BIT Department Student Learning Outcome Assessment Report
Graduate Degree Program Assessment Report

1. Department/Program Mission

BIT Department Mission:
To serve the economic interests of industry and the evolving needs of society in a challenging, rapidly-changing, global environment, the Department of Business & Information Technology capitalizes on the strong technological emphasis of Missouri S & T to enable individuals to excel in a technology-centric business world. Recognizing this rapid evolution of the marketplace, we create and disseminate knowledge impacting the theory and practice of business.

BIT Graduate Degree Programs
The BIT department has two graduate degree programs. One is a Master of Business Administration and the other is a Master of Science in Information Science and Technology. Consistent with our mission, with a focus of management through technology, business and information technology are integrated in each of our degree programs, which will be evident from our learning outcomes.

2. Graduate Learning Outcomes (GLO)

a. Campus-Wide Student Learning Outcomes:
   Programs must demonstrate that their graduates have:
   I. Knowledge: An ability to apply knowledge of subject matter within their field of study
   II. Communication: An ability to communicate effectively within their field of study
   III. Critical Thinking: An ability to engage in productive critical thinking within their field of study
   IV. Professional Development: An ability to develop professional within their field of study

b. Additional Program Specific Student Learning Outcomes (Optional)

Graduate learning goals are a central concept of our department operations. The mission of the Department involves knowledge creation and dissemination with a strong emphasis on management through technology. The mechanism for realizing these learning goals is reflected in each syllabus for every course. As discussed above, our faculty members for all degree programs are central in the management of achieving these learning goals. The graduate degree programs learning goals are described below.

MBA Outcomes:
Communication (Oral & Written) – Students can clearly and concisely communicate via verbal and written methods.

Critical Thinking - Students can demonstrate an understanding of ethical decision-making and leadership.

Teamwork & Leadership - Students can function effectively as a team member and as a team leader.

Technology Proficiency - Students can use information technology to enhance problem solving and decision making skills

MS-IST Outcomes:
Communication (Oral, Written & Digital) – Students can communicate effectively, in oral, written, and digital forms, as it relates to information technology and systems.
Teamwork - Students can work effectively in teams, on tasks related to information technology and systems.
IT Impact Knowledge—Students understand and are able to apply knowledge regarding the impact of information technologies and systems on people and organizations.
Leadership - Students acquire the ability to manage and lead in the information technology and system lifecycle.

3. Mapping of Program’s Student Outcomes to Campus Student Learning Outcomes

Map your Graduate Student Outcomes (departmental specific or other Accreditation Commission) from your Program to the Campus GLOs (above). If you use campus GLOs, this section is not needed.

I – Knowledge – Knowledge is an integral part of all of our degree classes. Specifically it is part of the written assignments used to assess written communication for both degrees. It is also part of the technology assessment for the MBA program.

II – Communication – Communication is assessed in multiple ways in both degree programs. This includes written and oral communication.

III – Critical thinking – Critically thinking is directly assessed in the MBA program using a survey measurement from Insight Assessment. Critically thinking is indirectly measured in the MS-IST program through leadership and through other written assignments (IT impact knowledge).

IV – Professional Development – This is indirectly measured through the leadership and teamwork outcome goals for our courses.

4. Methods/Instruments and Administration

Describe your assessment methods, both direct and indirect, and their frequency of administration. Currently the only measures used are direct assessments of thesis/dissertation student performance on major exams.

To standardize the scoring of each outcome, a faculty committee developed a set of rubrics for each graduate learning goal. In general, three faculty members score the outcome based on the rubric in a double-blind fashion, or inter-rater reliability method, initially so that the rubrics could be proven reliable and valid measures. Once the rubrics were established, a faculty member in each degree program are assigned to measure the learning goal via an assignment in their course. Once the assignments are collected by the teaching faculty members, the results of the scoring process are collected and compiled by the Assessment and Curriculum Committee. Each outcome is measured at
least bi-annually. More important than this is to have demonstrated at least one closed loop improvement process for each outcome in a 5 year period. This is described in more detail below.

5. Findings
Provide quantifiable results of direct and indirect assessments

The tables below depict the collected outcomes measurements from Fall 2012 to the Spring 2017 semesters. Note that data is not collected during each semester for adequate information to close the loop. “NC” indicates semesters where data was not necessary to be collected, and “NO” indicates semesters where the course in which data is collected was not offered.

**Oral Communication** *(Target ≥ 70% satisfactory or above)*

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*BUS 5980 - Business Models for Entrepreneurship and Innovation; BUS 6622 - International Marketing; IST 5885 - Human-Computer Interaction*

**Written Communication** *(Target ≥ 70% satisfactory or above)*

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*BUS 5980 - Business Models for Entrepreneurship and Innovation; BUS 6622 - International Marketing; IST 6261 - Advanced Information Systems Project Management*

**Digital Communication** *(Target ≥ 70% satisfactory or above)*

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*IST 5885 - Human-Computer Interaction*

Critical thinking

The need to process information in a logical, analytical fashion characterizes clear thought processes. When faced with new situations, one can deduce solutions and find answers. Furthermore, a critically thinking individual must be able to give consideration to ethical constraints and values such as diversity. Critical thinking is identified with its means of realization: decision making, analytical explanations, and decisive leadership. To think critically, one must be able to consider options and decide between them in realistics situations.

One operational definition of critical thinking is that a person can answer questions on a variety of topics toward a particular end, such as profitability. Critical thinking is a skill developed by guided repetition and applied examples. It needs to be cultivated, a task we embrace in the BIT curriculum. Ultimately, we use a standard examination for undergraduate students to gauge the success our program has in realizing the critical thinking learning goal.
**Critical Thinking** (Target ≥ 70% satisfactory or above)

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*BUS 5980 Business Models for Entrepreneurship and Innovation; BUS 6426 Integration of Business Areas

**Teamwork**

As a business concept, teamwork is unrivaled: working as a team to solve problems is a pervasive business practice. The productivity of many people is usually greater than the sum of its parts; yet teaching this is a challenge. In the MBA program, the role of the team builder in teamwork is underscored. Operationally, leaders are seen by the fruits they bear: productive teams with strong morale moving forward in a decisive direction while turning a profit. While some students are seemingly “born leaders,” there are certainly skillsets that can be taught, including: project management, finance, managerial accounting, and strategic planning, and so forth. In the fertile combination of these basic management skills, leadership can grow and flourish.

The use of technology to enable teamwork has facilitated an entirely new model for team formation to emerge. This new paradigm means today’s technology professionals need to seek out expertise in different locations and contribute to teams through digital means. Students in the MS IST program are accordingly assessed.

**Teamwork** (Target ≥ 70% satisfactory or above)

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<td>100%</td>
<td>85.71%</td>
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* BUS 6121 Teambuilding and Leadership; IST 5885 Human-Computer Interaction

**Technology Proficiency**

Operationally, mastering technology requires hands-on experience. To have technology proficiency as a learning goal commits a school to providing access to these tools. Yet teaching people in basic usage sells the proficiency short. Rather, the technology must be embedded in a larger understanding of the business processes. This is the responsibility the Department takes in setting technology proficiency as a learning goal for both undergraduate programs. MBA students are trained to use software (or hardware) and apply it to different situations. As skill with the system grows, more complicated business problems are solved. This requires an understanding of how the technology works within the business process. From the operational perspective it is important to avoid technical obsolescence: this requires an understanding of concept, not just technique.

**Technology Proficiency** (Target ≥ 70% satisfactory or above)

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<td>NO</td>
<td>NC</td>
<td>NO</td>
<td>90.91%</td>
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* BUS 6723 Corporate Information Systems Management

**IT Impact Knowledge**

As a learning goal, this is more comprehensive than basic technical proficiency, which is assumed. It looks at the larger picture of the role technology plays within organizations. Technology has changed the world, and it is a responsibility of IST professionals to understand that change and manage it for the betterment of mankind.
Ultimately, information systems are about people: those who operate them and those who profit from them. Technology professionals will be expected to apply common sense to choices about when and where to use technology in a business setting. Graduates of the MS IST degree will be expected to assess technology's application in business as being disruptive and necessary or being a fad which is hyped up to generate revenue of consulting and licenses for a firm. The technology being employed should demonstrate a clear relative advantage to the preceding state and show a demonstration of observable results for an organization.

While IST is heavily technology-based, it is still people-centric. Hence, a learning goal of “IT Impact Knowledge” leads students to come to this realization: their use of technology impacts the people. Individuals, just like firms, show a different propensity to adopt and use technology and to see its benefits.

**IT Impact Knowledge** (Target $\geq 70\%$ satisfactory or above)

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IST: IST 5251 Technological Innovation Management and Leadership

**Leadership**

A leader is a person who directs, guides, controls, and manages people toward a common goal in a fashion so as to inspire and motivate others to excel beyond individual expectations and self-ordained capabilities. This is easily said, yet great leadership is an elusive quality. While some MBA students seem to have the innate ability; others can look toward formal management education to form them into the leaders they hope to be. Even those so-called natural-born leaders can profit from learning the tools and techniques used by the great managers.

One difference in this goal for the specialized master’s degree is that leadership also includes IT products, not just organizations. Students should learn to understand how technology can challenge existing business relationships or processes and bring great benefits to an organization. Leaders in a technology department should seek out new opportunities from technology in order to transform the “status quo” into something better. This includes the ability to see an alternate future where technological transformation has occurred and benefits have been gained. These technology leaders of tomorrow should also possess the ability to inspire those around them to embrace change.

Our students should understand an IT project’s lifecycle from requirement analysis to development and testing and ending in installation and maintenance. This is key in providing leadership for an organization to adopt technology as well. Furthermore, they should be able to manage that process, creating budgets and setting schedules and so forth.

**Leadership** (Target $\geq 70\%$ satisfactory or above)

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<td>NC</td>
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<tbody>
<tr>
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<td>NO</td>
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*BUS 6121 Teambuilding and Leadership; IST 6261 Advanced Information Systems Project Management

6. **Continuous Improvement Changes**

List in narrative form the metric-drive improvements suggested from your findings. Our department looks at this process of improvement as “closing the loop.” This is documented by each faculty in a
shared spreadsheet. The department seeks to measure an outcome, make a change in one or multiple courses related to improving the outcome measurement, and then measure again for the impact of the change(s). This shared Google sheet can be provided upon request. Each year faculty teaching in the degree programs meet to review outcome scores and discuss any changes or adjustments necessary. Our outcomes, and their definitions, are also reviewed and changed periodically. For each of our outcomes this is demonstrated below. Please note the narrative describes the data in the tables above.

**Communication Closed Loop Improvement**

**MBA Communication**

Overall, the communication scores have been above the 70% of students scoring satisfactory or above threshold, but between AY13-14 and AY14-15, Oral Communication scores declined, while Written Communication scores increased. (Note: the discussion of the MBA outcomes assessments will be in terms of academic year, as the classes in which measurements are taken are only offered once per year). Changes were made in multiple courses to enhance the overall outcome of MBA communication learning goals:

- **BUS 6622 – International Marketing (FS12):** Replaced the textbook with 4 practitioner books, each of which is now presented by student groups.
- **BUS 6723 – Corporate Information Systems (SP14):** Addition of a technology proficiency presentation and an online discussion board.

Although changes were made in the aforementioned manner, we observed a decline in the AY15-16 scores for oral and written communication for the MBA. Therefore, additional changes were made in courses during AY15-16 as follows:

- **BUS 6827 – Managerial Finance (FS15):** Addition of detailed rubrics for students’ written projects.
- **BUS 6723 – Corporate Information Systems (SP16):** Addition of an online discussion board to discuss IT and business news.

Review of the AY16-17 scores will reveal whether the last curriculum changes will positively impact the overall outcome scores. The MBA faculty also discussed the impact that an increasing number of non-native English speaking students has had on the measures and agreed to continue to work on changes to address this concern.

**MS IST Oral Communication**

The scores for oral communication in the MS IST program have been overwhelmingly high during the semesters in which data was collected. Due to personnel changes, however, a year of data was not collected. This was noted by the Assessment and Curriculum Committee and is now being carefully monitored to ensure data collection is resumed.

- **IST 5885 – Human Computer Interaction (SP15):** A second oral assignment was added so students could practice oral communication skills more.

The impact of these changes will continue to be monitored for impact.

**MS IST Written Communication**

The measurements for written communication in the MS IST program have also remained high, indicating that our graduate students have the ability to communicate well through written language. In the pursuit of continuous improvement, changes were made in the following courses:
• IST 6261 – Advanced Information Systems Project Management (SP13): Added the following statement to homework 5 through 14: “Extra Requirement: We have emphasized how important communication is for a Project Manager. It is also important to communicate clearly in writing. For this assignment, up to 5 points might be deducted for poor writing.”
• IST 6261 - Advanced Information Systems Project Management (SP14): Lectures and assignments were revised to give more emphasis on written communication.

Additional changes were made in IST 6261 in the FS15 and SP16 semesters and will continue to be monitored for impact on future measurements.

MS IST Digital Communication
The measurements of students scoring satisfactory or above have decreased during one cycle of measurement. The Assessment and Curriculum committee took note of this and assigned a subcommittee to address the situation. The method by which the outcome was being measured in the course was improved in FS15, and an increase of outcome measurement was realized.

Other changes to the curriculum impacting digital communication are as follows and will be monitored for impact in the future:
• IST 5885 – Human Computer Interaction (FS15): Updated edition to the textbook to give students the ability to have access to the newest trends.
• IST 5885 – Human Computer Interaction (SP16): Hybrid or blended learning style introduced to give students more experience working in digital communication.

Critical thinking Closed Loop Improvement
MBA Critical Thinking
The MBA critical thinking scores showed an improvement from AY13-14 to AY14-15. Due to faculty limitations, the data was not collected during AY15-16. The Assessment and Curriculum Committee is acutely aware of this situation and is working carefully with the new faculty member in charge of collecting this data to ensure that it is done properly and in a timely manner.

In light of this effort to improve our measures of this learning goal, the following changes were made and will continue to be monitored for impact:
• BUS 6723 – Corporate Information Systems (SP14) – Added technology proficiency presentation to enhance students’ critical thinking on IT impacts on businesses
• BUS 6675 – Advanced International Business (SP15) – Changed textbook from Peng’s “Global” to Wild and Wild’s “The Challenges of Globalization” for a better understanding of critical business decisions as they relate to global business
• BUS 6827 – Managerial Finance (FS15) – Changes to projects were made, online homework added, one exam was added, and changes to text were made; allows students to spend more time on the learning process
• BUS 6723 – Corporate Information Systems (SP16) – Added a section to online discussion board to discuss latest IT and business news to enhance students’ critical thinking on IT impacts on businesses
• BUS 6426 – Integration of Business Areas (FS16) – Students are now expected to creatively compete with other student teams and computer teams in the Capsim simulation. This includes but is not limited to developing new product, increasing production capacity, optimizing production process, and changing sales and/or promotion budget.
Teamwork Closed Loop Improvement
MBA Teamwork
Teamwork measurements were last taken in the MBA program in AY13-14. Again, due to faculty complications, measurements were not taken in the most recent academic years. However, the Assessment and Curriculum Committee is acutely aware of this situation and is working with a tenured faculty member assigned to this class on collecting data.

- BUS 6426 – Integration of Business Areas (FS16): Students are now expected to creatively compete with other student teams and computer teams in the Capsim simulation. This includes but not limited to developing new product, increasing production capacity, optimizing production process, and changing sales and/or promotion budget.
- BUS 6121 – Leadership and Teambuilding (FS16): Added team assignment (case study) to help students in developing team forming skills as well as coming to a team consensus on a leadership case with no clear cut right or wrong answer.

Data was collected in the FS16 semester to close the loop for this learning goal. We will be monitoring measurements after this change was implemented and closing the loop for this learning goal in the near future.

MST IST Teamwork
The MS IST graduate students continue to perform well in the area of teamwork with students always meeting the 70% or above satisfactory target. For the sake of continuous improvement in this extremely important area, the following changes were introduced in the curriculum:

- IST 6641 – Advanced Electronic and Mobile Commerce (FS15): Replaced creating mobile app to prototyping mobile app with presentations to class. Gave groups opportunities to work on smaller projects so they learned how to better communicate with each other.
- IST 5885 – Human Computer Interaction (SP16): Assigned mini group projects so that groups can get to know each other better; also used a hybrid or blended style of teaching so that students have more time to work in teams.

Since there was a slight decline in the measurement outcome in SP16, we will continue to monitor the outcomes for further changes as the students progress into the curriculum. The MS IST faculty discussed other changes to team-based projects, especially in ERP 5110 - Enterprise Resource Planning Systems in an ERP Environment (FS16), which will be reflected in future measurements. The faculty further discussed how the courses in the curriculum approach team projects and how additional measures of team participation might be adopted in the future. A subcommittee was directed to consider possible changes.

Technology Proficiency Closed Loop Improvement
MBA Technology Proficiency
Over two evaluation periods, the MBA graduate students exceeded the minimum target. The use of technology in business is centric of our mission in BIT, therefore, some of the additional changes being made to the curriculum are as follows:
• BUS 6723 – Corporate Information Systems (SP14): Added a technology proficiency presentation to enhance students’ knowledge on how IT impacts business.
• BUS 6723 – Corporate Information Systems (SP16) – Added a section to online discussion board to discuss latest IT and business news to enhance students’ critical thinking on IT impacts on businesses.
• BUS 6827 – Managerial Finance (FS16): Required students to use Excel to solve problems to help students build skills for their future career.
• BUS 6426 – Integration of Business Areas (FS16) – Students are now expected to creatively compete with other student teams and computer teams in the Capsim simulation. This includes but not limited to developing new product, increasing production capacity, optimizing production process, and changing sales and/or promotion budget.

Further, one significant curriculum change that took place in F14 was the introduction of IST 5420-Business Analytics and Data Science, which is available to all BIT students, including MBA students, and that may impact these scores.

**IT Impact Knowledge Closed Loop Improvement**

**MS IST IT Impact Knowledge**

Overall, our evaluation of the MS IST graduate students’ competency in the IT Impact Knowledge area has been solid. The scores have been consistently above the minimum target. The following changes in curriculum have been made over the evaluation period:

• IST 5251 – Technological Innovation Management and Leadership (FS13): Introduced a main text entitled "Strategic Management of Technological Innovation" by Schilling for the course.
• IST 6261 – Advanced Information Systems Project Management (SP13): Switched to the 4th edition of Marchewka’s text on Project Management (2012). This new edition reflected changes in the PMI PMBOK and added several case studies, along with tutorials on the Microsoft Project tool. Course lectures were revised to strengthen the technical aspects of the course.
• IST 5887 – Human Computer Interaction Evaluation (SP14): Started working with alumni/industry professionals to direct student projects.
• ERP 5410 – Use of Business Intelligence (FS14): Changed the software tool for data mining from Analysis Process Designer to SAP Predictive Analysis. This updated software tool prepares students with most recent IT skill set in the industry.

Measurements in FS14 and SP15, however, showed a dip, rather than improvement. The MS IST faculty agreed to continue to consider changes to try to improve this measure. Changes that should impact future measurements were made as follows and continue to be monitored:

• IST 6444 – Essentials of Data Warehouses (SP15): Added a hands-on lab in "In-Memory Database" to reflect recent developments in the field of database/data warehouses. Students will gain up-to-date knowledge desired by the industry.
• IST 6261 Advanced Information Systems Project Management (FS15): Switched to the 5th edition of Marchewka’s text on Project Management (2015). This new edition significantly revised the ordering of topics within the text and added new material on PRINCE2 and Agile approaches. It also expanded information about procurement and on project governance. Course lectures were revised to utilize the text material, although some of that material had been previously covered from the instructor’s notes.
• IST 6450 – Information Visualization (FS15): Expanded notes to include more practitioner case studies and discussion.
• IST 5001 – Data Methods in Python (SP16): Course created; the new material will meet IST market needs for Big Data skill sets.
• IST 5420 – Business Analytics and Data Science (SP16): Changed textbook to "Modeling Techniques and Predictive Analytics" by Miller. This book consists of case studies of hard problems. However, its analysis avoids extensive mathematical discussion which makes it more suitable for the students.
• IST 5887 – Human-Computer Interaction Evaluation (SP16): Instead of spending half the semester on a review of HCI evaluation methods, and half on project, the course moved to focus the whole semester on the project. Based on student feedback, this eliminated redundancy between the Intro to HCI class and the Evaluation class and allowed students more time to focus on a project, where they applied the principles learned in the introductory class.
• IST 6261 – Advanced Information Systems Project Management (SP16): Added lecture devoted to discussion on how to interpret the status of a project from an IT perspective; expanded the library research assignment to enhance student ability to seek out relevant technical and managerial leadership articles of interest.

The measurement will continue to be monitored and new curriculum changes implemented to stay current in this area.

Leadership Closed Loop Improvement

MBA Leadership
The measurement in FS13 for leadership in the MBA student population was positive. Again, due to faculty complications, measurements were not taken in the most recent academic years. However, the Assessment and Curriculum Committee is acutely aware of this situation and is working with the new tenured faculty member assigned to this class on collecting data.

• BUS 6675 – Advanced International Business (SP15): Added 4 Harvard case studies with different topic areas in IB to aid students in thinking strategically, look at the big picture, and make better leadership decisions.
• BUS 6121 – Leadership and Teambuilding (FS16): Changed textbook to comprehensive study of Leadership to expose students to many types of leadership theories.
• BUS 6121 – Leadership and Teambuilding (FS16): Added team assignment (case study) to help students develop team forming skills as well as team consensus building on a leadership case with no clear cut right or wrong answer.

Data was collected in the FS16 semester to close the loop for this learning goal. The impact of these changes will be monitored in the measurement to come.

MS IST Leadership
The measurements have been fairly consistent over the periods, but the relative percentage of students scoring outstanding has not changed. Further, there was a dip in the scores for F15. Changes were made in:

• IST 5251 (FS13): All students prepare a presentation to highlight the key characteristics needed in a IT/IS leader, such as CIO and CTO.
• IST 6261 (SP13): Switched to the 4th edition of Marchewka's text on Project Management (2012). This new edition reflected changes in the PMI PMBOK and added several case studies. Course lectures were revised and additional material on management and leadership was added to the lectures.

Going forward to improve the future measurements, the following curriculum changes have been implemented:
• IST 6261 Advanced Information Systems Project Management (FS15): Switched to the 5th edition of Marchewka’s text on Project Management (2015). This new edition significantly revised the ordering of topics within the text and added new material on PRINCE2 and Agile approaches. It also expanded information about procurement and on project governance. Course lectures were revised to utilize the text material, although some of that material had been previously covered from the instructor’s notes.

• IST 6261 Advanced Information Systems Project Management (FS15): Focused additional attention in lectures on leadership aspects of project managers.

• IST 6261 Advanced Information Systems Project Management (SP16): More time during lectures was focused on explaining a number of parameters relating to project status and exactly how they should be interpreted and how leaders guide these efforts.

• IST 6261 Advanced Information Systems Project Management (SP16): Expanded library research assignment to enhance students’ abilities to seek out relevant technical and managerial/leadership articles of interest.

The MS IST faculty discussed how IT leadership characteristics might be incorporated into current offerings to improve scores. We will continue to monitor these measurements in the future.