Contact: Diana Gonzalez

REQUEST FOR NEW PROGRAM AT THE UNIVERSITY OF IOWA: MASTER OF SCIENCE PROGRAM IN BUSINESS ANALYTICS

Action Requested: Consider approval of the request by the University of Iowa to establish a new Master of Science Program in Business Analytics in the Graduate College.

Executive Summary: The proposed program will provide training in the practice of methodical exploration of an organization's data with emphasis on statistical analysis. This proposal was reviewed by the Board Office and the Council of Provosts and is recommended for approval. No concerns were raised when it was presented to the Iowa Coordinating Council for Post-High School. The proposed program addresses the Board of Regents Strategic Plan priorities to "provide educational excellence and impact as well as economic development and vitality" and Goal #8 – "Iowa's public universities and special schools shall be increasingly efficient and productive."

Background:

- Description of proposed program. The proposed program will provide training in the "scientific process of transforming data into insight for making better decisions (business analytics)."[1] The Department of Management Sciences currently offers undergraduate, full-time MBA, and Ph.D. programs. In Fall 2014, the department implemented a graduate certificate program in business analytics. The proposed graduate program will be a comprehensive, evening, face-to-face program for working professionals in Eastern Iowa; its goals are to provide deeper instruction in business analytics beyond the certificate level. The certificate program requires five courses; the proposed graduate program will require 10 courses and will culminate with a capstone course which applies all the knowledge gained in the program.

  The IBM Corporation describes three subtypes of analytics – descriptive, predictive, and prescriptive. An analytics degree must address all aspects of the analytics process, starting from raw data and culminating in critical business insights.

  - The proposed program's first focus is on data bases for storing, retrieving, and visualizing raw data. The program will incorporate both traditional data base design as well as new paradigms created by big data. Feedback from business partners indicates that analysts who cannot access their own data are ineffective analysts.
  - The next focus is on transformation of data, called predictive and prescriptive analytics by IBM. Faculty expertise in both predictive and prescriptive analytics will allow the department to design and coordinate the courses.
  - The program electives will also reflect the unified approach to analytics education.

[1] INFORMS, the leading professional organization for business analytics.

- Need for proposed program. Today's businesses face increasing amounts of data. For example, in 2010, a Gartner, Inc. survey found that nearly 50% of large companies see data growth as their biggest infrastructure challenge,[2] and Eric Schmidt, Executive Chairman of Google, stated that "we now collectively create every two days as much data as we did anytime up until 2003."[3] Companies also realize that they must be able to access and analyze these data intelligently. A 2011 Accenture analysis found that "Companies that invest heavily in advanced analytical capabilities outperform the S&P 500 on average by 64%."[4]

  As the recognition of analytics has grown, so has the demand for analytics education to train skilled workers. A 2011 report by the McKinsey Global Institute found that "demand for deep analytical talent in the United States could be 50 to 60 percent greater than its projected supply by 2018."[5] A 2014 survey by IDG Enterprise concluded that "organizations are facing numerous challenges with big data initiatives and limited availability of skilled employees."[6] Although various educational programs have existed since the 1970s under different names, recently, numerous programs are appearing through the United States under the unified name "analytics." In addition, the *Certified Analytics Professional* credential is now an option for analytics professionals. Several Big 10 schools have created analytics programs.

- Link to institutional strategic plan. The University's strategic plan seeks to "enhance undergraduate, graduate, and professional education, health care, and other services provided to the people of Iowa." During 2013-2014, the University initiated a Cluster Hire Initiative in Informatics. The proposed program supports and aligns with these goals and initiatives. The strategic plan of the Tippie College of Business includes the following goal: "Transforming students and business professionals through rigorous, innovative instruction and lifelong learning grounded in the Tippie values."

- Relationship to existing programs at SUI. Programs with aligned goals include Computer Science, School of Library and Information Sciences, and the Interdisciplinary Graduate Program in Informatics which will be supported by the cluster hire in Informatics. The proposed program will serve working professionals and their companies in an accessible, evening format. The focus on business analytics entails a specific approach targeting the core business disciplines of business (operations, information technology, finance, marketing, accounting, and human resources). The proposed program will enhance opportunities for students and faculty in the Marketing, Finance, and Computer Science departments as well as in informatics. It will also enhance the offerings of the MBA-PM and full-time MBA programs.

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[2] Gartner, Inc. research report, "User Survey Analysis: Key Trends Shaping the Future of Data Center Infrastructure Through 2011;" https://www.gartner.com/doc/1456136.
[3] TechCrunch article, "Eric Schmidt: Every 2 Days We Create as Much Information as We Did Up to 2003;" http://techcrunch.com/2010/08/04/schmidt-data.
[4] Accenture research report, "The Analytics Advantage;" http://www.accenture.com/SiteCollectionDocuments/microsites/seb/Accenture_The_Analytics Advantage_FinTech_Discussion.pdf.
[5] McKinsey research report, "Big Data: The next frontier for innovation, competition, and productivity;" http://www.mckinsey.com/insights/business_technology/big_data_the_next_frontier_for_innovation.
[6] IDG Enterprise survey; http://www.idgenterprise.com/report/big-data-2.

- Relationship to existing programs at other colleges and universities. Iowa State University is in the process of developing a Master of Science Program in Business Analytics and intends to submit it to the Education and Student Affairs Committee in March 2015; details were shared with the University of Iowa in June 2014. The two programs share the following similarities:
  - Both programs lead to the same degree with the same number of required semester hours.
  - Both proposed curricula cover a number of common topics in business analytics, including data visualization, statistical analysis, and social media analysis.
  - Both programs include a capstone project course.
  - Approximately 40%-50% of the topics overlap between the two programs.
  - Both programs will allow students to proceed at their own pace.

  The two programs differ in terms of structure and delivery, as well as target audience.

  - The proposed program is a face-to-face evening program designed for delivery at existing facilities (starting in Cedar Rapids, and including Des Moines, Iowa City, and the Quad Cities), while ISU's program will use a blended approach primarily with online courses. The university is using feedback from students that in-class instruction is particularly important for courses with a significant quantitative component. Students prefer the more highly structured delivery, accountability, and faculty/student contact offered in-class. The multi-location facilities provide an opportunity to expand face-to-face delivery to population and business centers in the state.
  - The proposed program will allow students to take classes at their convenience over several semesters (offering students a menu of electives) whereas ISU's program will require students to take the same schedule of classes as a cohort.
  - The proposed program, delivered by the Department of Management Sciences, will focus on the "business" half of "business analytics" while ISU's program will be an interdisciplinary program involving several departments and colleges. While the basic tools and techniques of analytics are interdisciplinary in their potential for application across fields, the university projects that the target market (working professionals in Iowa businesses) will benefit from a consistent instructional context of business applications, cases, problems, and examples. "Business faculty will also have a stronger and more consistent orientation than an interdisciplinary faculty."

  Loras College provides an undergraduate program, a graduate certificate, and an evening specialty MBA in business analytics. The certificate is a 10-week online program which costs $4,000 per student with discounts for corporate groups. Loras' MBA program is a 38 credit hour, on-campus, face-to-face, evening program with a tuition cost of $795 per credit hour. Loras's MBA courses have a greater emphasis on organizational issues, such as ethics, communication, and leadership than the proposed program which will focus more deeply in the technical aspects of Business Analytics.

  The University of Iowa's proposed 30 credit hour program can be completed in as little as 24 months. The tuition rate will be $665 per credit hour.

- Unique features. The University of Iowa's Department of Management Sciences has first-hand experience in the growing demand for analytics – the Supply Chain and Analytics track in the full-time MBA program continues to grow; the retooled Business Analytics and Information Systems undergraduate program has seen 86% growth in the number of majors since Spring 2012.

  The department faculty has experienced growth in professional and research organizations. The faculty are international leaders in the subfields of descriptive, predictive, and prescriptive analytics. Two faculty members have leading textbooks in the field, and one faculty member served on the task force responsible for creating the Certified Analytics Professional credential; one faculty member has served in a leading role in developing the University's Informatics initiative.

- Duplication. Iowa State University intends to propose a Master of Science Program in Business Analytics. Loras College has established an undergraduate program, a graduate certificate, and an evening specialty MBA in business analytics.

- Opportunities for collaboration. On December 22, 2014, the following areas of cooperation were included in a memorandum of cooperation between the University of Iowa and Iowa State University. (Attachment A)

  - *Articulation of courses*. A student enrolled in either of the two programs may take up to nine credits of approved courses in the other program for credits in the home program; students will pay the tuition to the institution that offers the articulated courses at the rate of the offering institution. The approved course list will be determined, published, and maintained by each institution independently.

  - *Referral of prospective students*. Prospective students may have different needs and constraints that favor one program over another. The two institutions will refer prospective students to each other based on providing the maximum benefits to students.

  - *Sharing of course materials and ideas*. The dynamic nature of the data science and business analytics field requires continuous improvement of course content, learning tools, pedagogy, and delivery mechanisms. The two institutions will hold an annual summer workshop for faculty in the two programs to share syllabi, trends, tools, instructional ideas, and training opportunities. The location will alternate between the two campuses, and the hot institution will cover the cost of the workshop.

- Student demand. As the recognition of analytics has grown, so has the demand for analytics education to train skilled workers. Although educational programs have existed since the 1970s using different names, recently numerous programs throughout the United States have been created using the unified name "analytics." The nationally recognized Certified Analytics Professional credential is now an option for analytics professionals, which affirms the need for professional recognition and certification in analytics.

The department indicated that the enrollment prospects are strong for the proposed program. In Fall 2014, the total number of students in the Certificate Programs was 28 (out of 40 applicants). Survey data from Iowa Workforce Development has helped the department to identify employers and industries in the Cedar Rapids Metropolitan Statistical Area (MSA) for the proposed program to target. Stakeholders have expressed their belief in the market potential for the proposed program, as demonstrated by numerous letters of support, including Aegon, Wellmark, and Proctor and Gamble.

According to an article in the *Washington Post* (September 15, 2013), George Washington University had an initial enrollment of 18 in their new graduate program in business analytics; the University of Maryland had an initial enrollment of 38. The University of Cincinnati rebranded its quantitative graduate program under the name "analytics" which resulted in an increase in applications and enrollments.

- Workforce need/demand. Today's businesses face increasing amounts of data. While business analytics is an emerging occupation, a 2011 report by the McKinsey Global Institute found that "there will be a need for 1.5 million more data-savvy managers to take full advantage of big data in the United States." Letters of support for the proposed program describe the breadth and scope of industries interested in the program, including Aegon US Investment Management, Wellmark Blue Cross and Blue Shield, ACT, Proctor & Gamble, John Deere, and Rockwell Collins. One comment provided included the following: "I can attest that business analytics is a critical part of our core skillset. Whether we are talking risk management, credit scoring and adjudication, pricing, insurance underwriting and risk management, budgeting and forecasting, collections and recovery, data mining, or business optimization, business analytics is at the heart of almost all that we do."

- Resources. The program is designed to be self-sustaining within the College of Business with a break-even enrollment of approximately 42 students, including all students enrolled in the master's and Certificate programs combined. Revenues include tuition and fees; costs include faculty salaries, staff salaries supporting the program's operation, extra compensation to pay an academic coordinator, facility costs to use the building infrastructure in downtown Cedar Rapids, and marketing and recruiting costs.

  The proposed program will be administered and operated by the Department of Management Sciences with assistance provided by College of Business staff. The department will make admission decisions, develop the curriculum, provide student advising, and lead the academic aspects of the program. This will require a faculty coordinator, which will be a new, paid position. A committee appointed by the department executive officer will assist the faculty coordinator. College staff will provide logistical support for the program, including handling applications and enrollments, answering students' day-to-day questions, providing support at the classroom sites, and marketing the program. This will require the equivalent of a half-time staff member.

  Faculty will teach in the program on-load; this will ensure faculty interest in the program and its success. Tenure-track faculty will be used primarily with opportunities for lecturers, while trying to limit the role of adjunct faculty. The department will require approximately two new faculty to fully support the master's program because the program will require seven additional courses each academic year (beyond the existing Certificate program) and full-time tenure-track faculty teach three courses per year. The number of new faculty could be reduced by using lecturers.

To market and recruit for the program, the department will continue existing efforts for the Certificate in Business Analytics, which includes a website, e-mail and social media outreach, and targeted traditional advertising. The department will also continue direct company visits to raise awareness of the program.

Faculty from the Department of Management Science will provide the majority of instruction in the proposed program, but there will also be opportunities for courses taught by outside faculty, including from the Marketing, Finance, and Computer Science departments. Existing faculty are in place at the Cedar Rapids Center in downtown Cedar Rapids. No additional equipment will be required for the proposed program.

- Cost. The new costs for the proposed program including advertising, a half-time staff member, and faculty costs which will total $220,040 in the first year, increasing to $380,230 by the seventh year. The department anticipates that tuition will cover all on-going costs, including advertising, staff, and facility costs with an enrollment of 50.

- Projected enrollment. The projected enrollment in Year One is 20, increasing to 50 by Year Seven.

- Potential for accreditation. The College of Business's regular accreditation process will include the proposed program.

- Marketing plan. There are synergies between the certificate program and the proposed graduate program. The course requirements are designed to allow a student to move into the master's level work upon completion of the certificate coursework. It is anticipated that the demand generated for the certificate program will overlap into the recruitment efforts for the proposed program. The proposed program will have a pipeline of candidates from currently enrolled students in the certificate program. The department's prospect data base includes more than 150 candidates who are not yet enrolled in the certificate program but have expressed interest.

  The College of Business has in-house marketing capabilities, which include customer insights, go-to-market strategy, customer relationship management, digital marketing, messaging, media buying, measurement, and optimization. The department anticipates using owned media, earned media, and paid media.

  As prospective working professionals in Iowa express interest in the program, dedicated staff will provide timely follow-up, address concerns, providing additional information, and provide guidance to enrollment. This level of personal attention ensures a positive student experience leading to enrollment.

- Date of implementation. Creation of the proposed program will become effective upon approval by the Board of Regents and will be included in the University's General Catalog. The anticipated implementation date is Fall 2015.

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Memorandum of Cooperation on Graduate Business Analytics Programs
January 15, 2015

1. Background

The digital revolution empowered by the Internet and computer technology in business and individual life during the last several decades has generated unimaginable amounts of data in the form of digital records stored in databases and files servers. The volume, velocity, and variety of these data have produced a new set of problems and challenges for businesses and organizations in their pursuit of competitiveness, effectiveness, and efficiency. These problems and challenges have also created unprecedented opportunities for businesses and organizations to discover, model, understand, and serve their customers and partners in ways never imagined and in details never possible before. Businesses and organizations that are able to master this data deluge, a.k.a. Big Data, will have a tremendous competitive advantage over their competition in the marketplace.

As the need for implementing data analytic solutions grows, demand for professionals who understand and are capable of working with, exploring and exploiting Big Data – the profession of business analytics – has exploded in recent years. According to McKinsey Global Institute, by 2018 "the United States alone could face a shortage of 140,000 to 190,000 people with deep analytical skills as well as 1.5 million managers and analysts with the know-how to use the analysis of Big Data to make effective decisions."

To meet the growing demand for graduates and professionals with data analytic skills, Iowa State University and the University of Iowa have developed and implemented various flavors of business analytics programs in their undergraduate and graduate programs during the last five years. For example, the Department of Supply Chain and Information Systems in the College of Business at Iowa State University offers a business analytics track in its MIS major, and the Department of Management Sciences in the Tippie College of Business at the University of Iowa offers an undergraduate major and graduate certificate in business analytics.

In the Fall of 2014, both institutions independently developed proposals for graduate degree programs in business analytics to further expand the scope, skill, sophistication, and delivery of their business analytics offerings. While both proposals aim to deliver graduate level courses and degrees to students interested in advanced business analytics, they differ significantly in target audience and delivery methods. ISU's Master of Business Analytics program is a 30-credit blended delivery program targeting working professionals nationally, with a mixture of online (70%) and on-campus (30%) courses. In contrast, Iowa's Master of Science in Business Analytics program is a 30-credit evening program targeting working professionals with face-to-face courses in various locations in Iowa. However, a review of the curricula of the two proposed programs suggests that there are similarities in at least some of the courses related to the fundamentals of business analytics, providing a foundation for collaboration between the two programs.

2. Areas of Cooperation

The faculty and leadership at the two institutions (the College of Business at Iowa State University and the Tippie College of Business at University of Iowa) enthusiastically embrace the idea that cooperation between the two programs will benefit first and foremost students, data science professionals, businesses, and organizations in the State of Iowa, and will enhance the quality of both programs in the long run. The two faculties have thus agreed to the following collaboration activities with the option to develop future collaboration ideas where appropriate.

2.1 Articulation of Courses

A student enrolled in either of the two programs may take up to 9 credits of approved courses in the other program for credits toward the home program, and students will pay the tuition to the institution that offers the articulated courses at the rate of the offering institution. The approved course list should be determined, published, and maintained by each institution independently.

2.2 Referral of Prospective Students

Prospective students may have different needs and constraints that favor one program to another between the two proposed business analytics programs. The two institutions agree that each program should refer prospective students deemed more appropriate for the other program to that program in order to provide the maximum benefits to the students.

2.3 Sharing of Course Material and Ideas

The dynamic nature of the data science and business analytics field requires continuous improvement of course content, learning tools, pedagogy, and delivery mechanisms. The two institutions agree to hold an annual workshop in the summer for faculty involved in the business analytics programs to share syllabi, trends, tools, instructional ideas, and training opportunities. The location will alternate between the two campuses, and the hosting institution will cover the cost of the workshop excluding travel and lodging expenses of the participants.

3. Additional Provisions

This memorandum reflects the intention of the parties to establish a mutually beneficial relationship but does not create any legally binding obligations.

This memorandum is in-place for a period of five years, and may be renewed thereafter by mutual consent.

This memorandum may be terminated by either party by giving a written notice to the other party. Such termination shall not affect the final execution and conclusion of specific activities in effect. Insofar as possible, such notice will be given six months in advance of the desired termination date.

Representative of the Iowa State University
College of Business

Name: David Spalding

Title: Raisbeck Endowed Dean

Signature: David Spalding

Date: 1/13/15

Representative of the University of Iowa
Tippie College of Business

Name: Sarah Fisher Gardial

Title: Dean

Signature: Sarah Fisher Gardial

Date: 1/15/15