Setting
Northern Illinois University is a four-year public university in a college-town setting. The school serves more than 21,000 students from a main campus in DeKalb and satellite centers in Hoffman Estates, Naperville, Rockford, and Oregon, Illinois. The average undergraduate age is 22.6 years, 75 percent attend full time, and 40 percent identify as a minority.

Introduction to Business Information Systems is a one-semester, three-credit course enrolling approximately 1,000 students per year. Required by all students in the School of Business, the course emphasizes technology literacy to enhance business decision making, provide business intelligence, and improve organizational efficiency and effectiveness. The course employs Microsoft desktop applications and a variety of Web applications.

Challenges and Goals
In 2010, the College of Business identified a need for a new Information Systems course that would provide their business students with the background in Excel and Access necessary to pursue and complete the courses that comprise their 4 year business curriculum. Many business courses were spending too much time teaching students how to use these common desktop applications and not getting to the more important course content. Being designated as part of the CTP, 30% of the course content had to be available in a media rich online environment so students could complete pre-work before attending lecture. Additionally, lectures were to be more interactive and engaging, and the digital program chosen would need to provide instructors with in-class activities as well. Downing and his colleagues would be working with large sections, being tasked with doing more with less, so the digital resource adopted would need to provide comprehensive application projects that could be used as both homework and assessment.

Implementation
MyITLab assignments
- Skill Based Trainings: Students are allowed unlimited attempts, contributes 10 percent of the MITL grade, due Wednesdays at 12 a.m.
- Grader Project homework: Contributes 10 percent of the MITL grade, due Wednesdays by 12 a.m.
- Skill Based Exams: Contributes 40 percent of the MITL grade, due Thursdays by 12 a.m.
- Grader Project Assessment: Students are allowed two attempts, contributes 40 percent of the MITL grade, due Thursdays by 12 a.m.

Key Results
Data indicate that MyITLab homework scores may be an indication of future success on quizzes, final exams, and final course grades. Students who earned higher MyITLab scores had consistently higher letter grades across all course assessments. MyITLab completion rates are also indicative of higher quiz and final exam scores.
Students may opt not to complete initial Skill Based Trainings and Grader Project homework. If so, their Skill Based Exam and Grader Project assessment scores will count for 50 percent of their MITL assignment grades. Students are encouraged, however, to complete the trainings and the Grader Project homework as the option to skip these assignments is intended for more-advanced students who already know much of the material. In addition, if the Skill Based Exam or Grader Project assessment grade is higher than the corresponding Skill Based Training or Grader Project homework grades, the Skill Based Exam or Grader Project assessment grade will count as 50 percent.

Quizzes
Students complete seven in-class, paper-and-pencil quizzes worth 25 points each. Quizzes are based primarily on MyITLab assignments, but also include content from lecture. Students receive a zero for missed quizzes, there are no make-ups, and the lowest quiz grade is dropped before calculation of the final quiz grade.

Final exam
The final exam is a cumulative, in-class, paper-and-pencil exam; the design is similar to that of the quizzes.

Participation
Despite being a hybrid course—leading to the potential for less in-class time—much of the learning in the course is designed to come from a thoughtful exchange of ideas during class. To promote participation, use of a personal response system was instituted and responding to clicker questions is required. Approximately 10 questions are asked per lecture; students may discuss answers with peers, but their responses must be recorded within 30 seconds. Participation grades are based on correct responses; the lowest 10 percent of the total scores is dropped. Downing reports that the use of clickers has resulted in students paying closer attention to lecture content and engaging more in class.

Assessments
25 percent  MyITLab exercises and exams
25 percent  Quizzes (seven)
25 percent  Final exam
15 percent  Participation
10 percent  Group process: technology project

Results and Data
A comparison of total average MyITLab homework scores and average quiz, final exam, and final course grades suggests that MyITLab homework scores may be good indications of future assessment grades (Figure 1).

- Students earning an A average on quizzes had total average MyITLab homework scores of 95 percent.
- Students earning a D or F average on quizzes had total average MyITLab homework scores of 94 percent.
- Students earning an A average on the final exam had total average MyITLab homework scores of 94 percent.
- Students earning a D or F average on the final exam had total average MyITLab homework scores of 72 percent.

Figures 2 and 3 (on the following page) are correlations that measure the strength of the relationship between total average
Students who completed more than the average number of skipped assignments had both higher quiz averages and higher final exam grades.

MyITLab homework grades to average quiz and final course grades. Correlations do not imply causation but instead measure the strength of a relationship between two variables. The \( p \) value measures the statistical significance/strength of this evidence (the correlation); \( p \) value < .01 is considered strong evidence. A strong positive correlation where \( r = .56 \), \( p \) value < .01 exists for MyITLab homework to average quiz grade and a very strong positive correlation where \( r = .85 \), \( p \) value < .01 exists for MyITLab homework to final course grade. Instructors may find the MyITLab scores an indication of students in need of additional support or under course stress and in need of intervention.

MyITLab assignment completion was also assessed. Figure 4 shows a positive relationship between the number of completed assignments and a student’s average quiz and final exam grades. Students were placed into two groups based on the average number of skipped assignments (seven). Students who completed more than the average number of skipped assignments had both higher quiz averages and higher final exam grades.

- Average number of skipped assignments: 7
- Students who skipped six or fewer assignments had average quiz scores 15 percent higher than students who skipped seven or more assignments.
• Students who completed all assignments had average quiz grades 20 percent higher than students who skipped seven or more assignments.

• Students who completed all assignments had average final exam grades 8 percent higher than students who skipped seven or more assignments.

The Student Experience
In fall 2014, students were asked to participate in a voluntary, 10-question, end-of-semester survey administered by Downing. Survey questions covered students’ use of MyITLab and its impact on their learning and assessment. Of the 87 percent of students who responded:

88% Indicate that they always or usually used the available learning aids in MyITLab when unable to start or complete a homework assignment.

79% Agree or strongly agree that MyITLab provided additional resources that helped them learn more than they would have from traditional paper and pencil homework.

76% Agree or strongly agree that their understanding of the course material increased as a result of using MyITLab.

61% Agree or strongly agree that they would recommend MyITLab for other courses for which it is available.

50% Agree or strongly agree that the use of MyITLab positively impacted their quiz and exam scores.

Conclusion
In his flipped, hybrid course environment, Downing reports that MyITLab is a critical component of the course implementation. “I wouldn’t teach this course without MyITLab,” he says. While homework and repetitive practice is the key to learning Microsoft applications, the interactive nature of MyITLab was a contributing factor in helping the university to redesign the course and to achieve its goals of increased student engagement, improved learning outcomes, and greater interaction and collaboration during in-class sessions.

The interactive nature of MyITLab was a contributing factor in helping the university to redesign the course and to achieve its goals of increased student engagement, improved learning outcomes, and greater interaction and collaboration during in-class sessions.