The Computerworld Honors Program

Honoring those who use Information Technology to benefit society

Final Copy of Case Study

Year:
2013

Status:
Laureate

Organization Name:
Cyber Defence Challenge

Organization URL:
http://www.cyberdefencechallenge.ca/

Project Name:
Cyber Defence Challenge

Please select the category in which you are submitting your entry.
Collaboration

Please provide an overview of the nominated project. Describe the problem it was intended to solve, the technology or approach used, how it was innovative and any technical or other challenges that had to be overcome for successful implementation and adoption. (In 300 words or less.)

MindSet, Manitoba Network for Science & Technology, through the support of Canadian Information Processing Society (CIPS) Manitoba, collaborated to implement an innovative cyber security educational program called the Cyber Defence Challenge (CDC). The CDC is part of a pilot study that will develop students' awareness and understanding of cyber security fundamentals. The program is an extracurricular school course that combines classroom learning with practical hands-on training that tracks and records students' progress and development in a virtual emulation computer environment. In October 2012, CIPS Manitoba joined with the International Information Systems Security Certification Consortium, Inc., (ISC) Winnipeg & Saskatchewan Chapter and ISACA Winnipeg to form a strategic support alliance focused on educating and empowering the

local community to use the Internet safely and securely at home, work, and school, protecting the technology individuals use, the networks they connect to, and Canada's shared digital assets. This new collaboration team is aligned with the National Cyber Security Alliance (NCSA), whose mission is to build strong public/private partnerships that create and implement broad-reaching education and awareness efforts to empower users at home, work and school with the information they need to keep themselves, their organizations, their systems, and their sensitive information safe and secure online and encourage a culture of cyber security. The consortia of CIPS, ISC, and ISACA have developed a multi-faceted program that incorporates the educational awareness components of StaySafeOnline.org and the applied learning components of CDC. The joint program is being marketed as the Canadian Cyber Defence Challenge. The goal of the program is to prepare students to understand the fundamentals of cyber security as part of their personal and professional career paths and provide them STEM (Science, Technology, Engineering and Math) foundation components to grant them options in their post-secondary studies.

When was this project implemented or last updated? (Please specify month and year.) Has it incorporated new technologies and/or other innovations since its initial deployment? (In 300 words or less.)

This past year MindSet and CIPS facilitated a pilot program with six Manitoba High Schools to participate in an international Cyber Security e-Learning Pilot program. The goal of the pilot was to select the top two (2) teams from Manitoba to compete in an annual national cyber security competition in the U.S. called CyberPatriot. CyberPatriot is the premiere national high school cyber defence competition created by the Air Force Association to inspire high school students toward careers in cyber security or other science, technology, engineering, and mathematics (STEM) disciplines critical to the nation's future. In the CDC, high school teams learn to defend a virtual network malicious attack. After an opportunity to learn and practice the problem-solving skills to do this, they get together with other high school teams in a competition to see which team can do it the best. With the financial and technical support of the Winnipeg technology community, sponsors and education supporters of the program, Manitoba was able to send two high schools (Winnipeg's Sisler High School and Winkler's Garden Valley Collegiate) to compete at the Cyber Patriot Games, held in Washington, D.C., March 21-24, 2012. As the first international guests to the high school cyber defence competition, the teams were not counted in the official standings. Both teams performed exceptionally well and ended up finishing (unofficially) second and fourth out of the 24 American regional winners they competed against. These results prove that with the right tools and support, students are capable of learning new concepts and performing at the highest level.

Is implementation of the project complete? If no, please describe the project's phases and which phase the project is now in. (In 300 words or less.)

This year (2013) marks the first-ever demonstrated program in Canada. The project is composed of four phases. We are currently in the process of launching Phase I. Phase I – Instruction. Classroom instruction consists primarily of lectures and reading of facts. This is when the student adds new facts or theories with which they will continue the growing process. During classroom training, questions are raised to better understand concepts and details, and to put all of these facts in perspective. Phase II – Live Exercise. Armed with these facts and techniques, the student needs to reinforce this knowledge through personal trial-and-error exercises. They need to put their hands on the keyboard, and through the computer interface, see the consequences of the actions they take. To be meaningful, their actions must receive immediate feedback in the form of real performance numbers; this will measure their performance realized by their actions. Additionally, immediate feedback has the added benefit for the instructor, who, recognizing where demonstrated weaknesses lay, are then able to focus training in those weak areas. The outcome is a richer learning experience. Phase III – Competition. To reinforce this training, competitions provide the students with an opportunity to demonstrate what they have learned, and in a high-stress environment, much like the real world. We need to set our expectations for what high school students can handle, and our assessment is that they "get it" and are capable of managing technologies, such as UNIX, IDS, networking gear, etc. Competition can be structured at the school/classroom as well as intra-school competitions. The final playoff competition will be staged at a professional network/industry forum to showcase the program to the professional community. Phase IV – Certification. A certification exam is administered using this centralized trainer that quantifies performance.

Please provide at least one example of how the technology project has benefited a specific individual or organization. Feel free to include personal quotes from individuals who have directly benefited from the work. (In 300 words or less.)

The vision of the CDC is to transform the pilot program into the Canadian version of Cyber Patriot. The CDC has potential to become a national-based competition that would involve high schools across Canada competing for recognition, scholarships, and ultimately career advancement opportunities in the IT Security market. In the U.S., it has been proven that these types of programs are making a difference in changing the perspectives of students in terms of how they view careers and opportunities in the IT security market. We have seen firsthand that competitions are an essential element of the training life cycle. We have seen positive examples of students demonstrating great excitement, both in

anticipation of the competition, and post-competition when they have proven to themselves that, in fact, they can really do this "Cyber Security" thing. We have had several educators tell us, "Students like being recognized as competent in something; especially amongst their peers." We also know from post-exercise surveys conducted during CyberPatriot that, as a result of this competition experience, the participating high school students were more likely to attend post-secondary studies as a result of the experience. For example, of the five students that participated in the CDC from Sisler High School and then went on to compete in the CyberPatriot, two students were hired directly for summer employment work by one the leading Cyber Security consulting firms here in Winnipeg and all five students are now focused and committed to pursuing post-secondary studies in Computer Science in anticipation of gaining full-time professional employment in the Cyber Security profession. The CDC program is making a positive contribution in building awareness of the exciting career opportunities available to young people in the field of technology and Cyber Security.

Would this project be considered an innovation, a best practice or other notable advancement that could be adopted by or tailored for other organizations and uses? If yes, please describe that here: (In 300 words or less.)

This project is an innovation as well as best practice. The work that was undertaken to develop the cyber simulation technology for the students in the classroom was designed and architected by a group of local IT professionals – all members of CIPS, ISC2, ISACA, and Skull Space. See Appendix 1 and Appendix 2 for details. The simulation technology can be leveraged and utilized by and for other organizations. However, its primary purpose is to provide a stimulating real-time environment for the students to learn. The technology can be set up to help students learn one-on-one, in small teams, and within and between teams at school and intra-school competitions. In addition, the project is considered a notable advancement for Canada in that there is no other program that combines the simulation technology and the learning curriculum together as an integrated classroom program for students at the high school level. Another key aspect of the project is the fact that three professional organizations, namely, CIPS, ISC2, ISACA, and Skull Space, have all come together to provide mentoring and education support to the students and teachers in the classroom and at the competition level as part of the overall program delivery.

If there are any other details that the judges should know about this project, please note them here. (In 300 words or less.)

In closing, we are excited by the opportunity to establish Manitoba's and Canada's first high school cyber defence curriculum that has a high probability of

success. We know that the kids are capable of training on live IT environments and that with minimal instruction, can navigate complex computer operating systems as well as network and security devices. But to get started takes the commitment of educators and volunteers to establish the cadre of trainers. We also know that for instruction to be meaningful, it requires practical application in a real environment with immediate feedback of results. See Appendix III for details. There are many organizations and institutions that try to implement pieces of the puzzle, but if we don't address all of these technology requirements up front, partial programs will have a hard time showing a return on investment, that is, kids demonstrating enhanced skills. This project attempts to provide one holistic model that we believe will yield real, and relatively quick, results.