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Author(s)	Toki, Masako
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Bringing Disarmament and Nonproliferation Education to a Wide Range of Audience: Case Study of High School Students in the U.S. and Russia

Masako TOKI*

Abstract

Education has been utilized as a tool to solve problems human beings have encountered throughout history including the proliferation of weapons of mass destruction. This paper examines how the concept of disarmament and nonproliferation education has been introduced to and developed in the international community with an emphasis on the 2002 United Nations Study on Disarmament and Nonproliferation Education. The paper takes as a case study a disarmament and nonproliferation education program for high school students in the United States and Russia, and how the UN Study endorses such education in a variety of educational levels for international peace and security. The challenges and future prospects of disarmament and nonproliferation education are also discussed.

Keywords: Disarmament, Nonproliferation, Education, United Nations, Weapons of Mass Destruction

* Project Manager/Research Associate James Martin Center for Nonproliferation Studies at Monterey Institute of International Studies, Monterey, California

Introduction:

It is a generally accepted concept that education is a necessary instrument to reduce, solve, or eliminate problems and challenges human beings have encountered throughout history. Most of the problems humankind needs to surmount are global or at least transnational. These problems include environmental degradation, global warming, malnutrition, ethnic minority problems, and the proliferation of weapons of mass destruction (WMD) as well as the haunting potential for nuclear annihilation.¹⁾ Education entails a profound mission in order to solve a variety of problems in society. Education is not only the transmission of knowledge or development of talent and skills, but also a tool to empower people to tackle and solve those problems. As former United Nations Secretary-General Kofi Annan stated, “education is quite simply, peace building by another name.”²⁾ Nevertheless, education is the most underutilized tool to solve global challenges, including disarmament, nonproliferation of WMD, and peace building.³⁾

This paper discusses why disarmament and nonproliferation education is necessary for achieving the goal of international peace and security. Emphasis will be placed on the issue of practical applications of disarmament and nonproliferation education through a case study of disarmament and nonproliferation education for high school students. The Critical Issues Forum (CIF), an international nonproliferation education program for high school students sponsored by the James Martin Center for Nonproliferation Studies (CNS) will be described in detail. The origin, evolution, and current status of the program; its pedagogical framework; challenges facing the program; and future prospects for further improvement of disarmament and nonproliferation education on a secondary educational level are discussed based on the author's experience managing this program.

The paper describes the 2002 UN Study on Disarmament and Nonproliferation Education's endorsement of critical thinking skills, the pedagogical basis of the CIF program. It addresses the disarmament education initiatives taken by the United Nations with a focus

1) Magnus Haavelsrud, “On the Substance of Disarmament Education,” in *Approaching Disarmament Education*, ed. Magnus Haavelsrud (Westbury House, Guilford, 1981), 100.

2) Kofi Annan, “Secretary-General in Address to “Learning Never Ends” Colloquium, Calls Education Investment Which Yields Highest Profit” UNIS/SG/2361, 13 September 1999
<http://www.unis.unvienna.org/unis/pressrels/1999/sg2361.html>

3) William C. Potter, “A New Agenda for disarmament and Non-proliferation Education,” *Disarmament Forum* No. 3 (2001), <http://www.unidir.ch/pdf/articles/pdf-art43.pdf>

on the 2002 UN Study, and how the study highlights the importance of developing critical thinking skills for disarmament and nonproliferation education.

The United Nations Study on Disarmament and Nonproliferation Education in 2002

In the past 30 years, the United Nations has attempted to promote disarmament and nonproliferation education with an aim to contribute to peace and security. The UN Study on Disarmament and Nonproliferation Education was commissioned by Secretary General Kofi Annan under a General Assembly resolution in 2000 that was sponsored by Mexico and 11 other nations.⁴⁾ A group of experts from Egypt, Hungary, India, Japan, Mexico, New Zealand, Peru, Poland, Senegal and Sweden submitted the study to the Secretary General with a consensus document including 34 practical recommendations. In November 2002, the UN General Assembly unanimously endorsed the study.

The study finds that education and training are vital but underutilized tools for peace and disarmament, and identifies “a pressing need to expand and improve disarmament and non-proliferation education and training in order to promote disarmament and non-proliferation and to strengthen international security and enhance sustainable economic and social development.”⁵⁾ The study further concludes that the need for education on nonproliferation and disarmament education has never been greater, especially in the field of nuclear weapons and other weapons of mass destruction and their delivery systems.⁶⁾ The study also highlights the importance of critical thinking skills in this type of education. It also underlines the importance of taking a variety of educational methods taking into account “a diverse spectrum of actors and audiences, infrastructures, and technologies.” The study says that different groups require different pedagogic approaches and methods. What a school-age child in a refugee camp needs to know about disarmament is not the same as what is required for a border guard, let alone for a political official or a high school teacher.⁷⁾

The objectives of contemporary disarmament and nonproliferation education and train-

4) United Nations General Assembly Resolution, United Nations Study on Disarmament and Non-Proliferation Education, 55/33 E, November 20, 2000.

5) “United Nations Study on Disarmament and Non-Proliferation Education-Report of the Secretary General” UN General Assembly 57th Session, A/57/124.

6) Ibid.

7) UN Study

ing described in the UN Study include a) learning how to think rather than what to think about issues; b) developing critical thinking skills in an informed citizenry; c) deepening understanding of the multiple factors at the local, national, regional and global levels that either foster or undermine peace; d) encouraging attitudes and actions which promote peace; e) conveying relevant information on and fostering a responsive attitude to current and future security challenges through the development and widespread availability of improved methodologies and research techniques; f) bridging political, regional and technological divides by bringing together ideas, concepts, people, groups and institutions to promote concerted international efforts towards disarmament, nonproliferation and a peaceful and non-violent world; and g) projecting at all levels the values of peace, tolerance, non-violence, dialogue and consultation as the basis for interaction among peoples, countries and civilizations.⁸⁾

History of the UN initiatives promoting disarmament education

The UN study is the culmination of almost three decades of UN efforts to promote disarmament education. The Tenth Special Session of the General Assembly declared the urgency of disarmament education in 1978 and emphasized the importance of teaching and research. The Final Document of the Tenth Special Session urged governmental, non-governmental, and international institutions, especially UNESCO, “to take steps to develop programmes of education for disarmament and peace studies at all levels.”⁹⁾ As a result, the Final Document of the UNESCO World Congress on Disarmament Education in 1980 included numerous recommendations for measures to promote both research and education in disarmament.

In 1982, the UN General Assembly adopted a resolution to promote disarmament. On June 7th of that same year, the United Nations World Disarmament Campaign was launched. The campaign aimed to promote and disseminate the goals of the United Nations in the area of arms control and disarmament. In 1992, the United Nations transformed this campaign into the UN Disarmament Information Program, with identical goals but a reduced budget. However, the efforts of the Disarmament Campaign were not so well received due in part to prevailing Cold War international politics which prevented

8) Ibid.

9) Final Document of the Tenth Special Session of the General Assembly, 27th Session, June 30, 1978

progress in disarmament. Moreover, ideological disputes between the two super powers hindered education's development as a driving force to promote disarmament.¹⁰⁾

With the end of the Cold War, a changing security environment provided the opportunity for new initiatives involving peace and disarmament. In 1999, the United Nations launched the International Year for the Culture of Peace to sponsor peace education, dialogue, and conflict resolution with an aim to promote a global culture of non-violence.

Resurgence of disarmament education: Need for new awareness

While these initiatives from the United Nations were noteworthy, there were no eminent developments until the UN General Assembly adopted a resolution to obligate the Secretary General to submit the report on the UN Study on Disarmament and Nonproliferation Education at the 2000 UN General Assembly. The reason efforts to promote disarmament education during the Cold War did not come to fruition is that ideological disputes and conflicts between the West and East had dominated world politics, and there was no room to reach a consensus on promoting disarmament and nonproliferation education.¹¹⁾

The changing security environment surrounding nonproliferation and disarmament issues after the end of the Cold War certainly contributed to opening the door to consider how education could serve as a more effective tool in promoting nonproliferation and disarmament. The end of the Cold War decreased the possibility that the sphere of disarmament and nonproliferation education would become an area where countries would dispute ideological differences. In addition, the possibility that weapons of mass destruction would be transferred to non-state actors has increased, and the security situation has become more complicated compared to the Cold War era. This changing security situation requires a new approach and greater knowledge regarding WMD issues. As the 2002 UN study correctly assesses, "there is a need to raise awareness of new challenges to international security and the process of disarmament. Among them, terrorism, with the possibility of the use of weapons of mass destruction, is a source of particular concern."¹²⁾

10) Yukiya Amano, "Gunshuku Fukakusan Kyōiku, (Disarmament and Nonproliferation Education) in Gunshuku Mondai Nyūmon (Issues in Disarmament: An Introduction) ed. Mitsuru Kurosawa (Toshindo, Tokyo, 2005).

11) Ibid.

12) "United Nations Study on Disarmament and Non-Proliferation Education-Report of the Secretary General" UN General Assembly 57th Session, A/57/124.

Peace education initiatives by the United Nations and nongovernmental organizations during the late 1990s also gave momentum to a resurgence of disarmament education. The year 1999 was designated as the International Year for the Culture of Peace. Under this designation, the United Nations endorsed peace education, dialogue, and conflict resolution to promote a global culture of non-violence.

In May 1999, the Hague Appeal for Peace conference launched a global campaign for peace education.¹³⁾ The Hague Agenda for Peace and Justice for the 21st century deals with disarmament, human security, prevention, resolution and transformation of violent conflict, international humanitarian and human rights law and institutions, the root causes of war, and the culture of peace.

The Secretary General's report on the UN Study on Disarmament and Nonproliferation Education adopted at the 2002 UN General Assembly was the culmination of efforts for disarmament education during the previous three decades. Since the adoption of the report, likeminded countries, international organizations, and research and educational institutes have enhanced their efforts to promote disarmament and nonproliferation education. Moreover, the concept of using education as a disarmament and nonproliferation tool has been continuously endorsed in the NPT review process. This concept was first raised at the 2002 NPT Preparatory Committee (PrepCom) meeting. The 2002 PrepCom Chairman's Factual Summary included disarmament and nonproliferation education in a favorable light. The Japanese government has been a major supporter of this idea and has continuously submitted working papers, and taken initiatives by introducing new educational methods.

The report highlights an urgent need for and the importance of disarmament and nonproliferation education at all academic levels, including high school. Noting that "different groups require different pedagogic approaches and methods," the report elucidates the importance of developing suitable educational materials and resources for all academic levels. It goes on to say that "disarmament and nonproliferation resource and enrichment materials need to be adapted and integrated into existing educational or training materials at various levels of education and for different target audiences. Education programmes for children and youth should integrate elements of the culture of peace. In ad-

13) Hague Appeal for Peace Website, <http://www.haguepeace.org/>

dition to enrichment materials for teachers and students resource material could also provide primary and secondary education curriculum planners with practical examples of ways to integrate disarmament and nonproliferation education into a range of curricula or teacher training programmes.”¹⁴⁾ In particular, the need for nonproliferation education among secondary students is included in the 34 practical recommendations provided in the report.

The origin of the Critical Issues Forum at the James Martin Center for Nonproliferation Studies

Although weapons of mass destruction (WMD) present an urgent and growing threat to national and international security, few educational programs at any level focus on WMD and options for their control and limitation. Moreover, there are fewer institutes following the guidelines recommended by the United Nations Study and other educational authorities. Only a very few non-governmental organizations and research institutes submitted a report on their disarmament and nonproliferation education activities in 2004 and 2006 even though the UN study encourages those organizations to inform on their activities biannually pursuant to the 34 recommendations stated in the UN study.¹⁵⁾ This indicates that few educational or research institutes conduct their disarmament and nonproliferation education activities pursuant to the recommendations of the UN study.

As delineated in the UN study, disarmament and nonproliferation education requires an interdisciplinary approach and multiple perspectives. It has been proven that participatory learning is an effective tool in learning the issues of disarmament and nonproliferation. Both the Final Document of the 1980 World Congress on Disarmament Education and the UN Study endorsed participatory learning.¹⁶⁾ Also, as emphasized by the UN studies, it is important to teach students how to think, but not what to think in this field.¹⁷⁾

14) United Nations Study on Disarmament and Non-Proliferation Education-Report of the Secretary General” UN General Assembly 57th Session, A/57/124.

15) First Biennial Report of the Secretary-General on Disarmament and Nonproliferation Education, <http://daccessdds.un.org/doc/UNDOC/GEN/N04/439/96/PDF/N0443996.pdf?OpenElement>, Second Biennial Report of the Secretary-General on disarmament and Nonproliferation Education, <http://daccessdds.un.org/doc/UNDOC/GEN/N06/438/04/PDF/N0643804.pdf?OpenElement>

16) William C. Potter, “A New Agenda for disarmament and Non-proliferation Education,” *Disarmament Forum* No. 3 (2001), <http://www.unidir.ch/pdf/articles/pdf-art43.pdf>

17) William C. Potter, “A New Agenda for disarmament and Non-proliferation Education,” *Disarmament Forum* No. 3 (2001), <http://www.unidir.ch/pdf/articles/pdf-art43.pdf>

The mission of CNS is to combat the spread of weapons of mass destruction by training the next generation of nonproliferation specialists and raising global public awareness on WMD issues through disseminating timely information and analysis. Education for high school students is essential towards accomplishing this mission.

The CIF program originated with an interaction between Dr. William Potter, director of CNS, and a local high school student. In the summer of 1997, Dr. Potter had an opportunity to make a presentation regarding issues of WMD proliferation to a community organization in Monterey. After his presentation, the high school student asked Dr. Potter why information like this was never taught in high schools -- in fact, the student said that until that moment, he had never heard of the subject of nuclear nonproliferation.¹⁸⁾

This student's remark motivated CNS to start the Critical Issues Forum in 1998 in partnership with the Lawrence Livermore National Laboratory's Science and Technology Education Program. The program aims to provide curricula and educational materials on WMD nonproliferation to secondary schools.

Background of CIF

Objectives mentioned in the UN Study are all relevant to the Critical Thinking Curriculum Model, the pedagogical basis of the CIF program.¹⁹⁾ This model fosters a multidisciplinary approach: students in the program investigate real world problems related to WMD nonproliferation from political, sociocultural, economic, and scientific perspectives. The UN Study also encourages adopting a multidisciplinary approach for disarmament and nonproliferation education. The global and controversial demands of disarmament and nonproliferation issues require both learners and educators to take this multi-faceted approach to finding solutions to global challenges.²⁰⁾ According to the UN study, the overall purpose of disarmament and nonproliferation education and training is to empower people through education so that they learn to contribute to the disarmament and nonproliferation solution towards international peace and security. To achieve this purpose, the teaching methodologies need to be innovative, creative, and effective. The CIF pro-

18) Critical Issues Forum Website, <http://www.criticalissuesforum.org/>

19) Bill Robertson et.al., "Critical Thinking Curriculum Model," *TechKnowLogia* January-March 2003, www.TechKnowLogia.org.

20) Ibid.

gram based on the Critical Thinking Curriculum Model is therefore ideal for achieving this purpose.

CIF is a unique program of project-based education designed to promote awareness of nonproliferation and international security issues and the development of critical thinking skills among high school students in the United States, Russia and other countries. CIF was initially developed at Los Alamos and Lawrence Livermore National Laboratories, with CNS taking the lead in July 1999. The CNS program modeled its activities on a previous nonproliferation education initiative developed in 1996 by the Science Education Team (SET) at the Los Alamos National Laboratory. In 1997-98, the Science and Technology Education Program (STEP) at the Lawrence Livermore National Laboratory began to collaborate on nonproliferation education projects.

In the fall of 1997, STEP sponsored three Bay Area high schools, one of which went on to attend the student conference on Terrorism in the Nuclear World held in May 1998 in Los Alamos. In 1998-99, CNS joined the CIF program by providing lectures at the Summer Workshop in Los Alamos and sponsoring a Winter Workshop in Monterey. In 1999-2000, CNS became the program leader while continuing to cooperate with the Lawrence Livermore National Laboratory.

Purpose of CIF

The CIF is designed to involve high school students and teachers in issues of proliferation and the control of weapons of mass destruction. The purpose of the program is to increase awareness of disarmament and nonproliferation issues as well as international security and to engage and recruit the next generation of nonproliferation specialists. CIF also provides a framework for using student research to investigate the scientific, economic, political, and ethical aspects of nonproliferation and related security issues. It has proven effective in empowering young people, including many at-risk students, to develop informed opinions and to think critically about WMD, terrorism, and other crucial international issues of the 21st century. CIF promotes both higher-order thinking skills and substantive knowledge of WMD. CIF uses authentic materials and requires original research. In line with the UN study objective, CIF is not an advocacy program, but is designed to empower students to develop critical thinking skills and to form their own opin-

ions based on policy -oriented research.

One of the significant features of the CIF is its emphasis on diversity. In addition to promoting interaction between students of formerly hostile countries, and with unique representation from many of the most remote Russian nuclear cities, CIF offers a one-of-a-kind learning experience by engaging a wide demographic pool of U.S. students. They are diverse not only ethnically and geographically, but also in terms of socioeconomic level and income distribution among rural, suburban, and urban areas. Although several CIF schools are highly selective private institutions, over 70% of the students in other CIF schools in California, New Mexico, and Texas qualify for assisted lunch programs. Teachers and administrators report that the program has proven especially effective in schools with high percentages of students from underrepresented ethnic groups and disadvantaged backgrounds and in encouraging girls to explore the scientific and technical aspects of international issues.

Russian high schools from “Closed Nuclear Cities”

Participation of high schools in Russia's closed nuclear cities is an important aspect of the CIF program. Since the closed nuclear cities were created in order to support nuclear facilities in the cities and families of their employees, the cities activities and people's life center on nuclear facilities in the cities. Therefore, educating those who live in such cities on nonproliferation issues will significantly influence global security. Partnerships with Russian schools from closed nuclear cities began in 2001.

Engagement of Russia's closed nuclear cities is particularly unique and enhances the CIF program. Through Russian high schools in closed nuclear cities, the CIF program can contribute to promoting nonproliferation in communities where WMD materials and skills are concentrated.

The CIF program also provides Russian students in these cities who used to have restricted access to information and resources and some degree of isolation from their peers in normal cities with rare opportunities to be exposed to abundance of information through the program activities. Moreover, participating high schools both from the United States and Russia can experience cultural exchange focused on nonproliferation. Students from each country can exchange view points on WMD threats and responses, and

teachers can also exchange techniques and educational materials. In addition, students can learn about life, education, and culture in other countries.

About the CIF curriculum

Pedagogy

The CIF curriculum promotes higher order thinking skills by engaging students in original research on topics of national and international importance. Through its curriculum model benchmarks and teacher training, CIF provides students with instruction and guidance in research methodologies, including brainstorming, evaluation of content, synthesis of information, and writing. The CIF program makes extensive use of its website for curriculum updates, data sharing, and communication among participants. CIF also allows students to share their work with peers in a professional style conference.

Curriculum design is based on the recommendations of the American Association for the Advancement of Science (AAAS) in *Science for All Americans* (1990) and the *National Science Education Standards* (1996) from the National Research Council, and is compatible with national education standards. Participating teachers have successfully conducted the program in a wide variety of content areas, including language arts, aerospace science, chemistry, current issues, government, and history, and are able to adapt the curriculum to meet state educational standards.

The CIF curriculum consists of the benchmarks, an outline of what students are expected to learn throughout the project organized hierarchically according to Bloom's taxonomy.²¹⁾ The benchmarks are guidelines for learners to use in choosing their research topics, conducting research, using critical thinking skills, communicating through writing, speaking, and multimedia; and making connections to topics in other levels of the benchmarks. The benchmarks also provide criteria for both program coordinators and classroom teachers to assess student work. Benchmark I lays the groundwork of understanding including history, vocabulary, and timelines. Benchmark II defines the problem or situation. Benchmark III looks at current or future approaches to solving the problem or alleviating the situation. Each benchmark builds upon previous skills and knowledge bases, which allow the student/teacher teams to construct meaning from seemingly unrelat-

21) Critical Issues Forum Website, <http://www.criticalissuesforum.org/>

ed material.

Each Benchmark includes the required learning objectives with examples of topics, directions of research, suggested activities, and approaches to presentation of information. Since participating teachers teach a diversity of subject matter, such as physics, social studies, and history, these objectives also vary significantly to allow students choices according to the instructional context at their schools. Most Russian teachers in CIF are English teachers, and many of them apply the CIF program as a Content-Based Language course. The listed activities are suggestions. Each school is strongly encouraged to come up with additional activities.

Content Domains

Understanding WMD nonproliferation issues requires integrating knowledge from various perspectives and disciplines since these are issues happening in the real world. Investigating global issues such as WMD nonproliferation requires to have a various perspectives and to take multidisciplinary approaches. Thus, the Critical Thinking Curriculum Model containing four different content domains was developed as a curriculum model for the CIF program. Based on the model, CIF set up the following crosscutting domains where students can connect their ideas through their research activities. These content domains facilitate implementation of the CIF curriculum in a wide range of courses. These domains also engage students with a wide variety of interests and talents and encourage teamwork.

Scientific / Environmental: This domain aims to enable learners to identify scientific facts related to a given issue and understand their basic concepts. The science impact on society could be both beneficial and harmful. Therefore, it is crucial to understand the scientific impact of the issues learners are investigating.

Social/Cultural – People from different social and cultural background perceive and react to events differently. This domain defines the beliefs that people hold and the ties that bind them together. Whether a religious, ethnic or diversity issue, the impact of this domain on a given issue can be considerable.

Economic - Economics makes a significant impact on both the national and international

decision-making process. In order to investigate a major source of competition or conflict relevant to a given issue, learners need to understand the basic economic needs and motivations of individuals, nations, and special interest groups.

Political/Geopolitical – Both national and international policies are primarily influenced by political and geopolitical situation. This domain mainly covers world events relevant to a given issue.

How CIF works

Each annual Critical Issues Forum project typically includes three key elements:

- CNS content experts and core teachers create a curriculum that will be presented to students,
- Core CIF teachers and CNS content experts participate in a Winter Workshop where the CIF curriculum is introduced to all participating teachers, and
- Students and teachers from both the U.S. and Russia meet at a student-teacher conference to share student work.

Curriculum Development Process:

Each academic year, CIF staff members, in consultation with CNS experts, experienced CIF high school teachers, and program consultants, decide a topic taking into consideration timely global nonproliferation-related events. The topic for each academic year is usually decided after the spring conference. The curriculum development starts during the summer while CIF staff collect appropriate resources relevant to the topic. CIF staff and CNS experts hold several meetings to consolidate curriculum benchmarks. Concurrently, the agenda containing relevant subject matter to be delivered at the teacher-development workshop is decided by CIF staff in consultation with subject matter experts. This process is extremely important since benchmarks become the basis of all the CIF activities for the academic year.

Teacher Development Workshop

The CIF Teacher Development Workshop is usually held in the winter. At the workshop, teachers are introduced to curriculum benchmarks, and teaching materials on each year's topic jointly prepared by CNS experts, CIF staff, and experienced CIF

high school teachers. The workshop also includes a series of lectures by CNS experts and outside experts such as scientists from national laboratories. Workshop participants also discuss tools and methods for implementing CIF projects in the classroom. After the workshop, participating teachers return to their schools to begin work on each year's curriculum benchmarks introduced at the workshop.

Students Conference

After the Teacher Development Workshop, students conduct directed research and design original projects and submit their projects for evaluation. In addition to the written products (students' response to benchmarks), students prepare final projects, presentations for the spring conference. The CIF spring student-teacher conference is the culmination of the year-long program. During the conference, students from each school present their research findings in a variety of innovative ways using multimedia tools, interactive games, simulations, role plays, and video scripts featuring news segments and interviews. Student presentations have included a wide range of issues.

CIF students, who have a wide variety of backgrounds, also take advantage of opportunities for engaging in cultural exchanges during the spring conference, making contacts, and building friendships. The ethnic, economic, and cultural diversity of CIF schools is a major strength of the program.

Evaluation

CIF attaches great importance to program evaluation and has in place a formal outside review process. For further improvement of the program, it has hired a program evaluator with a PhD in education and extensive experience in program evaluation. Evaluation of student work in CIF contains three parts: 1) observation by one independent evaluator of student presentations at the yearly conference, followed by 2) a survey questionnaire filled out by the students and teachers, and 3) a review by two independent evaluators of student benchmark written material that is posted on the CIF website. Student work is rated in five distinct areas: a general overview, project ideas/content, writing/organization, citation of sources, and content mastery. In addition, the student live presentations are rated on the poise of the live presentation and answers to open-ended questions regarding the content of the presentation.

CIF also routinely solicits feedback from participating students. Responses from them elucidate how the program stimulates these potential future leaders to study international issues so that they can be influential in forming a safer and more secure world. At the 2007 spring conference, CNS conducted a survey among participating students. Most of students believe that participating in CIF:

- ▷ has enhanced their education
- ▷ has changed their opinions on global issues
- ▷ has given them insight into the viewpoints of other people and nations
- ▷ has made them more interested in being involved in the political process.

In each question, the students were required to rate their agreement with a statement about the CIF program. The rating scale was from 1 (strongly disagree) to 5 (strongly agree.) The average rate of these questions was 4.4.

Benefits of the CIF

The most important benefit of the CIF program is that it promotes critical thinking skills among its participants. Students should be able to find, integrate and evaluate information, examine issues from multiple viewpoints as well as formulating conclusions based on their own investigations not opinions of celebrities or other role models. The CIF program also motivates at-risk and underserved students to study science and technology. According to CIF teachers, the program is particularly effective with female Hispanic students.

CIF also develops knowledge of WMD issues and helps students separate facts from opinions, misconceptions, and hoaxes. The program also encourages students to conduct civil engagement. For example, as part of CIF activities, students met with congressional representatives, and conducted “person-on-the-street interviews.” Students, with teacher guidance, can also contact local governments and first responders to assess community vulnerabilities and response to WMD.

For the high school students from Russia’s closed nuclear cities, participation in CIF projects contains several significant factors in terms of the future of the closed nuclear

cities as a whole as well as their own career path. Since CIF deals with real world non-proliferation problems and issues, especially, educating the future generation about non-proliferation issues in these cities is directly relevant to the future of nuclear security, and international peace and security. Before the introduction of the CIF program, Russian high school students in these closed cities had been granted limited access to educational materials in this field. Now, through the program and their tenacious research activities under the guidance of teachers and CIF staff members, students have become aware of the importance of the issues, acquired essential knowledge, and understanding that even they can be part of the solution to this problem.

The CIF program for high school students in closed nuclear cities also has a long-term impact. Many of the younger generation in these cities are the future residents and workers of nuclear facilities. They are also likely to be key players of future nuclear nonproliferation and security issues within the nuclear-industrial complex. The CIF program is crucial in this regard as it helps the students of Russian nuclear cities to understand the risks and threats related to nuclear energy, as well as the political and legal aspects of nonproliferation.

Conclusion

While project team members are satisfied with the results of the CIF program, efforts to improve the quality of student work continues. Some room for improvement includes providing better guidelines for Internet research and requiring strengthened content review before presentations. The project also plans to expand, as well as to other countries, such as China and Japan. It would be also desirable to explore follow-on programs such as an international summer camp for nonproliferation and conflict resolution. In addition, creating a reliable and comprehensive list of educational resources in the field of nonproliferation for online learning in high schools and undergraduate academic institutions in English and other languages is important.

Like most of challenges facing humanity, one of the major obstacles to implementing action-oriented programs is funding. While our organization is very fortunate to receive funding from both the U.S. government and a private foundation to conduct this project, the importance of nonproliferation education for high school students and teachers is not

well understood by many. Thus, conducting sustainable programs of nonproliferation education for high schools poses a tremendous challenge. The solution to this problem can be found in part from a wider understanding and implementation of the UN studies' 34 practical recommendations which encourages governments and international communities to understand the importance of nonproliferation education for the younger generation.

Given the fact that few educational materials in the field of disarmament and nonproliferation issues have been developed for high school level curriculum on social studies, history or current event, collaborative efforts by educational and academic institutes and relevant agencies in national government as well as relevant international organizations are necessary to promote such education for high school students. While the concept of disarmament and nonproliferation education is relatively new, the UN study stipulates, "the need for disarmament and nonproliferation education and training has never been greater." Since 2002, there have been several significant milestones in this field, and more efforts are definitely needed to make further progress to implement the 34 recommendations in the UN study.

In order to increase awareness of the importance of disarmament and nonproliferation education, especially among high school students who normally do not have enough opportunities to study this issue, active cooperation among academic and educational institutions, civil society, national governments, and relevant international organizations is necessary. The following proposals might be considered by each party as practical measures. For example, national government in cooperation with academic and educational institutes could be encouraged to provide educators on a variety of levels with opportunities to receive specialized comprehensive training on disarmament and nonproliferation issues at research and academic institutes with extensive experiences in this field. Academic and research institutes specialized in disarmament and nonproliferation issues with financial support from national governments should be encouraged to develop user friendly disarmament and nonproliferation educational materials and disseminate them to audience at a various educational levels from high school to graduate school students.

Nonproliferation and disarmament education at the high school level is essential in making progress in the field of international security. This requires tenacious efforts and a long term plan. Educational activities in the field of nonproliferation of WMD, one of the

most pressing issues in international security, is essential, not optional, in order to make progress toward a safer world.