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Case Study

High-tech High School's Geography Curriculum Introduces Students to the Power of Geospatial Technology

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Founded in 1984, Esri Canada provides enterprise geographic information system (GIS) solutions that empower businesses, governments and educational institutions to make timely, informed and mission-critical decisions by leveraging the power of geography. The company distributes the world's leading GIS software from Esri, along with a comprehensive portfolio of complementary GIS products and services. Headquartered in Toronto, the company serves over 10,000 customers from 16 regional offices across Canada.

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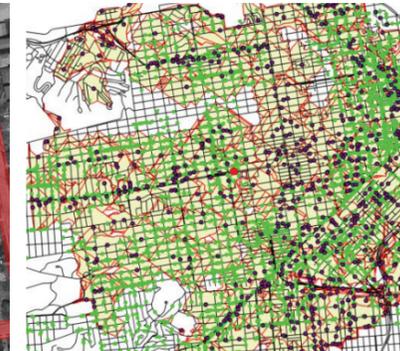


Waterloo Collegiate Institute teaches GIS to give students an academic edge

Due in part to its advantageous location in Canada's Technology Triangle, Waterloo Collegiate Institute (WCI) has built a strong geography program that introduces students to geographic information systems (GIS) technology starting in grade nine. Tools and technologies that are now commonplace in high school classrooms were available to students earlier at this public school, enabling the teaching staff to develop a time-tested, experiential curriculum that now serves as a model for other schools to follow. Upon graduation, students who specialize in GIS have developed strong critical-thinking and analysis skills along with solid university-level technical skills and real-world GIS work experience within local organizations.



Students used GIS to help the school define tree planting placements to increase shade without interfering with buildings or sports fields.



Students developed an app that predicts parking availability in the city of San Francisco, which is one example of how WCI brings real-world context to projects by taking advantage of data now available online through government transparency initiatives.

“The future of GIS education will be in ArcGIS Online. It’s a great place for younger students to experience geospatial technology without yet having much GIS training. They can analyze spatial relationships immediately and be immersed in geography, not software.”

Mark Menhennet
Department Head of Geography
Waterloo Collegiate Institute



“My fondest high school memories are of the GIS lab where a pair of dedicated teachers helped me discover my passion for geomatics. I completed my Master’s last spring and am employed at my dream job because of the opportunities made possible by the GIS program at WCI.”

Andrew Blakey
GIS Developer
Clearpath Robotics

Challenge

For many promising students, success is seen as becoming an engineer, doctor or lawyer. Unless they are exposed to geospatial technology in school, they may never be aware of the expanding opportunities for careers in GIS or the value that geospatial analysis brings to virtually any field they may choose.

Solution

WCI welcomed the opportunity to develop a GIS program for several reasons. Not only does GIS technology promote critical thinking and analysis, but it also provides the technical skills so highly valued in today’s workforce.

In grade nine geography courses, WCI students explore data-rich maps available in ArcGIS Online and are introduced to ArcGIS for Desktop basics such as working with buffers and layers. They build upon these simple mapping and analysis skills in grade ten. By grade eleven, students can choose to specialize in geospatial technology. They learn to integrate and work with remotely sensed data, aerial imagery from local government sources and the wide variety of public data that are increasingly being made available online by local, regional and federal governments.

Students are encouraged to participate in regional science fairs and conferences to hone their presentation skills and share their real-world GIS analyses and applications. Some of these GIS projects help to solve real problems faced by the school, such as apps that provide students with bus route details or help teachers and staff from different schools collaborate to arrange cooperative education placements. WCI students have won gold medals for their GIS projects in many recent provincial competitions held by Skills Canada, which promote careers in skilled trades and technologies among Canadian youth.

Students who specialize in geospatial technology also participate in a co-op program, through which they gain 330 hours of real-world experience using GIS in local organizations such as environmental consulting firms, the police service and the region’s urban planning office. By the time they enter university, some WCI graduates immediately become the top students in GIS-related courses due to their level of expertise. Many WCI students have gone on to successful careers in geospatial technology developing smartphone apps, founding start-ups and pursuing academic research.

Benefits

WCI’s geospatial technology curriculum enables students to apply GIS to topics that engage their strengths and interests. GIS helps them to discover relationships and to develop new insight that they might not have gained using traditional research techniques.

WCI teachers find that spatial analysis helps develop students’ critical thinking skills. For example, students in the school’s geotechnology program tend to approach problem solving in abstract ways, whereas those focused on science and engineering take a more concrete approach. GIS allows them to explore problems in many ways through a process of trial and error, bridging the gap between these approaches and resulting in collaborative, creative solutions.

Because of the visual nature of maps and the ability of GIS to convey complex information, it serves as an ideal platform for project reports, presentations and science fair projects. Learning to present their findings to others helps students strengthen their professional and interpersonal skills and gain what WCI teachers call academic character.