

# Boundless Science for Bountiful Agriculture: Conducting a National Essay Contest for Middle School Youth

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## Abstract

In fall 2002, the Council for Agricultural Science and Technology (CAST) captured middle school students' interests in the agricultural sciences by sponsoring a national essay contest. This paper describes the essential processes of conducting a national essay contest for sixth, seventh and eighth grade students.

Contest collaboration was achieved by CAST through contents promotions to the USDA and congressional representatives. The Cooperative State Research, Education, and Extension Service provided major funding for the contest. Information technology requirements included Microsoft's Internet Information Server, Structured Query Language database server applications, Active Server Pages, and Hypertext Markup Language.

A total of 804 essays were received from 40 states, the District of Columbia, and the Virgin Islands. First and second place essays were submitted from home-schooled female students, from the sixth and seventh grades respectively. Only two of the top five essays were submitted by public school students.

Contest management was successful due to the planning and organization of appropriate hardware and software configurations. Future essay contest coordinators should consider their strengths and weaknesses in three areas: existence of appropriate hardware, software applications, and the technological support to coordinate these resources.

## Introduction

Most students do not like to write. It seems as if written forms of communication at all levels of education have become a lost art in current classrooms. Too often, students abhor the notion of having to complete assigned essays. Why? One reason might be that outside of electronic mail (e-mail) usage, the common occurrence of writing down one's thoughts on any subject is a lost art. True, most Americans do not take the time to write letters or send cards to family members, or even to send postcards while on vacation. Cellular telephones, e-mail, and digital cameras have afforded many the conveniences to

“communicate” our thoughts and/or experiences almost instantaneously.

Student performance in writing is impacted by many forces. Academic self-concept is acknowledged to influence student performance across disciplines (Hattie, 1992). Apprehension about writing correlates to writing performance (Pajares & Valiante, 1997) and has been confirmed by self-efficacy researchers that students' confidence in writing is related to the writing competence (Pajares & Valiante, 1997).

For more than 30 years the National Assessment of Educational Progress has collected nationally representative data about American student performance in several subject areas, including reading, mathematics, science, U.S. history, civics, geography, and arts (U.S. Dept. of Education, 2003). Achievement levels of Basic, Proficient, and Advanced are used to report results, based on levels of student performance.

The National Assessment of Educational Progress in Writing was first conducted in 1998 and repeated in 2002. This assessment reflects performance of both public and non-public students at the fourth, eighth, and twelfth grade levels. The 2002 assessment found an increase in overall student writing scores at the fourth and eighth grade levels. There was also a significant increase in the percentage of eighth grade students performing at the Proficient level. The Proficient level is the level identified by the National Assessment Governing Board at which all students should perform. Proficient is defined by the board as a level of “solid academic performance,” demonstrated by “competency over challenging subject matter” (U.S. Dept. of Education, 2003, p. 8).

In fall 2002, the Council for Agricultural Science and Technology (CAST) was determined to capture middle school students' interests in the agricultural sciences by providing a venue for them to practice their writing skills. CAST, in partnership with the Cooperative State Research, Education, and Extension Service (CSREES), National Resources Conservation Service (NRCS), and several private companies and professional organizations estab-

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lished a national essay contest, Boundless Science for Bountiful Agriculture. According to Routman (1994) writing in all areas provides a way for students to extend their understanding of concepts. A national essay contest is one means of engaging students in agricultural sciences.

## Process

The purpose of this paper is to describe the process of establishing and conducting a national essay contest for sixth, seventh, and eighth grade students. The following objectives guided the development of this paper.

1. Describe the collaboration process necessary for establishing a national essay contest.
2. Describe information technology requirements needed to conduct the contest.
3. Describe online essay submission and evaluation processes.

## Outcomes

### Establishing Collaboration

CAST's mission is to assemble, interpret, and communicate science-based information on food, fiber, agricultural, natural resource, and related societal and environmental issues to national and international stakeholders (legislators, regulators, policy makers, the media, the private sector, and the public). National contests require profound planning, organization, and administration to achieve successful outcomes. As with most projects of this magnitude, funding was necessary to pay for staff and technical support throughout the duration of the project. CAST support staff took advantage of their location in Washington, D. C., to promote successfully the national essay contest to USDA officials, funding agencies, and congressional representatives working in the nation's capitol. The primary mode of promotion was achieved through face-to-face meetings with USDA officials and congressional representatives, while telephone and e-mail contact occurred with funding agencies (NASA and Dow AgroSciences). As a result of these promotional efforts, CSREES provided major funding to initiate the national contest; additional funding to conduct the contest was provided by NASA, NRCS, CAST, Dow AgroSciences, and several private and professional organizations.

The CAST Science Education Committee held regular conference calls and communicated weekly through e-mail during the planning stages of the Boundless Science for Bountiful Agriculture contest. The committee created all contest conditions, including:

- **Purpose:** A national essay contest to educate and excite students, teachers, and parents about agricultural science.
- **Eligibility:** The contest was open to all youth enrolled in sixth, seventh, or eighth grades, including

those attending public, private, parochial, or home schools in any of the fifty states or five United States territories.

- **Word Limit:** Students were limited to writing a 500-word essay with references, based on their research, for one of seven categories, which included: Ag Science in the City; Alternative Fuel Research; Conservation of Resources; Cultivating New Technologies; Dynamic DNA; Food Science and Nutrition; and Weather and Crop Production.

- **Judging Criteria:** The evaluation criteria (Content, 170 points and Mechanics, 30 points) for the essay contest were provided to all judges. All essay submissions were judged according to their originality, creativity, organization, quality of work, use of new sources, grammar, and essay length.

- **Judges:** At the state-level, essays were judged by a panel of three evaluators from each state's representative cross section of agricultural scientists, professional agricultural communicators, and educators. Each state's winner competed at the national level for recognition as one of the nation's top three essay writers. National essay judging was completed by a panel of five evaluators (three scientific-technical experts and two agricultural communications professionals) representing specialized expertise in each of the contest topic areas.

- **Submission Requirements:** All students interested in entering the essay contest were required to submit their essay online through a closed, secure Web site. Essays were submitted from September 1, 2002, to November 1, 2002.

- **Award Categories:** Essays award occurred first at the local school level. Each school winner was entered into competition for the best essay in each state congressional district from which the schools were represented. Congressional district winners from each state or territory competed for the best essay in their respective states or territories (Note: some states and territories have only one congressional district, therefore students in those situations won two levels congressional district and state automatically). State or territory winners competed against each other for the best essay nationwide.

- **Prizes:** Local school winners were awarded a certificate. Congressional district winners traveled to their state's or territory's land-grant universities for a ceremony in which medals were awarded to each congressional district winner. State winners received a \$100 savings bond. National winners (top three) were awarded an all-expense paid trip with his/her parents and essay advisor to Washington, D.C., for National Agriculture Day on March 20, 2003. National winners met with Members of Congress from their respective states, the Secretary of Agriculture, and had a VIP day at the USDA where Secretary Veneman awarded trophies and plaques to the top three winners. The national 3rd place winner received a \$500 savings bond, national 2nd place winner received a \$1000 savings bond, and the

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national grand prize winner received a \$3000 savings bond.

### **Information Technology Requirements**

The Boundless Science for Bountiful Agriculture essay contest management system was established using a data driven Web site. These sites, also called dynamic Web sites, generate individualized pages upon request from data stored in a database rather than simply delivering the same Web page to every user. By using a database to identify users, and then generating pages made up of components selected especially for them, users can experience a Web site individualized to their needs. This can be accomplished in many ways, using a variety of databases and programming languages ranging from freeware solutions using PHP/MySQL to completely off-the-shelf solutions using Microsoft ASPX/SQL Server. For this project, the authors reviewed several solutions and chose hardware and software to maximize security, performance, and reliability.

**Hardware:** While server software can be installed on any machine, the reliability of this system would be questionable at best. Machines designed to provide extreme levels of reliability through planned redundancy of critical components are often called Enterprise servers. The machine selected for this project had dual Xeon (Intel) processors, redundant power supplies, a Redundant Array of Independent Disks (RAID), and a Digital Data Storage (DDS3) tape backup drive. These redundant hardware features, common to all Enterprise-class servers, are designed to ensure around-the-clock availability of the server to remote clients and the integrity and longevity of data stored on the server. In essence, all data submitted to the server were stored in two different locations in real-time and backed up to a third location every 24 hours.

**Software:** For the Boundless Science for Bountiful Agriculture essay contest, Microsoft's Internet Information Server (IIS©) and SQL Server© database software applications were installed. Microsoft's SQL Server© was chosen over less robust databases primarily because of its enhanced security. SQL Server allows security to be applied to fields within the database, whereas lesser database management systems, Microsoft Access for example, can only apply security to tables or collections of fields. In this project, field-level security was important so that judges had access to their own essays/scores only.

The programming language chosen to develop the Web site was Microsoft's Active Server Page (ASP). Pages developed using ASP output or send standard HTML to the connected user's Web browser, and are therefore totally browser independent, meaning that they can be read equally well by Microsoft Explorer, Netscape Navigator, or most other browsers. These dynamic pages connected users of the Web site directly to the secure database for storing and managing both the essays submitted

by students and the judges' evaluations for each essay.

In short, the IT requirements (hardware and software configurations) for this project allowed students to submit essays to the Web site and receive confirmation that the essay had been received day or night, seven days a week. Each essay was stored securely and yet instantly accessible to the judges assigned to evaluate that essay. Students submitting essays were assured their essays were not lost, and judges were assured that accessibility to score only the essays they were assigned to evaluate. No physical copies of the essays were ever needed to be transported to or from the judges during the evaluation stage of this project.

The judges' evaluation scores were collected, stored, tabulated, and reported without delay and without the possibility of human error. The database application ensured an "audit trail" for the essay review and evaluation system. The contest administrator ascertained minute-by-minute whether an essay had been evaluated and its current placing. The reduction in human effort required to collect the essays as well as collect, manage, tabulate, and report the results of the judges evaluations in an essay contest of this size was by itself worth the costs of developing the system. The additional benefits to the timeliness of the process and the reduction of the possibility of human error made the decision to build the system even more attractive.

### **Online Essay Submission and Evaluation Processes**

To conduct the Boundless Science for Bountiful Agriculture national essay contest, where submissions were expected from every state and territory, the CAST Science Education Committee decided to implement an online contest management system. First, an informational Web site was developed to promote the essay contest in May 2002. Promotional materials were developed and distributed to agricultural commodity organization magazines, state newspapers, breed association journals, and notices were sent to all state directors of education, middle school science teachers' associations, state land-grant agricultural communications' electronic mail lists, and professional agricultural communicators' listservs. Inquiries from students, teachers, parents, and interested stakeholders were directed to the contest Web site.

Once the promotional site was finalized in July 2002 additional informational Web pages were developed for the Boundless Science for Bountiful Agriculture Web site. These pages included helpful links explaining the purpose of the contest, important dates, contest rules, judging criteria, prizes, research help, reference examples, frequently asked questions, and sponsors of the national essay contest. Individuals' questions could be sent via e-mail to the contest coordinator at CAST's National Headquarters in Washington, D.C.

In August 2002, an apolitical Web site address



was created whereby contestants and judges could not readily identify the physical location of the server, thereby reducing threats of bias and/or security breaches. The Web site, [www.ag-communicators.org](http://www.ag-communicators.org), featured links to the contest home and an online essay submission entry point. The SQL database, not residing on the same server as the contest Web site, was developed to store students' contact information, essays, judges' login names, and passwords. Students entered their school name, grade, congressional district number, essay title, and were given the opportunity to type their essays and references directly into text boxes. Students could use a cut-and-paste function from a word processing program to enter the information.

At the conclusion of the essay submission period judges were identified through contact with land-grant agricultural communications faculty members, industry professionals, and agricultural government agencies. Contest judges must have had an educational background and/or professional experience in food science, agricultural science, natural resources, or agricultural communications and must have completed no less than their sophomore year in college. Their names and e-mail addresses were collected through this contact, and then unique login identifications and passwords were assigned and stored in another SQL database.

More than 800 essays were analyzed using two levels of judging: state and national. At the state level, 238 judges reviewed and scored no more than 30 essays each and only from students in their respective states/territories. A minimum of three judges scored each essay using two criteria: Content [originality (70 points), creativity (40 points), organization (35 points), quality of work (20 points), and use of new sources (5 points)] and Mechanics [grammar (20 points) and essay length (10 points)]. Average scores (200 points possible) were established to determine school, congressional district, and overall state winners.

Overall, the writing skills of middle school youth were considered poor and/or inadequate, as reported from judges' telephone calls and e-mail notes from eight different states. Students struggled with grammar, punctuation, and correctly citing sources. Many judges (from eight states) expressed concerns about the extensive amount of plagiarism in essays they reviewed and scored. Judges often found their own works in essays without appropriate citations.

State winning essays were grouped by one of the seven contest categories, which were judged by an independent panel of five national judges (n = 35) that included three scientific-technical experts and two agricultural communications professionals. Although the CAST Science and Education Committee had established tie-breaking rules, no ties in scoring occurred at the state or national levels.

A total of 804 essays were received from 40 states, the District of Columbia, and the Virgin Islands.

More essay submissions were received from females (n = 446) than males and more from eighth grade students (n = 437) than from any other grade. Over one-third of the essays originated from either Kansas (n = 165) or Texas (n = 110). More essays (n = 453) were submitted within the last three days of the contest with over 29% (n = 236) occurring on November 1, 2002, the very last day of the essay submission period.

There were essays submitted to all seven contest categories, but the categories, Alternative Fuel Research (n=156) and Cultivating New Technologies (n = 155) received the most entrants; the fewest number of essay submissions were received in the Conservation of Resources (n = 69) and Weather and Crop Production (n = 58) categories.

The nation's first and second place winning essays were submitted from home-schooled females, in the sixth and seventh grades respectively. Home-schooled students represented 2.49% (n = 20) of total essay entrants in the contest. Only two of the top five essays were submitted by public school students. A CAST special publication (CAST, 2003, No. 29) was created to list in their entirety, the top three winning essays, all state winning essays, winners at the congressional district and school levels, entry rules, scoring criteria, and all participating judges.

## Summary

Contest coordinators learned much from this experiment in communicating the science of agriculture. The online essay submission and judging processes worked flawlessly. No problems were reported to the contest coordinators concerning either aspect of the contest. The successful management of this contest was attributed to the planning and organization of appropriate hardware and software configurations. Future essay contest coordinators should consider their strengths and weaknesses in three areas: existence of appropriate hardware, software applications, and the technological support (staff or consultants) to coordinate these resources. These three components should be addressed prior to implementing a national essay contest.

The outcomes of poor and/or inadequate writing skills, plagiarism, and inappropriate citation use across the majority of essays caused much concern for some contest judges and all the contest administrators. Herein lies a teachable moment for all educators interested in furthering the American agricultural knowledge base. For example, future national essay contest coordinators must exercise greater care in "educating" students and writing coaches about the differences between copying work from an Internet site and researching and writing (in your own words with appropriate citations) an essay. Copying another author's work and passing it off as your own is plagiarism. If you work in a teacher-educator program, this point bears repeating often with all future

teachers so they may educate youth at all levels of elementary and secondary education. Additional information regarding the development of research papers and the perils of plagiarism must be developed and posted to future contest Web sites and promotional materials.

This contest failed to support the findings of the National Assessment of Educational Progress in Writing (U.S. Department of Education, 2003). Students who entered this national essay contest may not have been representative of the national norm (eight grade students writing at the Proficient level; i.e., no eighth grade students ranked among the top five essays nationwide), according to the National Assessment of Educational Progress in Writing (U.S. Dept. of Education, 2003). However, repeated national essay contests in the agricultural sciences could contribute to decreasing middle school students' apprehension (Pajares & Valiante, 1997) and increasing their confidence in writing (Pajares & Valiante, 1997). Additional studies should be conducted to determine writing skill levels between entrants in this essay contest and those from the National Assessment of Educational Progress in Writing.

Conducting a national essay contest of this magnitude requires an immense amount of collaboration, promotion, and service from contest coordinators and essay judges. It behooves all educators with a vested interest in agriculture to continue inspiring, motivating, and "teaching" the next generation of

agriculturists nationwide. One method of accomplishing this responsibility is to become involved in national essay contests for middle school students. College of agriculture scientists, public service employees, and private sector personnel, such as the many agricultural communications industry professionals who participated in this contest, were essential to the success of this project; such collaboration and service will be essential to the success of future National Boundless Science for Bountiful Agriculture essay contests.

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