harder than we'd expected, but just as enriching as we had hoped!

Paragraph 48, 82 characters.

Find out how devoted your partners are before start doing the project with them.

Paragraph 50, 218 characters.

Be sure to communicate with your potential teammates before deciding to join with them. It mainly comes down to communication with the rest of your team, both before deciding to join with them and during the challenge.

Paragraph 51, 116 characters.

My advice to future participants would be to establish regular communication as soon as possible with all concerned.

Paragraph 52, 61 characters.

I would advice to start dividing up sections of work quickly.

Paragraph 52, 160 characters.

It is important to finish research and set an idea quick so that more specific research can be done individually depending on the section that is being handled.

Paragraph 55, 109 characters.

use an instant, or "live" messaging program. schedule meetings when everyone will go online and talk real time.

Paragraph 56, 89 characters.

Form a good relationship between the group members, its the key to the project's success.

Paragraph 73, 129 characters.

I think it is important for mentors of the two halves of a team to be communication with each other as well as with the students.

Paragraph 74, 117 characters.

It might have been good for mentors to talk to each other, and each other's students and not only the two under them.

Paragraph 80, 156 characters.

If possible, hold several "paries" online for all the team members to let them communicate together and to gather fantastic ideas through online discussion.

(IN RESPONSE TO "HOW DID YOU HEAR ABOUT GC?")

Paragraph 157, 36 characters.

My classmate (partner) told me that.

Paragraph 159, 16 characters.

A friend told me

Paragraph 161, 102 characters.

A friend who had heard of Global Challenge before, invited me to complete the Indian half of the team.

Paragraph 162, 13 characters.

Word of mouth

Paragraph 164, 16 characters.

Through a Friend

Paragraph 165, 13 characters.

from a friend

Paragraph 166, 16 characters.

Through a friend

**Limited Time & Students (8% of total coding)**

Paragraph 26, 55 characters.

We had limited time, so we didn't do some of the STEMS.

Paragraph 26, 77 characters.

it wasn't always easy to find time when both sides are available for meetings.

Paragraph 27, 34 characters.

balancing GC work with schoolwork.

Paragraph 29, 399 characters.

The deadlines of the Global Challenge were so placed, that the bulk of the work started to take shape just as our exams here in India drew close. Our project required research and understanding on a level that was way beyond what we had initially expected, and we found it quite a challenge to balance our work for this project with board exams - for preparation, preliminary exams, and final exams.

Paragraph 29, 173 characters.

There was really only two or three weeks between the end of our finals and the final deadline of Global Challenge, and we found it difficult to manage all our work together.

Paragraph 30, 328 characters.

One of the greatest barriers we faced was the difficulty in maintaining communication with our American counterparts. We faced trouble because of exams over here, and they faced trouble due to technical difficulty and illnesses. It worked out just fine, but it did pose a challenge, and slowed us down in the middle for a while.

Paragraph 31, 8 characters.

Time gap

Paragraph 32, 122 characters.

I think the speed of communication was difficult since we were working with students in a completely different time zone.

Paragraph 32, 171 characters.

it was difficult finding another team to work with and by the time that we did, we were already part way through the year and we had to work more quickly than we hoped to.

Paragraph 47, 49 characters.

never put things unfinished until the last minute

Paragraph 49, 54 characters.

Start early, work hard, hold yourself to deadlines!!!!

Paragraph 50, 77 characters.

First of all, get involved early, give yourself plenty of time to do things.

Paragraph 51, 103 characters.

It is important to distribute work quickly so that there is ample time to trouble shoot and do editing.

Paragraph 51, 250 characters.

I also realized the hard way that sections like bibliography and appendix take longer than one would expect, so we would advice to target to finish the project at least a week before the actual deadline - somehow there is ALWAYS something more to do!

Paragraph 52, 160 characters.

It is important to finish research and set an idea quick so that more specific research can be done individually depending on the section that is being handled.

Paragraph 53, 66 characters.

Pace yourselves, or you'll be quiet gloomy when the due day comes.

Paragraph 54, 233 characters.

I would suggest that you start working as early as possible. I didn't realize how much work we had to put in until it was too late. At the beginning at least start out by doing STEM challenges and try to follow along on the calendar.

Paragraph 55, 23 characters.

manage your time well,

Paragraph 56, 57 characters.

Start as soon as possible, never leave any details behind

Paragraph 69, 91 characters.

If possible, check our works regularly so that most teams can accomplish the tasks on time.

Paragraph 84, 161 characters.

Global Challenge needs to take into consideration academic pressures (school finals, board exams, entrance exams etc...) of countries other than the United States.

### **Teammates & Adults (8% of total coding)**

Paragraph 9, 54 characters.

chance for students to work with an international team

Paragraph 21, 90 characters.

I kept trying to get my students interested in working with students from other countries.

Paragraph 26, 52 characters.

Adult Team Advisor of country and International team

Paragraph 36, 183 characters.

my son was extremely interested but the involvement of the other students from Italy and from the group in California was less regular and so at a certain point the thing was dropped

Paragraph 39, 106 characters.

Disappointed - I could only contact one team member. The rest of his team never responded or participated.

Paragraph 44, 101 characters.

Our students learned about solar power and environmental issues. They also learned to work together.

Paragraph 46, 134 characters.

The two students I worked with are very involved in science to begin with. This project only helped channel their thirst for learning.

Paragraph 52, 77 characters.

Only slightly. His project could not get off the ground without team support.

Paragraph 58, 183 characters.

It takes time to find the right team - put the work into finding the best match team for you  
-Create a plan with your international team on how you will work together in an equal way

Paragraph 62, 261 characters.

to choose partners both in their team and in the counterpart more accurately, so that communication can be easier and work can be distributed evenly, also to consider in the choice the time zones, it's quite difficult to keep in touch with 9-10 hours difference

Paragraph 63, 141 characters.

Don't wait for deadlines - get your work done as early as possible. Plan for periods when team members will be unavailable due to exams, etc.

Paragraph 64, 112 characters.

If they want to be happy and proceed the project well, I hope they should enjoy it and interact with each other.

Paragraph 65, 83 characters.

Make sure you have willing team members, with whom you can communicate effectively.

Paragraph 65, 60 characters.

Start early- so you have the option to change group members.

Paragraph 68, 64 characters.

Watch out for language skills in finding over seas team members.

Paragraph 74, 56 characters.

To try to contact the international students more often.

Paragraph 77, 159 characters.

It would be better that advisor can contact their students more easily such as real life meeting, phone, email, and skype as well as other country team member.

Paragraph 85, 146 characters.

It may make sense for the mentors to occasionally converse along with the students of a team. That way we avoid contradictory advice and guidance.

Paragraph 95, 156 characters.

Coordinating work across countries was a challenge due to different exam and vacation schedules. establish personal team calendars ASAP when you form a team

Paragraph 109, 58 characters.

Communication with Global Challenge and the other students

Paragraph 111, 83 characters.

Communicating with the American half and getting work done quickly and efficiently.

Paragraph 112, 55 characters.

To connect more often with the students from Shangha...

Paragraph 116, 18 characters.

Team communication

Paragraph 124, 131 characters.

To allow me to comprise of this challenge, to share knowledge with my daughter, besides to feel very proud of her and her teammates

(IN RESPONSE TO "HOW DID YOU HEAR ABOUT GC?")

Paragraph 136, 101 characters.

A representative met my neighbor who then contacted my daughter to do the project along with her son.

Paragraph 137, 14 characters.

By my daughter

Paragraph 139, 11 characters.

from my son

Paragraph 142, 41 characters.

Paragraph 132, 11 characters.

through UVM

Paragraph 133, 11 characters.

High School

Paragraph 135, 26 characters.

Contact through our school

Paragraph 138, 17 characters.

On UVM's website.

From a student who wanted to start a team

### **Communication & Adults (8% of total coding)**

Paragraph 29, 68 characters.

They got very frustrated with the language barriers and the rubric.

Paragraph 39, 106 characters.

Disappointed - I could only contact one team member. The rest of his team never responded or participated.

Paragraph 59, 121 characters.

Communication, technology and articulating your team objective proves to be difficult and needs to be addressed quickly.

Paragraph 62, 261 characters.

to choose partners both in their team and in the counterpart more accurately, so that communication can be easier and work can be distributed evenly, also to consider in the choice the time zones, it's quite difficult to keep in touch with 9-10 hours difference

Paragraph 64, 112 characters.

If they want to be happy and proceed the project well, I hope they should enjoy it and interact with each other.

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Paragraph 68, 64 characters.

Watch out for language skills in finding over seas team members.

Paragraph 74, 56 characters.

To try to contact the international students more often.

Paragraph 77, 159 characters.

It would be better that advisor can contact their students more easily such as real life meeting, phone, email, and skype as well as other country team member.

Paragraph 85, 146 characters.

It may make sense for the mentors to occasionally converse along with the students of a team. That way we avoid contradictory advice and guidance.

Paragraph 103, 143 characters.

English at the website should be more easy for students and advisor who use English as a second language to understand the steps of GC project.

Paragraph 106, 30 characters.

Email sometimes not as direct.

Paragraph 107, 60 characters.

Language barriers and communication with over seas partners.

Paragraph 109, 58 characters.

Communication with Global Challenge and the other students

Paragraph 111, 83 characters.

Communicating with the American half and getting work done quickly and efficiently.

Paragraph 112, 55 characters.

To connect more often with the students from Shangha...

Paragraph 116, 18 characters.

Team communication

Paragraph 118, 25 characters.

Direct and quick response

Paragraph 120, 100 characters.

fast response to questions, careful step by step instructions fro creating accounts, passwords, etc.

Paragraph 121, 18 characters.

Emails were useful

Paragraph 122, 75 characters.

individual attention given to us by Sally and David when we needed it most.

Paragraph 123, 101 characters.

Regular correspondence with the Advisors and their gently reminders and promptings were very welcome.

Paragraph 128, 108 characters.

The interaction with Dr. Gibson through email and skype always give us a key help to do the GC project well.

### **Provide Help & Adult (6% of total coding)**

Paragraphs 15-16, 147 characters.

Because I can give a chance to students to apply their knowledge for real world problem solving

Engaging young people to solve an important problem

Paragraph 23, 48 characters.

Also to act as a sounding board for their ideas.

Paragraph 24, 19 characters.

I helped supervise.

Paragraph 34, 133 characters.

I think they feel satisfied with the ideas I could bring to them for improving their project or calling their attention in a problem.

Paragraph 60, 293 characters.

That they always must in mind finish what they initiated, that is not discouraged in the process of the project since in the end they will feel a great satisfaction, they are already winning single for that reason, winners by the shared knowledge and the new ones acquired in this experience.

Paragraph 67, 74 characters.

First timer- be ready for openness, sharing and willingness to participate.

Paragraph 73, 107 characters.

That they encourage the team, there are difficult moments at which need a little direction to follow ahead.

Paragraph 76, 411 characters.

Keep encouraging them - it's easy to get discouraged and drop out after putting in a lot of work. Tell the kids about the fact they will have learned a lot about the world - and even if they don't win anything, it will be a great story to tell (and put on their resume when applying for college). Make sure they know they need to do a good job with their proposal but it does not have to be (cannot be) perfect.

Paragraph 77, 159 characters.

It would be better that advisor can contact their students more easily such as real life meeting, phone, email, and skype as well as other country team member.

Paragraph 80, 51 characters.

Set aside time, be patient, be willing to research.

Paragraph 82, 35 characters.

Ask to see drafts, provide prompts,

Paragraph 86, 236 characters.

The important thing is to respect the idea that the team has, to guide them where they can find the information that is need. To raise different scenarios to them, so that they can select what they create but advisable for the project.

Paragraph 90, 111 characters.

I think mentors should know the process, problem, obstacle of the GC project because they guide the teams well.

Paragraph 98, 300 characters.

When asking each project to be integrated to concepts like Cradle to Cradle or The World is Flat, keep in mind that these ideas cannot be the mainstay of the presentation. It took quite a while for the students in my team to understand these two books and see the connection with their own project.

Paragraph 114, 216 characters.

It's such a large project that it is daunting at the beginning. Then, towards the end it became hard to keep going. There was a point when they were about to give up. Motivating them to continue was the hardest part.

Paragraph 127, 117 characters.

The advisors provided splendid support and helpful critique of the proposal at many stages. This was very impressive.

Paragraph 217, 138 characters.

The students in my team did not need me much once they were on the roll. They used me as a sounding board after the project was completed.

### **The Participation *Time* Questions**

While the answers to the following questions appear elsewhere, on the website or other technical reports, they are brought in to TR3 for inclusion with the narrative responses:

**Document 'Adult Survey 6\_07', 2 passages, 665 characters.**

Paragraphs 172-184, 333 characters.

**22 - On average during the Challenge, how many hours a week would you say that each student spent working on it?**

Not sure because of distance

10

5  
5 - 10  
1-2 hours/week. toward the end, it was 5+ hours  
about 7 to 8 hours a week (about 1 hr a day)  
About 48 hours  
2-3  
(left blank)  
2 - but hard to say because I did not keep track  
3-4  
0

Paragraphs 185-197, 332 characters.

**23 - How many hours a week did you spend with students who were working on it?**

1  
4  
1  
1  
45 minutes/week  
Initially once a fortnight, then about twice or thrice a week and then, when the project  
idea was accepted by all members and the team started working, about once a month.  
Approximately 4 hours  
1-2  
(left blank)  
<1  
2-3  
less than 1

**Document 'Student Survey spring 2007', 1 passages, 191 characters.**

Paragraphs 222-232, 191 characters.

**29 - On average during the Challenge, how many hours a week did you spend working on it?**

5 hours  
1.5  
2  
2  
7 hours a week  
About 7-8 hours  
2. Mainly spent just before the deadline.  
1-5 hours  
1

**Document 'Adult Survey 6\_07', 2 passages, 986 characters.**

Paragraphs 198-210, 508 characters.

**26 - If the time that students spent on the Challenge increased during the months of March and April, how many hours a week would you guess that each student spent on it during that time?**

(left blank)

It was their life

10

Many - I can not guess

5-10 hours, but I would need to ask for a specific number

Each student spent nearly 30 hours a week in the last 3 to 4 weeks before the deadline.

Approximately 52 hours

3-4 hours

(left blank)

3 - 6, but hard to say for sure as I did not keep track

7-8

(left blank)

Paragraphs 211-223, 478 characters.

**27 - If the time that you spent with students on the Challenge increased during the months of March and April, how many hours a week did you spend on it during that time?**

(left blank)

It was my life

na

(left blank)

(left blank)

The students in my team did not need me much once they were on the roll. They used me as a sounding board after the project was completed.

Not increased

2-3 hours

(left blank)

No more than one hour. It was a pretty independent group.

3-4

(left blank)

**Document 'Student Survey spring 2007', 1 passages, 290 characters.**

Paragraphs 233-243, 290 characters.

**31 - If the time you spent on the Challenge increased during the months of March and April, how many hours a week did you spend on it during that period?**

approximately 12-16 hours

(left blank)

2-3

(left blank)

nearly 30

towards the end, almost 30 hours a week

6.

between 10 and 20 hours

3

7

### **Additional Themes of Interest**

While not a “major” theme, some ideas which rose from the participant data may inform some redesign of the GCA process:

### **Different Levels of Engagement**

**Document 'Student Survey spring 2007', 1 passages, 293 characters.**

Paragraph 83, 293 characters.

Try to make the challenges at all levels. Have some challenges that are easy enough that students who are weak in that area can still perform, but also make some that are challenging enough to maintain the interests of the strongest students, and teach them new ideas that they can then apply.

**Document 'Adult Survey 6\_07', 2 passages, 379 characters.**

Paragraph 29, 64 characters.

They wanted to do the project but not conform to the guidelines.

Paragraph 102, 315 characters.

I think you need more tangible, and more frequent rewards that are easy to achieve for the students. It's a very long time to work on something for no tangible reward and a high

risk that you will not win anything. That is very dispiriting and demotivating. If you make sure to have frequent rewards, it would help.

### **Schoolwork**

Document 'Student Survey spring 2007', 17 passages, 2731 characters.

Paragraph 27, 34 characters.

balancing GC work with schoolwork.

Paragraph 29, 399 characters.

The deadlines of the Global Challenge were so placed, that the bulk of the work started to take shape just as our exams here in India drew close. Our project required research and understanding on a level that was way beyond what we had initially expected, and we found it quite a challenge to balance our work for this project with board exams - for preparation, preliminary exams, and final exams.

Paragraph 29, 173 characters.

There was really only two or three weeks between the end of our finals and the final deadline of Global Challenge, and we found it difficult to manage all our work together.

Paragraph 30, 328 characters.

One of the greatest barriers we faced was the difficulty in maintaining communication with our American counterparts. We faced trouble because of exams over here, and they faced trouble due to technical difficulty and illnesses. It worked out just fine, but it did pose a challenge, and slowed us down in the middle for a while.

Paragraph 84, 161 characters.

Global Challenge needs to take into consideration academic pressures (school finals, board exams, entrance exams etc...) of countries other than the United States.

Paragraph 85, 164 characters.

Global Challenge organizers might consider arranging the timing of the project such that it takes into account exam schedules of other countries apart from the U.S.

Paragraph 117, 534 characters.

I don't think my teachers were aware of the degree of involvement necessary for this project to take place successfully. Our school is a very small one, where our teachers are

very close to us at a personal level. I didn't inform school that I was taking part in this project, and I suspect they would not be happy, considering that our priority this year was expected to be national level public exams. They would have been happy with my involvement with a project such as this, it is the timing that they would definitely object to.

Paragraph 118, 133 characters.

They encouraged it, and were happy that I engaged in extra work, but would have been happier if the project clashed less final exams.

Paragraph 128, 240 characters.

My parents were very happy with my involvement in this project, saw it as an enriching experience and supported my team mate and I through the whole thing. However, they helped make sure that we didn't compromise school work in the process.

Paragraph 132, 81 characters.

they think I was crazy to do the challenge on top of everything else I was doing!

Paragraph 212, 83 characters.

I am afraid not. It's almost with no connection with the things I learn at school.

Paragraph 213, 157 characters.

No, (In fact, it occupied much time that it did more harm than good to my exams scores. But I think it is worthy while I am not a fan of exams scores anyway.)

Paragraph 214, 3 characters.

Yes

Paragraph 215, 72 characters.

I don't think so, but mainly because I am already so advanced in school.

Paragraph 218, 36 characters.

No - I hate physics more than I did.

Paragraph 219, 29 characters.

A small amount with chemistry

Paragraph 221, 104 characters.

Yes. Now I am actively participating in any comments about the global warming or anything related to it.

**Document 'Adult Survey 6\_07', 11 passages, 952 characters.**

Paragraph 23, 125 characters.

Mostly to encourage them to plan and manage their time and attention for the global challenge project as well as school work.

Paragraph 37, 227 characters.

At times, they got very discouraged - often because of the perception that the other students in China were not pulling their fair share. That probably had to do with different academic schedules (exams at different times etc).

Paragraph 48, 67 characters.

They have learned a lot which will help them as they enter college.

Paragraph 61, 58 characters.

To start early, before college admissions work takes over!

Paragraph 63, 141 characters.

Don't wait for deadlines - get your work done as early as possible. Plan for periods when team members will be unavailable due to exams, etc.

Paragraph 95, 156 characters.

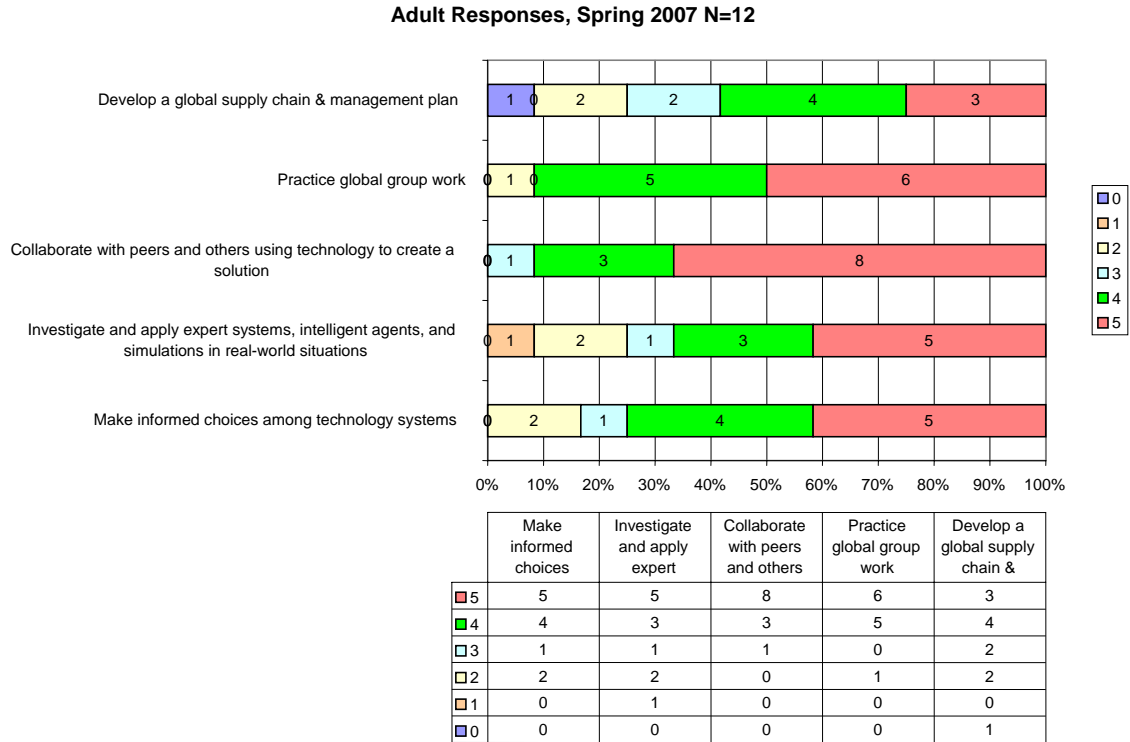
Coordinating work across countries was a challenge due to different exam and vacation schedules. establish personal team calendars ASAP when you form a team

Paragraph 113, 113 characters.

the lack of time especially of students here who had a lot to study and could dedicate much energy to the program

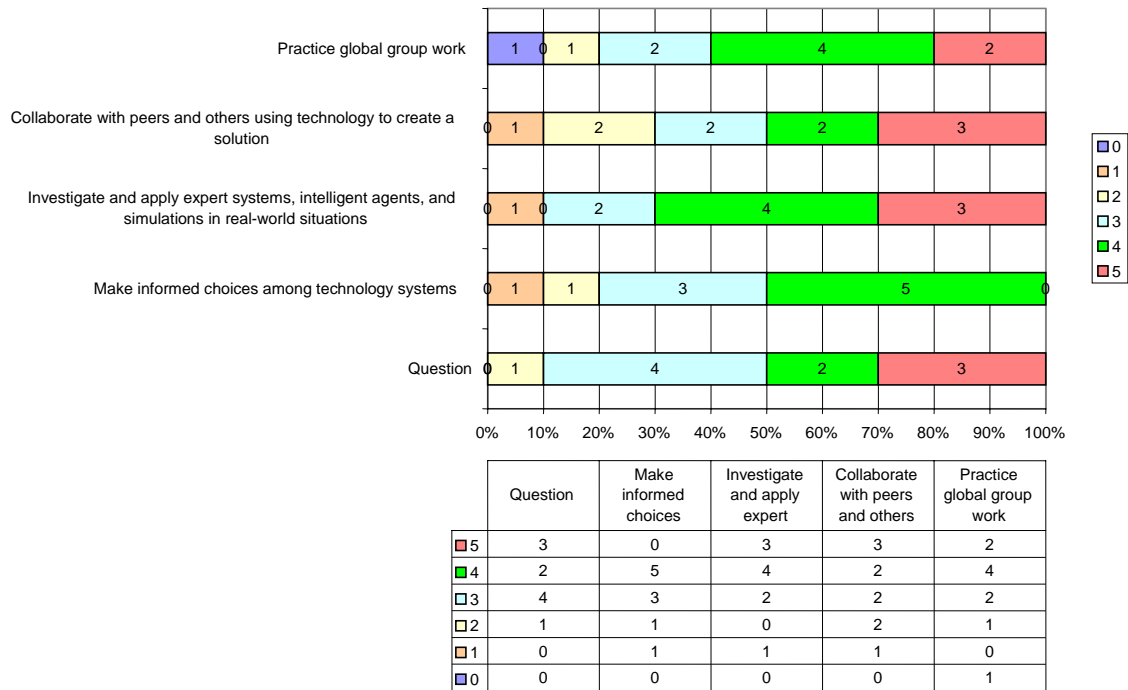
**Questions 11-15 (from TR#1):**

Adults as well as students were asked to complete the following survey questions, and to rate on a scale of 5, with 0 being not at all, and 5 being most, how “important” it was for student team members to have the learning experiences described.



Students were then asked to rate the same questions on the 5 point scale, but to rate the frequency, with 0 representing no opportunities and 5 abundant opportunities, which they were provided to take part in the described activities.

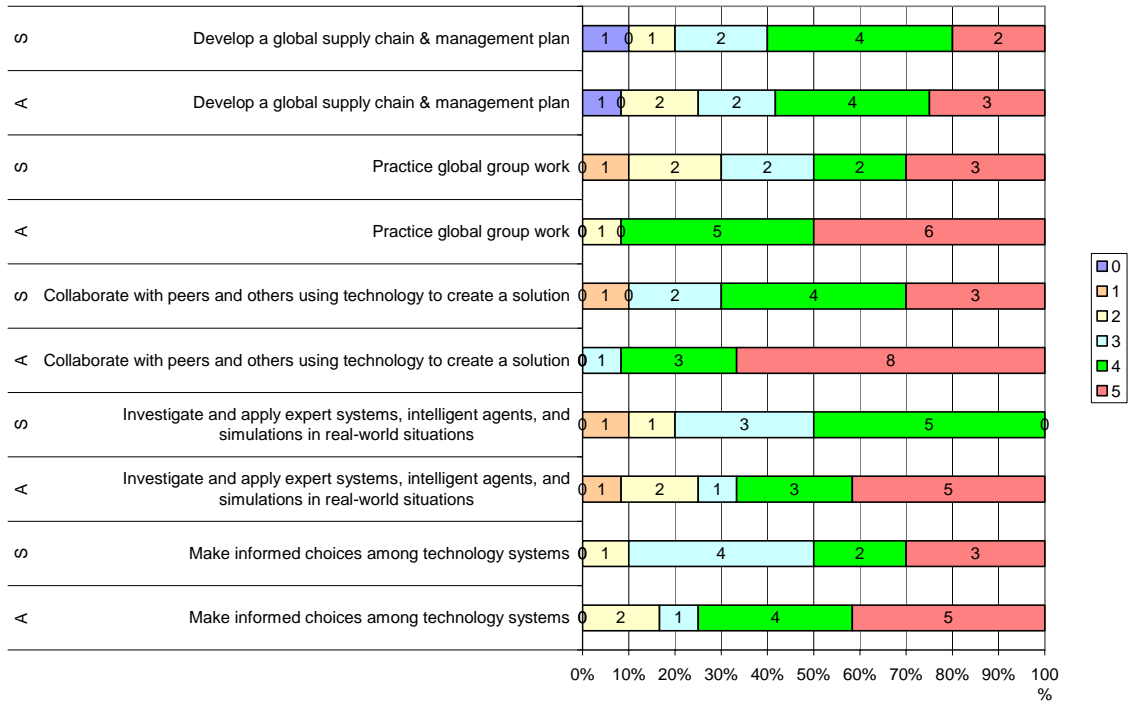
**Students Responses, Spring 2007 N=10**



Comparison of the two sets of responses shows similarities and differences between the importance that the adult advisors place on particular aspects of the Global Challenge opportunities, and the frequency with which students report having had an opportunity to engage in those activities.

While developing a global supply chain and management plan was seen as a similarly important (from the adults’ perspective) and frequent (by students report) activity, the other four questions show they have different perceptions of this importance-to-opportunity measure. Most strikingly, the students do not say that they have had abundant opportunities to investigate and apply expert systems, intelligent agents, and simulations in real-world situations. This is a somewhat surprising finding, given the technology-rich environment in which the Global Challenge is conducted. Of course obviously with such a small number (10) students completing the survey at this time, it may be that this view is not shared by the majority of those engaged in the project.

### Adult Responses Compared to Students



**Technical Report #4 – Further Details from Responses to the Global Challenge  
Student Post Survey Spring 2007**

67 participants match the search criteria, 10 students and 12 adults completed the survey. Their responses to the narrative questions posed by the survey follow, with initial coding shown in red text. Note: non-standard English spellings have been edited.

Table 1 summarizes the responses Students and Adult mentors or advisors made to 2 survey questions -- about the "most helpful" support for students, and the "greatest barriers" encountered by students. One individual's response may have contributed to more than one item on the list.

**Table 3**

Supports	Barriers	Students n=10	Adults n=12
[left blank]		1	3
A Family Activity			1
Content Experts		3	
Electronic means of Communication		1	3
Fast Response from GC Staff			2
GC Staff		4	4
GC Website		3	1
Mentors/Advisors		1	2
Parents		1	
Step by Step Instructions			1
Teachers		1	
Teammates		1	
	Amount of Work – Research/Understanding	2	
	Balancing GC w/Schoolwork & Local Exams	3	1
	Collecting Statistics	1	
	Communication w/Foreign Partners	7	5
	Communication w/GC Staff		1
	Decision Making	1	
	Finding/Keeping Partners	2	
	Lack of Knowledge	1	
	Limited Time for STEMS	1	
	Limited Time for Teamwork	2	2
	Nothing Important	1	
	Overwhelming Project		1
	Preventing Student Burnout		1
	Time Zones	2	

Supports	Barriers	Students n=10	Adults n=12
	Website – Format/Speed	1	5

### Students' Full-Text Responses – Supports & Barriers

#### 2 - What was the most helpful support provided to you or your team in the Global Challenge?

the support from our parents and the communication with my classmate (partner)

Internet Global Resources on the official website

The tireless help of Sally O'Rourke helping the team when it lost its international team and subsequently a local team member and the help of David Gibson to initially focus the team's mission.

the e-folio

In the initial stages, the guidance and gentle prodding of the organizers helped to keep us going. And once we were well into the project we were lucky to find many people - experts in their own fields - to help us with those aspects of the project that we could not discuss with authority on our own. The support of these subject experts who were willing to share knowledge and time with us were our greatest support.

The most helpful support we got as a team was from the advisors we had – both from Global Challenge, as well as those we were lucky enough to find to help us.

Internet resources.

What I found most helpful were different people that helped us along with all of the research that we did

(left blank)

The people of knowledge who helped us along the way, such as our mentors, professors and all the other means of communication (video, research, etc.) that made this possible.

#### 3 - What were the greatest barriers that you encountered in your work with Global Challenge?

the collection of statistics and the occasional communication with foreign partners

We had limited time, so we didn't do some of the STEMS. Also it wasn't always easy to find time when both sides are available for meetings.

International teammates who were unresponsive, local teammates who left, the

amount of work, and balancing GC work with schoolwork.

Definitely communication. Forming a team under these circumstances is not difficult. The great difficulty lies in what happens after the team is formed. Our team had almost no communication, and, because of that, we foundered, and never managed to even create an idea.

The deadlines of the Global Challenge were so placed, that the bulk of the work started to take shape just as our exams here in India drew close. Our project required research and understanding on a level that was way beyond what we had initially expected, and we found it quite a challenge to balance our work for this project with board exams – for preparation, preliminary exams, and final exams. There was really only two or three weeks between the end of our finals and the final deadline of Global Challenge, and we found it difficult to manage all our work together.

One of the greatest barriers we faced was the difficulty in maintaining communication with our American counterparts. We faced trouble because of exams over here, and they faced trouble due to technical difficulty and illnesses. It worked out just fine, but it did pose a challenge, and slowed us down in the middle for a while.

Time gap, language & the lack of professional knowledge.

I think the speed of communication was difficult since we were working with students in a completely different time zone. Also it was difficult finding another team to work with and by the time that we did, we were already part way through the year and we had to work more quickly than we hoped to.

communication, and decision making was difficult on a international scale... but that was what the project was all about

Nothing of great importance

### **Adults' Full Text Responses – Supports & Barriers**

#### **9 - What were the greatest barriers that you encountered in your work with Global Challenge?**

Email sometimes not as direct.

Language barriers and communication with over seas partners.

Keeping up with the emails and somewhat confusing using efolio.

Communication with Global Challenge and the other students

-I found the website and the platform slow. because content took more time than

I expected to load, I didn't access the website as much as I should have.

Communicating with the American half and getting work done quickly and efficiently.

To connect more often with the students from Shangha...

the lack of time especially of students here who had a lot to study and could dedicate much energy to the program

It's such a large project that it is daunting at the beginning. Then, towards the end it became hard to keep going. There was a point when they were about to give up. Motivating them to continue was the hardest part.

The speed of the GC website need more be up, because students usually are not patient with waiting for few second. I dearly wish that the change or upgrade of WEBSERVER of GC Website would be done.

Team communication

### **10 - What was the most helpful support provided to you in the Global Challenge?**

Direct and quick response

(left blank)

fast response to questions, careful step by step instructions fro creating accounts, passwords, etc.

Emails were useful

individual attention given to us by Sally and David when we needed it most.

Regular correspondence with the Advisors and their gently reminders and promptings were very welcome.

To allow me to comprise of this challenge, to share knowledge with my daughter, besides to feel very proud of her and her teammates

the website, and Sally O'Rourke.

(left blank)

The advisors provided splendid support and helpful critique of the proposal at many stages. This was very impressive.

The interaction with Dr. Gibson through email and skype always give us a key help to do the GC project well.

(left blank)

## Students' Time

Table 2 shows the Average and Range of responses that the 10 students and 12 adults gave to 2 questions asking about the amount of time per week that students had spent on the GC, and whether their time on the project increased during the final months of March and April.

**Table 4**

	Students n=10	Adults' responses estimating Students' Hours n=12
Hours Weekly	Average 3.8 Range 1 - 8	Average 5.7 Data Range 0 – 48*
Hours Weekly – March/April	Average 10 Data Range [left blank] – 30*	Average 9.4 Data Range [left blank] – 52*

Table 3 provides the same information about “time spent” on the project, but in greater detail. While students estimate they spent between 1 and 8 hours a week, with an average of 3.8 hours per week, during most of the GC, the adult mentors/advisors estimated that their students had spent an average of nearly 2 hours more, or 5.7 hours more, on it per week.

The range of hours that students spent per week during March and April was estimated higher by the adults than by the students themselves, however the average hours that students spent during the final months of the project are estimated as between 9.4 and 10 by both groups.

While the number of students and adults who responded to the survey is too low to make any statements about the amount of time that students actually spent with certainty, these data suggest that students spent an average of between 3 – 6 hours on the GC weekly during most of the project, while spending approximately twice that much time on it during the final 2 months. Some students spent much more of their time on it, with an upper range of between 30-52 hours each week.

**Table 5**

	Students n=10	Students Final Weeks n=10	Adults Estimate Student Hours n=12	Adults Estimate Student Hours Final Weeks n=12
0			1	
1-2	11111		11	
3-6	111	111	111	11
7-10	11	1	111	111

\* These intervals are based on those which respondents used. A range of 0-26 was used for purposes of computing the average, in order to correct for skewness of the actual ranges reported.

	Students n=10	Students Final Weeks n=10	Adults Estimate Student Hours n=12	Adults Estimate Student Hours Final Weeks n=12
11-15		11		
16-25				
26+		11	1	111
[left blank]		11	11	1111

**Students' Full Text Responses – Students' Time**

**29 - On average during the Challenge, how many hours a week did you spend working on it?**

5 hours

1.5

2

2

7 hours a week

About 7-8 hours

2. Mainly spent just before the deadline.

1-5 hours

1

5

**31 - If the time you spent on the Challenge increased during the months of March and April, how many hours a week did you spend on it during that period?**

approximately 12-16 hours

(left blank)

2-3

(left blank)

nearly 30

towards the end, almost 30 hours a week

6.

between 10 and 20 hours

3

7

### Adults' Full Text Responses – Students' Time

**22 - On average during the Challenge, how many hours a week would you say that each student spent working on it?**

Not sure because of distance

10

5

5 - 10

1-2 hours/week. toward the end, it was 5+ hours

about 7 to 8 hours a week (about 1 hr a day)

About 48 hours

2-3

(left blank)

2 - but hard to say because I did not keep track

3-4

0

**26 - If the time that students spent on the Challenge increased during the months of March and April, how many hours a week would you guess that each student spent on it during that time?**

(left blank)

It was their life

10

Many - I can not guess

5-10 hours, but I would need to ask for a specific number

Each student spent nearly 30 hours a week in the last 3 to 4 weeks before the deadline.

Approximately 52 hours

3-4 hours

(left blank)

3 - 6, but hard to say for sure as I did not keep track

7-8

(left blank)

**Adults' Time**

**Table 6**

	Adults' GC Hours	Adults' GC March/April Hours
0-1	4	2
1-2	4	
3-6	3	2
7-10		
11-15		
16-25		
26+		1
[left blank]	1	7

Table 4 shows the adults' estimates of their own time spent during most of the GC, as well as during the final months. For most of the project the adults spent no more than 6 hours a week, with an average of 1.5 hours. Most of the adults answered that their time spent with the students on the project did not increase during the final months, however

one adult's time did increase significantly, to more than 26 hours a week during March and April.

### Adults' Full Text Responses – Adults' Time

**23 - How many hours a week did you spend with students who were working on it?**

1

4

1

1

45 minutes/week

Initially once a fortnight, then about twice or thrice a week and then, when the project idea was accepted by all members and the team started working, about once a month.

Approximately 4 hours

1-2

(left blank)

<1

2-3

less than 1

**27 - If the time that you spent with students on the Challenge increased during the months of March and April, how many hours a week did you spend on it during that time?**

(left blank)

It was my life

na

(left blank)

(left blank)

The students in my team did not need me much once they were on the roll. They

used me as a sounding board after the project was completed.

Not increased

2-3 hours

(left blank)

No more than one hour. It was a pretty independent group.

3-4

(left blank)

## Appendix A

## Evaluator Vita

**HARRIS, DOUGLAS E.**  
**66 GRAND AVENUE**  
**SWANTON, VT 05488**  
**(802) 868-3631**  
**e-mail: [dharrisnga@aol.com](mailto:dharrisnga@aol.com)**

### PROFESSIONAL EXPERIENCE

Executive Director, The Vermont Institutes, Montpelier, VT. 1998-Present.

Direct Non-Profit Organization supporting State Department of Education, schools, and partners in higher education and business. Programs include research and development, an Evaluation Center, data analysis and utilization support, technology applications, leadership support, equity strategies, and extensive reform of teacher professional development, state standards and assessment. Operate a statewide interactive learning network linking all Vermont high schools with high speed broadband video for student offerings and professional development.

Director, The Center for Curriculum Renewal. 1993-Present.

Provide consulting services in systems design, curriculum, instruction, professional development, administration, and program evaluation throughout the U.S. and abroad.

Adjunct Professor, University of Vermont, St. Michaels College, and Trinity College of Vermont 1983-1997

Taught graduate courses in research methods, program evaluation, assessment, curriculum, and leadership over a fifteen year period. Also worked with students in independent study in curriculum, assessment, and leadership. See list of representative courses below.

Director of Education, National Gardening Association, Burlington, VT. 1994-1998.

Managed two major work groups (Education and Marketing). Responsibilities include program development, marketing, publications, professional development, grant development, and administration of national educational programs serving approximately 42,000 educators.

Superintendent of Schools, Franklin Northwest Supervisory Union, Swanton, VT 05488. 1990-1994.

Responsibilities included strategic planning, program evaluation and improvement, student well-being, school board operations, district management, budget/finance, personnel, administrator supervision and evaluation, and school/community relations.

Assistant Superintendent of Schools, Essex Town School District, Essex, VT. 1984-1990.

Responsibilities included curriculum, instruction, program evaluation, staff development, and staff evaluation.

Principal, Blue Mountain Union School, Wells River, VT.

Responsibilities included student well-being, community relations, curriculum, instruction, personnel, evaluation, and plant management in a rural K-12 school.

Teaching/Research Fellow/Adjunct Faculty, Kent State University, Kent, OH. 1980-1981.

Media Specialist and Director of Gifted Education, Bethlehem-Center School District, Fredericktown, PA 15333. 1976-1982.

Teacher, California Area High School, California, PA 1971-1976.

#### Other

1983-Present – Adjunct Faculty, University of Vermont, Burlington, VT

1978-Present – Consultant, program evaluator, inservice provider, and presenter in school districts, organizations, and agencies nationwide.

#### EDUCATION

Kent State University, Kent, OH. Ph.D., Special Education Administration, 1982.

York University, England. Doctoral Studies, 1975-1976.

West Virginia University, Morgantown, WV. MA, 1975.

California State College, California, PA. BS, 1971.

Other graduate study at the University of Vermont, St. Michael's College, and Princeton .

#### SELECTED PUBLICATIONS AND PROFESSIONAL ACTIVITIES

- *Succeeding with Standards* (with Judy Carr) ASCD, 2001.
- "Putting standards to work in schools: the big picture." *ASCD Curriculum Handbook*. (with Judy Carr). ASCD, 2001.
- "Standards-based assessment and action planning: implications for leaders." *Inside Education* June 2001.
- *How to Use Standards in the Classroom* (with Judy Carr, et al.), ASCD, 1996.
- *Getting It Together: A Process Workbook for Curriculum Development, Implementation, and Assessment* (with Judy Carr). Allyn and Bacon, 1993.
- "The school board's role in curriculum development." (with Michele Campbell, Judy Carr) *American School Board Journal*, April, 1989.

- Association for Supervision and Curriculum Development (ASCD). Member of Executive Council, 2000-2003. Member of Board of Directors, 1990-95. Chairperson, Issues Committee, 1994-96. Member, Consortium on Authentic Assessment, 1991-Present. President, Vermont Chapter, 1993-95.
- Currently in press: *Shared Journey* (with Judy Carr and Nancy Herman), anticipated publication, Spring, 2003.
- Vermont Department of Education. Consultant on numerous projects, including Vermont Common Core for Learning, Vermont Framework of Standards and Learning Opportunities, Standards Across the Department, Vermont Portfolio System, Vermont Comprehensive Assessment System, and others.
- Program Evaluation. Program evaluator on numerous projects for school districts, private foundations, universities, and the National Science Foundation. Taught graduate courses in program evaluation at the University of Vermont. Member, American Evaluation Association Validation Panel for Student Performance Standards, Robert Lynn, Chair.

#### PARTIAL LIST OF CLIENTS AND COLLABORATORS

Association for Supervision and Curriculum Development  
 Cambridge (MA) Public Schools  
 Charles Dana Center, University of Texas  
 Cleveland Municipal School District  
 Connecticut Academy for Math and Science  
 Indianapolis Public Schools  
 Intel Corporation  
 Joint Committee on Standards for Educational Evaluation  
 Louisiana Board of Regents/LASIP  
 Los Angeles Unified School District  
 Massachusetts Department of Education/PALMS  
 National Initiative for Community Innovations  
 National Science Foundation  
 New York City District 15, Brooklyn  
 Republic of Colombia  
 Republic of Trinidad and Tobago  
 St. Louis Public Schools  
 UCLA  
 University of Minnesota  
 UNC Chapel Hill/North Carolina Botanical Garden  
 University of Puerto Rico/Puerto Rico SSI  
 Vermont Department of Education  
 Vermont Mathematics Initiative  
 Western Michigan University Evaluation Center

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### ***Recent Work History***

#### ***5/03 – Present***

Evaluation Specialist, Vermont Institutes – internal and external evaluation of K-12 and teacher training programs. Data analysis, survey design, quantitative analysis, qualitative study design, application of organizational systems theory and using data for school reform

#### ***1/06 – Present***

Adjunct Instructor, Woodbury College – undergraduate Assessment & Evaluation courses, online graduate courses in Research Methods

#### ***10/99 – 8/03***

National Institute for Community Innovations, Senior Associate – creation, evaluation of on- and off-line materials. Staff training and supervision, teacher participant support in an online campus

#### ***6/99 – 8/03***

Art Responding through Technology (ARTT), Coordinator – responsible for overseeing training and programs in an online community of students, teachers, and artist-mentors

#### ***1/96- 9/00***

The Web Project, Project Manager – responsibility for day-to-day grant and office management of this award winning 2.5 million dollar USDOE funded Technology Innovation Challenge Grant program

### ***Education***

University of Vermont, Burlington, VT  
Currently completing Doctoral Studies in Educational Leadership & Policy Study

Clarkson University, Potsdam, N.Y.  
Master of Science, Management Systems

Regents Scholar, Syracuse University, Syracuse, N.Y.  
Bachelor of Fine Art

Woodbury College, Montpelier, VT  
Certificate in Legal and Paralegal Studies

Additional Graduate Coursework completed on Education, Technology, and Business Topics at Norwich University, Rhode Island College, University of Ottawa, and Potsdam College

Syracuse University, London England  
Graduate Internship, ABC News London Bureau

*Other Relevant Experience*

2007 Selected as AERA Conference Paper Peer Reviewer: Science Teaching and Learning, and School Evaluation and Program Development

2007 Lead Author and Presenter, VMP Evaluation Findings Related to Changes in Teaching Practice, Drawn from Qualitative Focus Group Data  
MSP-NSF Evaluation Summit II, Minneapolis, MN

2000-2003 Co-Instructor, VT MIDI/ARTT Graduate Courses and Summer Institutes, University of Vermont, Burlington VT

1996 Visiting Instructor, Workshop Presented on Grant Writing  
Jefferson Community College, Watertown, N.Y.

*Awards & Honors*

NVivo7 Qualitative Software “Train the Trainer” assistant to NVivo creators Lyn & Tom Richards, Madison, WI Spring 2006

NVivo2 Qualitative Software “Train the Trainer” assistant to Lyn Richards, Athens, GA Spring 2005

Co-Author, National Endowment for the Arts, 2002 Arts Organization Support Grant awarded for the Vermont MIDI/ARTT Project, Inc.

Author & PI, AAUW Community Action Grant to provide technology training for underserved girls and women in Vermont

Grant Consultant, NEA Community Arts Project Support award for the *Mary Miller Historic Mural*, Public Library, Lafayette, Colorado

Lead Author, SITE Conference paper, March 2001; Art Responding through Technology

Co-Author, Co-Presenter, AACE Conference, Oct. 1999; Distance Learning in Rural Schools of Vermont: Online Arts Mentoring

Arts Administration Fellowship, 1995  
National Endowment for the Arts, Washington, D.C.

Potsdam College United University Professional Development Tuition Award, toward completion of the Museum Management Certificate Program, Colorado University at Boulder

Visiting Professional Program: Records Management and Research  
Smithsonian Institution, Washington, D.C.