

ONLINE

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ISU GIS graduate students Jeff May and Christina Hauser demonstrate the Rehabilitation Capability Convergence for Ecosystem Recovery (RECOVER) system's in-field capabilities. RECOVER IS A Geographic Information System program developed by ISU and NASA that helps wildfire managers plan for the recovery from and management of wildfires.

GRADUATE DEGREES

Drivers of an economy

BY CORNELIS J. "NEELS" VAN DER SCHYF
For The Journal

While significant time and energy are quite correctly expended on the needs of K-12 and undergraduate education, the value and importance of graduate education needs to be communicated more than ever before in order to remain in the public consciousness. On a very practical level, the products of research — a hallmark of graduate education — impact our lives every day. Research lies at the basis of new discoveries, experienced daily and mostly going unnoticed as we live our lives in the 21st century. We drive technologically advanced cars with systems designed and prototyped by engineers with graduate degrees; if we are ill, we receive prescriptions from our physicians (holding graduate degrees), and drugs discovered or designed by scientists with graduate degrees are dispensed by pharmacists, who also hold graduate degrees; electronics in our smartphones and laptops or tablet computers, the satellites that guide our GPS systems, the video games that entertain us — all have been designed by women and men with a graduate degree education.

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Leciell Bono, a graduate dental hygiene student at ISU, chose the online program because it provided the opportunity to interact with classmates from all over the world. "It has completely broadened my perspective," she said.

ABOUT THE AUTHOR:



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A general explanation might be appropriate here to remind us of the difference between undergraduate and graduate education, and the expertise their holders bring to the table. Undergraduate education is exquisitely aimed at providing students with foundational knowledge and work skills in their selected fields, preparing them for a wide variety of employment options. It is designed with the general concept of creating highly educated employees who will contribute significantly to the labor pool and hence the economy of a region or country.

Graduate education goes far beyond this emphasis on foundational and advanced knowledge and work skills. It develops critical thinking skills, hones creativity and produces innovators. Graduate education not only produces employees, but also future employers.

As many of us can attest to in our own lives, the past three decades have seen many fellow Americans retiring who were able to lead a fairly good life with a high school education. They have benefited from a manufacturing economy that was built and depended on the availability of a large pool of citizens with a skillset acquired through a high school education. Most could rest assured that their livelihoods — with reasonable income levels as an added benefit — would be maintained and secured until they retired. But times have changed, and the manufacturing economy, once represented proudly by cities like Detroit and Pittsburgh in the United States, has been decimated by the offshoring of jobs to lower paying — in many cases third-world — countries. The



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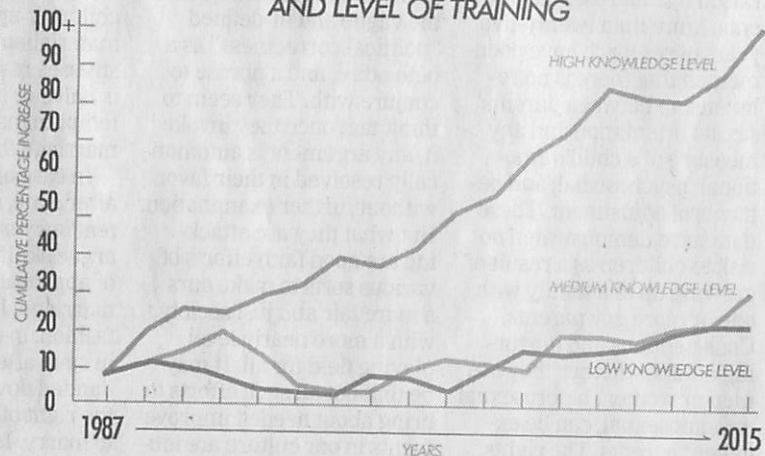
Graduate students in the ISU College of Business serving on the Bengal Solutions team discuss a business plan for a client.

knowledge economy has arrived. This new economy is based on creating, evaluating, and trading knowledge and information. One of the results of the arrival of the knowledge economy is not only a shift toward a more educated and academically skilled workforce, but also toward a demand for individual entrepreneurship and bold creativity. Examples of this trend abound in the news every day. Innovation is moving forward at a pace unheard of before. Companies like SpaceX, Tesla, Apple and many others fill the news and drive trends in the economy at a pace that astonishes. One indicator of this shift in the economy is the earnings premium associated with higher education and academic skills. Economists agree that this trend will continue, with tremendous growth in jobs in knowledge-providing industries (jobs created in most cases by entrepreneurial individuals with a strong graduate-level education) and fewer jobs in the goods-producing sectors of the economy. More than half of the new jobs projected over the next decade will be in professional and knowledge-

based occupations. The scientific and technical consulting industry, for example, has seen significant employment growth from 2008 until today, and this growth is expected to continue into the 2020s. More and more workers will be asked to think rather than produce in the traditional ways of manufacturing industries. Jobs that typically require a master's or doctoral degree are expected to continue increasing, with a projected estimate by some economists of more than 2.5 million additional jobs every decade. The Bureau of Labor Statistics, in its latest (April 2) report on earnings and unemployment rates by educational attainment (www.bls.gov/emp/ep_chart_001.htm) provides compelling evidence for this trend, and also points to the value of a graduate education compared with lower educational attainment.

As demonstrated in the following graph showing trends that started in the 1980s (data obtained from MDIE, Statistics Canada), the level of education in the current economy is directly linked to the number of jobs created. (See graph.)

CORRELATION BETWEEN JOB CREATION AND LEVEL OF TRAINING



This picture is a stunning reminder that it is the application of new knowledge and skills in creative and innovative thinking that will help ensure a country's future economic prosperity, influence social growth, and maintain or create new leadership positions in the global economy.

My role as the dean of the Graduate School at ISU provides me with access to recent statistics that speak to graduate education trends. One interesting statistic is that students enrolled in graduate education represent approximately 3 percent of total students enrolled in all levels of U.S. college education. Many of these graduate students are international students seeking the best graduate education in the world with plans to contribute to and benefit from the growing knowledge economies of their own countries upon graduation. In short, too few U.S. students see the opportunities that abound in the future. Finding innovative solutions to many of the greatest challenges facing this nation and the world in the remaining eight decades of the 21st century will depend upon having a highly skilled knowledge-driven and creative workforce. Huge challenges facing us, such as finding efficient alternative energy sources leading to energy independence, improving agricultural

practices in a changing climate environment, water management and conservation, emerging health care challenges, finding ways to feed the growing world population, and understanding other cultures that coexist in the global village will require an increasing number of citizens with graduate-level education.

In spite of the loss of once high-paying manufacturing jobs to lower-cost producers overseas, a high level of technical and knowledge skills — and a capacity for innovation — have all been attributes that allowed the U.S. to remain competitive and retain its important role as the global economic leader. This attainment was fueled by the preeminence of our country's graduate education system. For more than 50 years, the U.S. has produced the vast majority of graduate degrees conferred around the globe. Our graduate schools and their research facilities have been consistently ranked among the best in the world. But we are at risk of losing that advantage to many other countries that see the benefits of graduate education to their economies, and attract students (including U.S. students) who might have chosen the U.S. system instead. We should not let this happen. Our very existence as the leader of the world is at stake.