

Running Head: A STRATEGY FOR DEVELOPING A FOOD DEFENSE WEBSITE

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Abstract

The vulnerability of the food supply to intentional contamination attacks has highlighted the need for expertise in the area of food protection and defense. In order to meet this challenge, the U.S. Department of Homeland Security established the National Center for Food Protection and Defense (NCFPD) Center of Excellence. The educational component of the NCFPD, based at Michigan State University, was established to enhance our nation's intellectual capacity in food protection and defense. One major deliverable of the educational component was the creation of a website of food protection and defense materials and resources.

This document presents the strategy used in developing the website as a mechanism for disseminating food protection and defense information, and also offers recommendations to individuals developing similar information channels. It highlights the important role websites can play in promoting learning and education online.

A Strategy for Developing a Food Defense Website

The agriculture industry is one of the nation's largest employers (Institute for National Strategic Studies, 2003). Approximately one in six Americans are employed in the process of producing, processing, or providing food to our tables. The food supply is an area that has proven to be particularly vulnerable to an intentional contamination event (Institute for National Strategic Studies, 2003), as throughout the world there have been a number of attacks on the food supply. In 1978, mercury was found in Jaffa oranges in five European countries; in 1984, a salad bar was intentionally contaminated with salmonella in Oregon; and in 2003, rat poison was discovered in school breakfasts in China (Kinsey, Stinson, Degeneffe, Ghosh, & Busta, 2006). Any attack on the food supply would not only affect the health of many Americans, but would bring about potential losses in resources and money.

Food as a target of terrorism has elevated the need for expertise in food protection and defense, a lack of which consequently threatens the safety of our food supply (Reischl & Buss, 2004). For example, in a survey of environmental health professionals, 68 percent of workers reported wanting to know more about their role in emergencies and 49 percent wanted more training on food security issues (Reischl & Buss, 2004). A recent study conducted by Rochefort, Wakenight, Glazer, and Lapinski (2007) further supports the notion that there is a lack of knowledge in food protection. Rochefort et al. conducted three focus groups with 18 food regulators and found these professionals were unclear of their role in an intentional contamination event.

In order to meet this challenge, the U.S. Department of Homeland Security established the National Center for Food Protection and Defense (NCFPD), a DHS

Center of Excellence based at the University of Minnesota, to advance the security and safety of the nation's food supply through research, education, and outreach (NCFPD, n.d.). Components of the NCFPD include risk communication, supply chain management, and education.

A goal of the educational component of the NCFPD, based at Michigan State University (MSU), was the development of a website consisting of food protection and defense materials and resources (Conference Proceedings, 2005). This document describes a strategy for developing a website as a mechanism for disseminating educational information, in this case, relative to food protection and defense information, and provides recommendations to individuals developing similar information channels.

Establishing the most appropriate learning tool

The goal of the NCFPD educational component is to increase the nation's intellectual capacity relative to food protection and defense. To accomplish this goal, a learning community was enlisted consisting of colleagues from government, academia, and industry tasked with developing strategies to enhance food protection and defense education. A learning community is an intentionally created community meant to maximize learning (Eschedor and Voelker, 2006). This approach focuses on collaborative learning, defined as learning that occurs through joint partnerships, rather than teaching. It is often centered around an interdisciplinary theme pulling information from a variety of disciplines (DuFour, 2006; Washington Center for Improving the Quality of Undergraduate Education, n.d).

Learning community members from academia include subject matter experts with a background in disciplines relevant to food protection and defense, including risk communication and supply chain management. Government learning community members include federal, state, and local government officials who would play roles in the event of terrorist attacks involving the food supply (e.g. food regulators). Industry professionals include representatives from related industries and food industry associations (e.g. representatives from Kellogg Co. & Country Fresh)

The NCFPD learning community held education workshops in January 2005 and in January 2006, in East Lansing, Mich. At the initial conference, attendees determined that an online database would be the most appropriate way to disseminate food protection and defense educational materials to a wide variety of audiences. This would be done by providing links to educational and informational resources from within academia, government, and industry (Conference Proceedings, 2005).

The range of means for conveying information is vast.... The online format is a key tool in educational enhancement. Within this format, options range from entire curricula to single courses, industry short courses, specific modules and certificate programs (Conference Proceedings, 2005).

The learning community identified the benefits of an online repository of educational resources as:

- The ability to efficiently reach target audiences
- Access to international audiences and the means to foster international involvement

- The capability to overcome information overload and to avoid the duplication of food defense education resources and information
- The generation of a database of terminology
- The establishment of a lasting and sustainable information tool
- A means to announce events and conferences
- The creation of a credible and authoritative source on food protection and defense issues based on guidance from a learning community of experts

The learning community sought to expand its resource listings beyond educational organizations such as academia to include educational resources offered by government and industry, in order to provide resources sufficient to meeting the needs of the variety of groups that could be involved preventing, responding to, and recovering from an intentional contamination event. The desire to establish the website as a product owned by a learning community of academic, industry and governmental partners and not just a single institution, led the learning community to decide to adopt a “.org” uniform resource locator (URL). The website, www.foodprotectioneducation.org, was selected as the domain name by members of the learning community. Conference attendees and learning community members also agreed that the website should not promote a corporation, commercial service, or serve as a retail outlet.

Process of Creating the Website

The completion of www.FoodProtectionEducation.org occurred over a series of phases. The first step was the accumulation of education and training resources based upon specific audiences. At the 2005 conference, the NCFPD learning community identified occupations key to preventing, responding to, and recovering from a potential

intentional contamination event (See Table 1). Groups identified included academia, government, industry, first responders, laboratories/health care, and international audiences. Consequently, content for the website was selected and organized to fit the needs of these specific audiences.

Table 1. Occupations identified as relevant to food defense

Agriculture	Management
Aviation / Transportation	Military
Citizens	Non-Profit Organizations
Community Leaders	Physicians
Community Managers	Private Sector
Emergency Responders	Psychology
Environment / Natural Resources	Public Health
Fire Departments	Public Officials
Food Industry	Public Utilities
Food Production	Risk Assessment
Food Safety	School Officials
Food Science	Security
Government	Students
Graduate Students	Supply Chain Management
Homeland Security	Transportation Security
Information Officer	Veterinary
Law Enforcement	

Source: www.foodprotectioneducation.org

The NCFPD learning communication also identified a variety of topical areas that should be addressed by the accumulation of educational resources. Topics included agroterrorism, criminal justice, risk communication and public health (see table 2).

Table 2. Topics identified as critical to food defense

Agroterrorism	Law
Biotechnology	Microbiology
Border Protection	Military
Business & Economics	Other
Criminal Justice	Processing
Cyber Security & Information Security	Public Health
Emergency Response	RFID & Sensors
Engineering	Risk Assessment
Environmental	Risk Communication
Food Defense	Site Security
Food Protection	Sociology, Anthropology & Culture
Food Safety	Supply Chain Management
Food Science	Terrorism
Government	Transportation
History	Veterinary/Animal Health
Homeland Security	Waste Management
International Relations	

Source: www.foodprotectioneducation.org

The resources that comprise the content of www.FoodProtectionEducation.org were gathered from academia, government and industry. Specific to government, resources were collected through an extensive search of relevant organizations such as the U.S. Department of Agriculture (USDA), the Department of Homeland Security, and the Center for Public Health Preparedness. The types of the resources include PDF files, PowerPoint presentations, and information on training programs and academic courses offered by universities (See Table 3).

Table 3. Types of resources

Article	Document	Paper
Blended Course	Online information	PDF file
CD-ROM/DVD	Online video	PowerPoint Presentation
Classroom	Online Webcast	Video

Source: www.foodprotectioneducation.org

The selection of resources to determine which resources should populate the site involved a collaborative effort between two members of the NCFPD - a graduate student assigned to the project and the project coordinator. Resources were selected or rejected

based upon each item's (1) relevance to food protection and defense information, and (2) the potential applicability of the resource to serve the needs of the target audiences. Links were created from www.foodprotectioneducation.org to the selected resources. In addition, websites relevant to food protection and education were continuously reviewed to increase the variety of resources in the database.

Once selected, the resources were placed in the appropriate categories on the website. A resource could be placed in a topic category, occupation category, or both. Many resources were assigned to multiple categories as they contained information relevant to multiple topics and occupations. For example, a resource on agroterrorism could be placed under the environmental, food defense, food safety, and agroterrorism topic categories.

Simultaneous to the collection of resources, the vetting process, and the categorization of resources by audience type, was the designing of the site. The MSU Office of University Relations was chosen as the developer based on prior work with other MSU departments and recommendations from other University Relations clients.

Insight for the design came from learning community members present at the 2005 NCFPD conference. They determined that the design of the site should easily accessible with user-friendly navigation to allow for the efficient locating of resources.

MSU University Relations also developed the website to reflect other educational resources websites deemed appropriate models by the NCFPD Education component team. Useful in completing the design was the book, *Designing with Web Standards* (Zeldman, 2006).

An additional feature of the website design is an events page with links to food protection education conferences and other events relevant to food protection. The inclusion of this component was in response to the learning community's desire to inform target audiences and educators of upcoming events. Events were gathered from announcements on the parent NCFPD-Minnesota website as well as other sites such as that of the USDA. A few events were listed on the homepage to grab users' attention and emphasize upcoming events. These were linked to the events page. Though initially discussed by the NCFPD learning community, a breaking news component did not complement the goal of the website to provide educational resources to users, and therefore was not included (Conference Proceedings, 2005).

Conference attendees in 2005 were insistent upon the need to establish a common vernacular for the growing field of food protection and defense relative to intentional contamination. Accordingly, a glossary of terms was developed by members of the learning community and incorporated into the initial phase of the website. The terms listed in this initial glossary were based upon suggestions of the learning community. Members of the learning community from Iowa State, North Dakota State, Kansas State, MSU, and the University of Minnesota reviewed the glossary to assess the validity of the definitions.

Eventually, concern arose among NCFPD-Minnesota leadership as to the vetting and validity of some of the terms. To acquiesce this concern, the NCFPD Education component elected to only list references from the U.S. FDA-CFSAN-Office of Food Safety, Defense and Outreach website.

Marketing

In addition to determining the content and design of www.FoodProtectionEducation.org, a marketing plan was developed to increase the visibility of the website, attract users, and establish brand loyalty (FPE marketing plan, 2005). Research has shown that e-loyalty, loyalty to a specific website, has a positive impact on word-of-mouth. This is defined as the extent to which an individual says positive things about the e-retailer to other potential users of that site (Srinivasanm, Anderson, & Ponnayolu, 2002).

The marketing plan included five phases (See Table 4). The first phase sought to build awareness of the website to attract users and create usage. Research has shown that the first task of online marketing should be to attract users to the website (Yang, Ahmed, Ghingold, & Boon, 2003). The NCFPD learning community proposed that this be done through testimonials, sponsorships on education-related sites, and an e-newsletter. A blogging feature was also suggested reflective of prior research that indicates that users are more likely to revisit an interactive website with feature such as blogs and discussion forums (Yang, Ahmed, Ghingold, & Boon, 2003).

Table 4. Marketing Plan

<p>First Phase:</p> <p>Build awareness of the website to attract users to the website and create traffic</p>
<p>Second Phase:</p> <p>Attract new customers and partnerships within crucial market segments</p>
<p>Third Phase:</p> <p>Build upon established networks by collaborating with other media partners</p>
<p>Fourth Phase:</p>

Gather repeat customers through virtual branding
Fifth Phase: Market the website through its own linkages

Source: FPE marketing plan (2005)

The second phase of the marketing plan included attracting new customers and partnerships within crucial market segments which may find the information on the website useful. This was proposed to further increase traffic and build awareness among users.

The third phase included building upon established networks by collaborating with other online resources. From a business perspective, non-competitive affiliate programs, defined as directing users to one site through links listed on partnering websites, have been shown to increase online sales. For example, Jupiter Communications estimates 25 percent of its online sales come from affiliate programs or linked partners (Yang, Ahmed, Ghingold, & Boon, 2003).

The fourth phase of the plan was designed to gather repeat customers through virtual branding, described as creating an image consumers will recognize. This activity was delayed until the fourth phase as it has been proven to be difficult to establish a brand image in the absence of already established user recognition created through other channels (Rowley, 2004). Incorporating virtual branding into the marketing plan mix was included in order to enhance the online presence of the website and build on an already established user base.

Phase five included marketing the website through its own linkages. This effort was incorporated in order to increase the presence of the website and ultimately increase traffic to www.FoodProtectionEducation.org (FPE marketing plan, 2005).

Usability Enhancements

Discussions held at the 2006 NCFPD workshop and subsequent conference calls with learning community members prompted changes to the website design to enhance users' ability to locate resources. One enhancement was the division of resources into more stringently-defined categories beyond the occupation and topic categories used in the initial phase of the project. These included a categorization of resources by type, keyword, author/institution, topic, course/training, and occupation/audience. Course/training refers to a university course or other training program that may be delivered from industry, government, or academia.

An enhanced search function was also developed to enable resource location. The search function allowed for the use of additional search terms and permitted users to search by keyword, topic, occupation, type, format, or institution. These categories were based on recommendations from the learning community.

Reaching Marketing Goals

In order to promote www.FoodProtectionEducation.org as described in the third phase of the marketing plan, it was linked to partnering websites, such as the parent NCFPD-Minnesota website. Linkages were also created to www.foodSHIELD.org, a website designed to promote collaboration among food regulators in the event of a food-related crisis.

True to research recommending the incorporation of interactive features as a means of building interest, the NCFPD initiated a discussion forum to encourage collaboration between target audiences and promote awareness of the website. The forum, described in the first phase of the marketing plan, enabled users to post questions

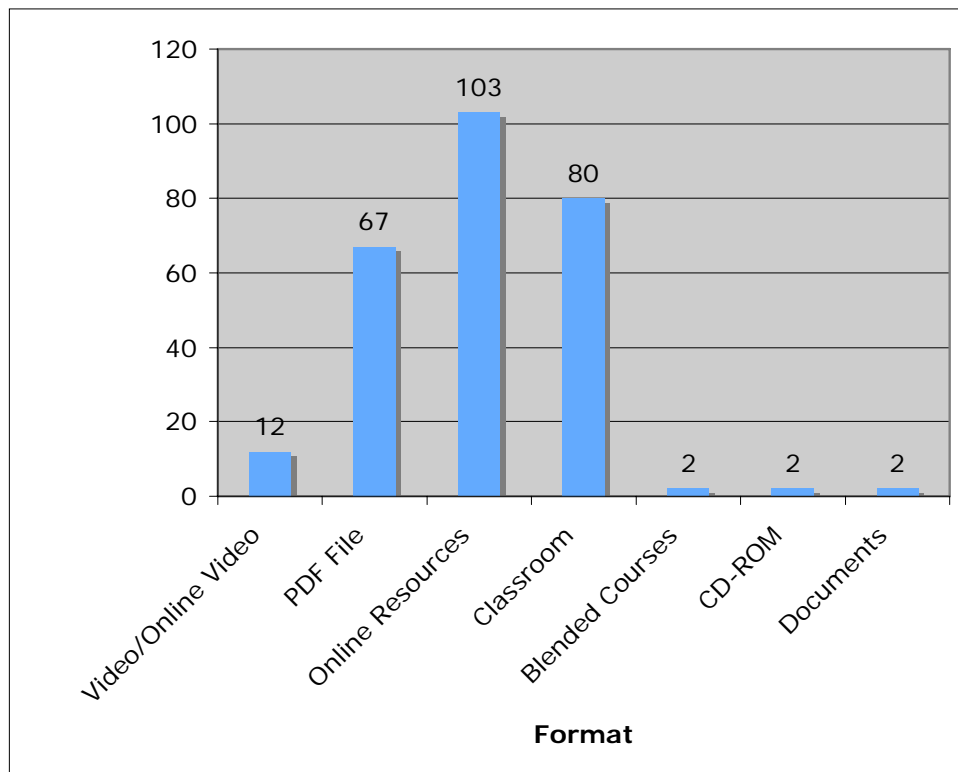
as well as respond to comments and questions posted by other users. Research has shown that forums enhance marketing communication through a hypermedia environment, a place where users have the ability to access large amounts of information through a variety of online channels (Hoey, 1998).

An additional feature was the enlistment of a customer resource management (CRM) tool to contact new and existing partners and to build awareness for the website. The CRM, developed by MSU University Relations, consisted of a means to manage a database of contact information of partners whose resources were listed on the database. This tool allowed users to sort and segment types of users. For example, an email could be sent just to industry partners and not to those in academia or government. When the database was created, an e-mail was sent to all partners to make them aware of the website.

Current Condition of Website

As of April 2007, the website listed 268 total resources. The resource format included 12 video/online video, 67 PDF files, 103 online resources, 80 classroom resources, two blended courses, two CD-ROM resources, and two documents (See Figure 1). Blended courses had both classroom and online components, and documents included resources such as online articles.

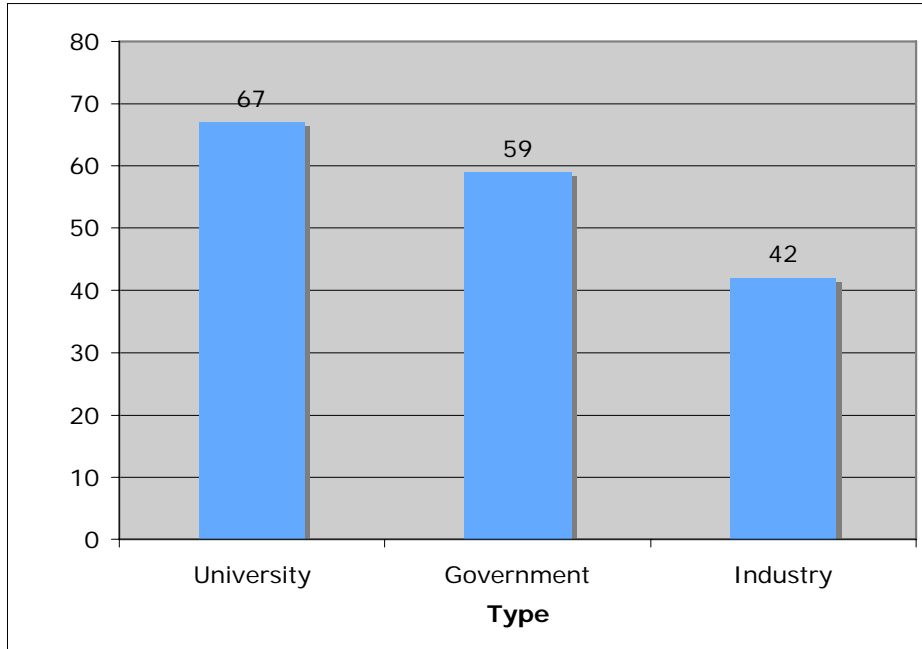
Figure 1. Resource Format



Source: www.foodprotectioneducation.org (2007)

The resources were selected from resources in academia, government, and industry. As of April 2007 the website had 67 of resources from universities, 59 resources from government, and 42 resources from industry (See Figure 2).

Figure 2. Resource Type



Source: www.foodprotectioneducation.org (2007)

Discussion

Internet usage has increased since the early 1990s and continues to grow annually. While only approximately 16.6 percent of the world's population uses the Internet, this number has grown 202.9 percent from the year 2000 to 2007 (Internet World Stats, 2007).

As Internet use becomes more widespread, the NCFPD would like to maintain a repository of online information for food protection and defense. Blogs and podcasts are some of the most popular, well known, and available media (Seitzinger, 2006) by which

to build interest and encourage repeat website traffic. As such, www.FoodProtectionEducation.org, intends to capitalize on these information tools and offer them on the website in the future. These features are key to online learning (Seitzinger, 2006) as blogs can offer immediate feedback to others, can give users new ideas and thoughts, and foster learning among users. They can also create a community and social presence online populated by a group of people who are aware of the website and visit regularly. (Seitzinger, 2006). Podcasts are MP3 files that can be downloaded from the Internet. They can be played on the computer, on mobile phones or on MP3 players. Podcasts allow the user a format for self-paced learning and a flexibility that traditional learning formats do not offer. Users are free to download the podcasts to listen to at their convenience and may stop and start the podcast as they wish (Seitzinger, 2006). The NCFPD hopes that adding these additional features will not only stimulate learning, but also create a sense of community among users and increase traffic to the website.

The NCFPD learning community intends to include a more extensive glossary in order to continue to establish a common language among users. As of April 2007, the website only included sources approved by the U.S. Federal Drug Administration. However, this may not include all of the relevant definitions and sources of food protection and defense. The NCFPD believes additional glossary sources will increase knowledge of language and verbage used in food protection and defense publications and industries.

As previously stated, the goal of the learning community is to create a website that provides users with a rich educational experience, and also create a brand name for

food protection and defense education. Additional design features discussed above will enable the accomplishment of these goals.

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