Given the importance that employers place on computer applications skills in a wide variety of fields, it is not surprising that increasingly colleges and universities are requiring their students to take a computer applications course as a prerequisite for graduation. Additionally, students also realize the value of proficiency in computer applications, most notably Microsoft Office applications, as critical skills for employment and advancement. To meet the demand of increased enrollments, and to provide students with opportunities to apply computer application skills to real-world tasks and activities, college instructors are embracing the use of online solutions that provide opportunities for proficiency assessment and auto grading.

To gain an understanding as to how these types of digital tools can improve outcomes in real classroom settings, Project Tomorrow collaborated with Cengage Learning to evaluate the efficacy of the use of SAM online projects within Microsoft applications courses during the spring semester of 2014. The mixed methods study included the participation of 38 college instructors and over 900 of their students from a geographically and demographically diverse set of two year and four year institutions as well as a small number of trade schools. Twelve of the instructors used only their Cengage textbook, while 26 instructors used both the textbook and SAM.

**About SAM**

Skills Assessment Manager (SAM) is an online learning environment that helps learners master Microsoft® Office skills and computer concepts that are essential to academic and career success. SAM engages students in self-paced learning of Word®, Excel®, Access®, PowerPoint®, Windows®, Internet Explorer®, and Outlook®, as well as technology concepts and issues. At the same time, SAM reduces instructors’ workloads with auto-graded assignments and exams, and easy-to-use course setup and management tools. SAM provides a simulated environment for Microsoft (MS) Office products that integrates an interactive learning experience with the tools and knowledge to prepare students to use these products in real-world settings.

Learn more online at www.cengage.com/samoffice2013
### Study Participants

- **35** higher education institutions — 16 four-year colleges and universities; 17 two-year or community colleges; 2 trade schools
- **22** different states representing all geographic regions of the country: AR, CA, CO, FL, GA, IL, IN, KS, MI, MN, MS, MO, MT, NE, NJ, NC, ND, OH, OR, TX, UT, VA
- **38** college instructors
- **900+** students enrolled in computer applications courses

- Course structure was primarily face-to-face traditional education with 54% of the instructors identifying with that classroom format. 42% of the treatment instructors and 38% of the control instructors taught in a fully online or blended classroom model.
- Of the 26 SAM instructors, 24 used SAM 2013 and two used SAM 2010.

### Profile of Student Participants

<table>
<thead>
<tr>
<th>Background Information</th>
<th>SAM users (treatment)</th>
<th>Non SAM users (control)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>67% Traditional</td>
<td>58% Traditional</td>
</tr>
<tr>
<td></td>
<td>33% Nontraditional</td>
<td>42% Nontraditional</td>
</tr>
<tr>
<td>Education Level</td>
<td>43% in 1st year in college</td>
<td>43% in 1st year in college</td>
</tr>
<tr>
<td></td>
<td>33% in 2nd year of college</td>
<td>33% in 2nd year of college</td>
</tr>
<tr>
<td></td>
<td>24% in 3rd year or greater</td>
<td>24% in 3rd year or greater</td>
</tr>
<tr>
<td>Female to Male</td>
<td>67% Female</td>
<td>67% Female</td>
</tr>
<tr>
<td></td>
<td>33% Male</td>
<td>33% Male</td>
</tr>
<tr>
<td>Interest in Majoring or Minoring in Computer Science</td>
<td>25%</td>
<td>30%</td>
</tr>
</tbody>
</table>

**About Project Tomorrow**

Project Tomorrow®, the national education nonprofit organization dedicated to empowering student voices in education discussions, prepared this program evaluation for Cengage Learning. Project Tomorrow has 16 years of experience in the K-12 and higher education sector and regularly provides consulting and research support to school districts, government agencies, business and higher education institutions about key trends and research in science, math and technology education.
Methodology

This study employed a mixed-methods approach in which we collected both qualitative and quantitative data that were analyzed to identify and explain patterns of outcomes. Quantitative data were derived primarily from instructor and student surveys that were completed at the beginning and end of the study period. Instructor questionnaires were designed to capture how instructors used SAM or other instructional technology in their teaching. Questionnaires also collected data on instructor attitudes about SAM and as well as attitudes about how access to SAM may have affected the way they teach their courses. Finally, where appropriate, instructors’ opinions about the helpfulness and importance of SAM projects and capabilities were surveyed.

The collected data were analyzed to explain how effectively SAM, and specifically the use of SAM projects delivers on primarily two significant value propositions:

1. The impact on the learning experience. This evaluation included analysis of student engagement in course content, student usage behavior and its impact on achievement, and students’ self-efficacy as a learner in these courses. As a reflection of the impact on the learning experience, we also analyzed the likelihood of students and instructors to recommend SAM or a course that was using SAM projects to a peer or colleague.

2. The impact on proficiency and productivity. This evaluation included examining students’ proficiency with Microsoft applications and their development of workplace ready skills, such as critical thinking and problem-solving.
Overview of Key Findings

The results of the study demonstrate the linkage between the use of digital tools such as SAM and increased student engagement in course content, student self-efficacy for learning success, and enhanced student skill development and achievement. Additionally, as a significant finding, both instructors and students identified and valued the role of SAM in supporting the development of vital workplace ready skills such as critical thinking and applied knowledge.

Key findings include:

- Students in courses that use SAM do more application projects than students in other courses where SAM is not utilized, thus providing the students in the SAM courses with additional opportunities to practice and develop their skills.
- Seven out of 10 students attribute their increased engagement in course content to their use of SAM projects.
- 85% of SAM students said that doing the online projects was a significant driver for their academic success in this course.
- 100% of SAM instructors and 76% of SAM students would recommend SAM to a colleague or friend.
- Two thirds of SAM students said that having access to SAM in their course helped them learn how to apply course content in real-world settings, and 56% said that it helped them develop critical thinking skills.
- SAM students in both online/blended courses as well as face-to-face courses outperformed their peers in similar non-SAM classes in overall Microsoft application skill proficiency.

As colleges and universities continue to grapple with the effective use of digital tools, the results of this study can provide significant value to those higher education discussions.
Students with Access to SAM Were More Engaged

For those using SAM Projects, 52% of the students indicated that they were more interested in their computer applications course content at the end of the semester compared to the beginning of the semester, with 14% indicating that they were much more interested. Notably, the increased interest was highest amongst males (62%) and nontraditional students, those students ages 24 and older (75%). The nontraditional students had the highest percentage of change in interest from their pre-survey results to their post-survey results with growth of 18% over the semester. In many of our focus group conversations, the nontraditional students were upfront with us about their trepidation at the beginning of the semester with this course content and the inclusion of SAM within the course. Since nontraditional students are more likely to self-identify their technology skills as average or beginning, their change in interest over the course of the semester is particularly compelling.

The increased interest in the course content also resulted in a perception of increased engagement by both the students and instructors. Seven out of 10 students in the treatment group attributed their increased engagement in their computer applications course to the inclusion of SAM projects within the course curriculum. This linkage of SAM to increased engagement was especially strong for nontraditional students; within that cohort, 75% attributed their increased engagement to the use of SAM, with one third strongly agreeing with that premise. SAM instructors (80%) also noted the causal effect of SAM on increased student engagement in their course with 16 of 20 instructors strongly agreeing with that impact value of SAM.

Four specific features or functionality within SAM that changed students’ learning experience and led to increased course engagement:

- Immediate feedback provided when working through the projects
- Opportunity to apply academic concepts to real-world problems
- Opportunity to self-remediate and practice to ensure proficiency
- Knowledge application outside of class (the immediate utility from the knowledge)
Students in the treatment group placed a high value on doing the online SAM Projects as having a positive impact on their success. Within the general group of treatment students 85% agreed that SAM Projects were an important factor in determining their academic achievement, with 54% of those students strongly agreeing with that statement (Chart 1). While nontraditional students (87%) placed a slightly higher value on doing the SAM projects, there was no significant differentiation within this value proposition based upon students’ technology skills, or whether they were in an online/blended class environment or a traditional, face-to-face class environment. This lack of differentiation underscores the wide appeal of the SAM projects to the students and the universality of the benefits that they are reaping through these activities. Not surprisingly, their instructors agree. Eight out of 10 of the SAM instructors noted that student participation in the SAM projects was a very important driver for their course success.

SAM Positively Impacts Student Success

Chart 1:
Participants agreeing that SAM Projects had a positive impact on success in the class

The SAM study guides were mentioned repeatedly in the student focus groups as a key factor in supporting student learning. Many students noted that the ability to identify errors and to be able to self-remediate within the projects was a contributing factor to achieving a higher grade in the course than they had anticipated.

“SAM helped me develop better speeches for my speech class once I learned more about PowerPoint.”

Student
Seminole State College
The SAM feature of multiple attempts was also highly valued by the students, but possibly not for conventional reasons. In fact, over four weeks of student polling, 60% of the students only used one attempt when working through their SAM projects. While most students did not actually utilize the option for multiple attempts or tries as set up by their instructor, the inclusion of that feature provided students with increased confidence that they could be successful if their first responses were inaccurate. Many students indicated that the multiple-tries feature reduced their stress. The availability therefore of the multiple tries was in itself a valuable component of the students’ self-efficacy as a learner using SAM.

As part of the study, both treatment and control students were asked to take part in the SAM Challenge (an assessment tool that gauged students’ skill levels in four Microsoft Office applications: Excel, Word, Access and PowerPoint) at both the beginning and the end of the semester. Due to the relatively small size of the control group students who took the assessment, our quantitative analysis of the assessment data was primarily focused on a select set of comparative results using the type of institution and course format as the variables.

Within the various subgroups below, students that had access to SAM projects outperformed their peers in the control group on the final SAM Challenge assessment (Chart 2).

![Chart 2: Students with access to SAM (treatment) outperformed those not using SAM (control)]

COMMUNITY COLLEGE STUDENTS
- The correct responses on the final assessment for the students within the treatment group (N = 287): 74%
- The correct responses on the final assessment for the students within the control group (N = 109): 62%

STUDENTS IN TRADITIONAL, FACE-TO-FACE COURSES
- The correct responses on the final assessment for the students within the treatment group (N = 218): 74%
- The correct responses on the final assessment for the students within the control group (N = 49): 55%

STUDENTS IN ONLINE COURSES
- The correct responses on the final assessment for the students within the treatment group (N = 69): 76%
- The correct responses on the final assessment for the students within the control group (N = 64): 69%

“Our maintenance department uses Access. That is one of the reasons why I thought this class would be very informative for me. I didn’t know anything about Access. Our department doesn’t use it. But now knowing how to use it, I can advance my career, especially since I have done actual projects using Access. I think this is going to be a big advantage for me if I want to move up in our company.”

Nontraditional Student
Moraine Valley Community College
Instructor Recommended, Student Approved

In general, instructors are typically reluctant to recommend products, and especially technology-based products, to colleagues unless they have benefited directly and significantly from their own personal use of the product. It is therefore especially noteworthy that 100% of the SAM instructors in the study said it was likely (15%) or very likely (85%) that they would recommend SAM to another instructor to use in his/her computer applications courses. This high valuation is consistent with the viewpoint of the SAM instructors that the use of the projects increased student engagement, was important for their students’ academic success in this course, and improved their own personal productivity.

Chart 3:
Percentage of instructors and students who would recommend SAM

The students in the treatment group were asked their response if a friend or fellow student asked them about taking a course that included the use of SAM projects. Overall, 76% of the SAM students said that they would recommend a SAM course to a friend or another student, while one third of the students would strongly recommend a SAM course. The students that are even more likely to recommend a SAM-enabled course to a peer are students in online or blended class formats (82%) and nontraditional students (85%). Underscoring the high value that nontraditional students gained from the SAM projects, 43% would strongly recommend that a friend take a computer applications course that included SAM.

Instructor and especially student valuation on any learning tool, digital or print based, is dependent upon the relevancy of the experience they had with that product. The recommendation likelihood therefore underscores the critical importance of the effective and meaningful use of SAM to address student and instructor needs.
Promoting Real-World Skill Development

Chart 4: Instructors and students who feel that SAM Projects helps translate course concepts to real-world solutions

In a landmark report released in April 2013, the Association of American Colleges and Universities (AAC&U) shared key findings about the skills that employers highly valued in college graduates. The report, *It Takes More Than a Major: Employer Priorities for College Learning and Student Success*, highlighted that 93% of employers say that “a demonstrated capacity to think critically, communicate clearly and solve complex problems is more important than a candidate’s undergraduate major” in the hiring process. Additionally, the report findings noted that more than 75% of the business leaders surveyed say that they want more emphasis in college courses on five key areas including: “critical thinking, complex problem solving, written and oral communications and applied knowledge in real-world settings.”

Within this study, students in the treatment group identified the following workplace skills as the most important to their future success: problem-solving skills (90%), critical thinking skills (89%) and computing skills (82%)

Given the high value placed on these skills by the students themselves, it is therefore appropriate to evaluate if the students saw any relationship between their use of SAM Projects and the development of these important workplace skills. Chart 5 (below) documents the strong correlation that the students experienced between their SAM usage and this skill development, with some differentiation by gender. The percentages noted indicate where students said that the SAM usage had a high impact on their skill development.

---

Besides critical thinking skills, the employers in the AAC&U study also noted the importance of students being able to apply academic concepts and knowledge to real world situations. The students and instructors in the SAM courses also endorsed that the use of SAM helped students learn how to develop the applied knowledge skills desired by employers. Two thirds of the SAM students (64%) said that their use of SAM helped them understand how to translate course concepts to real world situations. Students were particularly in tune with how SAM helped them learn how to think, apply skills successfully, and the benefits of trial-and-error exercises as a learning modality. Their instructors overwhelmingly agreed with 19 of 20 instructors supporting that conclusion as well.
SAM Plays a Critical Role for Instructors

Due to the emphasis within this study on the use of SAM Projects, it was important to identify the number and type of projects that instructors were assigning to their students, including those facilitated through SAM as well as off-line projects created by the instructors.

Chart 6: Total average number of projects assigned

Instructors using SAM within their courses assigned more total projects to their students than instructors not using SAM. Students in the SAM courses, therefore, had additional opportunities to apply academic content in a real-world setting through the assigned projects. On average, students in SAM courses were assigned 2.5 additional projects in those applications than their peers in the control group courses. From the students’ perspective, doing more projects resulted in greater proficiency.
Of paramount importance to the instructors was the opportunity that SAM afforded their students to extend learning beyond the classroom and to self direct the learning process. Additionally, the instructors valued how the SAM projects gave their students a chance to link the academic content within their course to real world applications.

**Chart 7: Role of SAM Projects within my course**

<table>
<thead>
<tr>
<th>Role within the course</th>
<th># of Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>To extend learning beyond the class period</td>
<td>17 of 20</td>
</tr>
<tr>
<td>To provide students with self-directed learning</td>
<td>17 of 20</td>
</tr>
<tr>
<td>As an assessment tool</td>
<td>17 of 20</td>
</tr>
<tr>
<td>To provide students with real-world application</td>
<td>16 of 20</td>
</tr>
<tr>
<td>To augment lectures with hands-on practice</td>
<td>16 of 20</td>
</tr>
<tr>
<td>To prepare for tests or exams</td>
<td>16 of 20</td>
</tr>
</tbody>
</table>
Amongst the SAM instructors, there was consensus that the vast majority of students could benefit from doing the SAM projects in their course, with little differentiation as to the type or background of the student. However, we see in our analysis that certain types of students may have derived greater value from doing the SAM projects than other types of students. For example, as illustrated in Chart 9, nontraditional students placed a higher value than some of their peers on the benefits of SAM around extended and reinforced learning opportunities as well as increasing their engagement in the course content. Community college students slightly edged out their colleagues in thinking about how doing the SAM projects helped their grade and motivated them to attend class more often. While these variances are slight, they do underscore the diversified value of SAM and provide interesting opportunities for both instructors and colleges to address varying student needs for more effective learning environments.

“Working with Microsoft applications is like playing the piano. The more you practice the more your muscle memory increases. The SAM training and projects allow them to do this. I also use projects in the back of the chapters, so they have to apply more critical thinking skills and after practicing with SAM many of them are easily able to transfer the knowledge effectively.”

Tina Boosel
Instructor, Reinhardt University (GA)
As one would imagine, students and instructors ascribe different learning outcomes or benefits to using SAM Projects within their course. While both groups value SAM as a tool of engagement and increasing comprehension, the instructors placed a higher premium on the use of SAM in driving self-directed learning outside of the classroom. Contrastingly, the students note that having access to SAM actually motivates them to attend class more often, a motivation factor that might be highly appealing to most instructors.

**Chart 9: Learner Benefits of SAM – Variety of Student Perspectives**

“SAM helped develop my critical thinking skills by testing my knowledge with interactive tests and giving me projects that helped improve my knowledge of the subjects.”

Student
Gaston College
Cengage Learning is a leading provider of innovative teaching, learning, and research solutions for academic, professional, and library markets worldwide. The company's products and services are designed to foster academic excellence and professional development, increase engagement, improve learning outcomes, and deliver authoritative information to people whenever and wherever they need it. Through the company's unique position within both the library and academic markets, Cengage Learning is providing integrated learning solutions that bridge from the library to the classroom. www.cengage.com