

Designing Effective Excel Training Courses for Organizations using the Corporate University Model

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Abstract

The notion of the Corporate University was popularized in the 1980s to address the needs of the ever changing skill demands of the workforce. The curricula for the Corporate University intentionally linked learning goals to strategic business objectives. While some companies opted to develop their Corporate Universities internally, others relied on partnerships with institutions of higher education to deliver the needed expertise. Partnering with colleges and universities provided additional sources of revenue in an industry that continues to face enrollment and budget pressures. Previous research indicates that the Corporate University framework has shown to be effective in upgrading the skills and supporting the strategic objectives for a firm. Furthermore, businesses rely heavily on applications like Microsoft Excel to perform calculations, sort, filter, and modify data. The combination of Corporate University frameworks and Microsoft Excel have been used to build the skills of a changing workforce in order to deliver better data analysis within a department of a Fortune 50 company. This paper reports on the development of Excel training courses for a global company and its effectiveness in supporting the strategic business objectives of the firm. Ultimately, over 100 employees have been trained at varying levels of Microsoft Excel and has allowed the business to save time and money through automating manual processes.

Keywords: corporate university, Microsoft Excel, spreadsheet, training, partnerships

1. INTRODUCTION

Higher education institutions today are facing increased pressure to maintain enrollments and increase revenue amidst tightening budgets and decreased state and federal funding. Colleges and Universities, in order to maintain their existence, are reaching to their entrepreneurial playbook to generate new sources of revenue to fund projects. As such, schools are looking to local business partners to provide educational services. Community colleges, in particular, have been at the forefront of this movement by meeting workforce demands by developing tailored programs for specific industries (Maliszewski, Nespoli, & Rosa, 2013). However, these programs are typically offered either online or onsite at a community college and are

often commoditized. Conversely, businesses are under pressure to deliver results and may not have the time or resources to dedicate internal training staff to upgrading the skills of its business unit.

Since 2014, a Midwestern University has partnered with one of the community's largest employers to build an onsite, customized training program to upgrade the technical skills of its workforce. Through working with campus and business leadership, the partnership has generated additional revenue for the business school and, as of June 2016, effectively trained over 100 employees in the shared services department of this global company.

This paper first discusses the importance of Microsoft Excel in the business world and previous research on Corporate University (CU) frameworks. Additionally, the design of customized Excel training courses for a Fortune 50 company is discussed and concludes with results from survey data taken before and after the customized training sessions were delivered. This work is important to the discipline as it underscores the importance for higher education to rethink the way it delivers education and diversifies its revenue sources and pool of students.

2. REVIEW OF LITERATURE

Microsoft Excel

Ever since Dan Bricklin conceived the idea of a computerized spreadsheet in the late 1970s, corporations have been transformed in the way that they can dynamically calculate totals, simulate what-if scenarios, and generate dazzling charts (Goldstein, 2015). With an estimated user base of over 500 million individuals (Microsoft, 2012), Microsoft Excel is considered to be the most popular spreadsheet software title in use within organizations and is consequently taught in the majority of business school curricula (McCloskey & Bussom, 2011). Large corporations and small businesses rely on Excel for a variety of tasks including, but not limited to: budgeting, forecasting, organizing, analyzing, and exploring data. With the increased use of enterprise and web-based systems, Excel is becoming a useful tool for storing and manipulating data retrieved from these systems (Scaffidi, Cypher, Elbaum, Koesnander, & Myers, 2007).

However, in a workforce comprised of entry-level staff workers responsible for data entry, invoice processing, and bookkeeping tasks, degrees at the bachelor's or associate's level are not necessarily required. As a result, these key employees may not be formally exposed to Microsoft Excel when joining the workforce. When employers from the financial industry were surveyed regarding Microsoft Excel training for entry-level staff straight from college, 92% said new hires would receive "on-the-job" training from their colleagues or supervisor (Kyng, Tickle, & Wood, 2013). Despite the assumption that the millennial generation is "tech-savvy" by their innate ability to use social media and text, this group of individuals haven't had to use spreadsheets or work with data extensively (White, 2015). However, employers are now seeking individuals who can already

work with data and information while having the technical acumen to complete these tasks with computer programs. In a 2015 survey by the National Association of Colleges and Employers (NACE), quantitative/analytical skills along with technical and computer skills were among the top 15 sought after attributes for job candidates (NACE, 2015). See Table 1. For those employees who may lack a formal education for entry-level positions, how can the Microsoft Excel skills gap be closed effectively?

Top 15 Skills Employers Seek

1. Leadership
2. Ability to work in a team
3. Communication skills (written)
4. Problem-solving skills
5. Communication skills (verbal)
6. Strong work ethic
7. Initiative
8. Analytical/quantitative skills
9. Flexibility/adaptability
10. Interpersonal skills
11. Computer skills
12. Detail-oriented
13. Organizational ability
14. Friendly/outgoing personality
15. Strategic planning ability

Table 1

Corporate Universities

Corporate Universities (CU) support organizational objectives through building and developing specific skills through formal learning (Rademakers, 2005). The notion of building CUs began in the 1980s when approximately 400 businesses had contracted with colleges to train their employees (Nash & Hawthorne, 1987). The original impetus was to meet the changing needs of businesses as the economy became more global and competition more intense (Cantor, 2000). CUs provide a "win-win" for both the business and the university. Aronowitz observed that private colleges, in particular, were facing changing demographics of matriculating students coupled with increased budget pressures (1998). Developing educational curricula tailored to area business partners provided an additional source of revenue and increased community visibility while the workforce was being educated to help support the strategic business objectives. Meister asserted that "the days when corporations passively fund tuition-assistance programs are coming to an end" and that businesses are now "managing education through strategic partnerships with universities"

to meet their training needs (2003). Employers, consequently, are looking for creative ways to integrate learning into the workplace. As such, many are experimenting with different formats, making it more personal and social to create a more engaging and collaborative learning experience. These models are appealing across all generations and are aiding in retaining talent as well (Meister & Willyerd, 2010).

While hiring internal staff dedicated to training or assigning the task as part of someone's existing job duties, utilizing a CU model partnered with a university alliance can leverage the expertise in theory and curriculum development and potentially evolve into certificate and degree programs. Meister lays out 10 necessary steps for developing a CU in Table 2 (Meister, 1998). These steps include crafting a vision with the right oversight, proper funding, determining the particular needs, selecting the learning partners, utilizing the right technology, measuring the outcomes, and proper communication. These steps have evolved over time to include key features such as: aligning the company's strategic objectives to learning goals, integrating company examples and assignments into learning, designing a schedule that fits the business calendar, and using the corporation's campus to deliver on-site programs (Meister, 2003).

10 Steps to Develop a Corporate University
1. Form a governing body.
2. Craft a vision.
3. Recommend the funding strategy
4. Determine the scope.
5. Identify stakeholders and their needs.
6. Develop products and services.
7. Select learning partners.
8. Draft a technology strategy.
9. Devise a measurement system.
10. Communicate the vision, products, and program throughout the organization and beyond.

Table 2

Research Questions

Based on the importance of and reliance upon Microsoft Excel in the workplace as a tool for formatting, modeling, and calculating data, can a corporate university framework, in partnership with higher education, be effective in its design and outcomes? Furthermore, will participants have an increased level of confidence in Microsoft Excel following the training course?

3. EXCEL COURSE DESIGN

Millikin University's business school was initially contacted by leadership from the shared services department of Archer Daniels Midland (ADM). The shared services department handles all of the invoices, payables, and expense reports for this global agricultural products company among the 2016 Fortune 50 list (*Largest U.S. Corporations*, 2016). The shared services department employs approximately 120 staff who are typically engaged in processing invoices through their enterprise resource planning system (ERP). Many of the staff do not have college degrees, nor have they had formal coursework in computing or spreadsheet software. However, the need for data and analysis has increased over time as the demand for management through business intelligence has also increased. As one manager in the area stated, "Being the metrics-driven organization that we are, it is important not only that we are doing our work as accurately and efficiently as possible, but also that our teams are able to create and understand metrics that are communicated out to our customers and leaders, and use them to manage day-to-day tasks." Furthermore, she recognized that "some of our colleagues had never even used Excel and [we knew that] processes could be automated that were currently being done manually. (E. Montgomery, interview, May 16, 2016). The department was in need of upgrading its technology skills, specifically in the area of spreadsheet software, to increase efficiency and productivity.

The Tabor School of Business at Millikin University was particularly poised to address the needs of this area business partner. In 2014, the dean of the business school, along with the coordinator for the information systems department, met with two managers from the shared services department at ADM to understand their educational needs. These four individuals comprised the governing body to develop and launch the Microsoft Excel training program. The shared services department had three key goals with this initiative: to create a long-term relationship with their education partner, to build a customized program tailored to the learning needs of their diverse workforce, and to deliver the training on-site and around their business calendar. While the ADM considered contracting with the local community college, the company preferred a four-year institution with a reputation for quality education and who would customize the training according

to their needs. In addition, the company cited that the community college's courses would not offer the training courses onsite. Leadership from the business partner involved upper management in the conversation and built buy-in by tying performance metrics to the need for funding this initiative. The initial agreement consisted of two Excel classes that focused on basic skills that, long-term, would evolve into intermediate, and advanced skills. The shared vision between upper management and department leadership was to eventually move from Excel into other technical and service-related skills such as database software, customer service, and project management.

Millikin University negotiated the terms of the agreement with regards to price, content, and agreed upon learning goals for the Excel courses. Representatives from the provider institution collaborated with academic and business office leadership for buy-in on the terms of the contract. This was important to ensure that all parties of both the university and ADM were on board with the training program. The training courses would be taught by either full-time or adjunct faculty who had proven success in the classroom through the use of course evaluation data. Faculty were also selected based on their external connection to the business world as this was important in building and maintaining the relationship. Faculty teaching these courses also agreed to answer any follow-up questions by participants for two weeks following the training. Participants received a certificate of completion at the end of the training course, but did not earn college credit.

With 120 employees in the shared services department, a long-term approach was taken to address the needs of the staff. All of the employees couldn't be trained at once. Leadership wanted small, intimate class sizes of 15 participants in their dedicated lab space to provide more opportunities for one-on-one support with the instructors. Courses ran for two days, back-to-back, for four hours in the morning from 9:00 am to 1:00 pm. Initially, two courses were offered at different levels of Excel expertise: basic and intermediate. Department supervisors hand selected high-performing employees, based on performance evaluations, to take either the basic skills or the intermediate skills Excel course. Employees typically started in the basic skills course. Employees with sufficient experience or through taking an Excel practice exam developed by the provider institution, could be placed in the

intermediate course. Prerequisites for both courses assumes that the participant has a working knowledge of Microsoft Excel and experience in operating and navigating a Microsoft Windows PC. This includes the use of a keyboard and mouse and understands basic Microsoft functions such as, but not limited to, opening and closing windows/programs and files.

Participants received a custom textbook using McGraw-Hill's Create platform. The text included custom material from the institution and instructors along with a blend of content, exercises, and examples from different Excel textbooks from the textbook publisher. The textbook served as a valuable reference following the training courses.

Learning goals for both the basic and intermediate Excel courses were developed through multiple meetings, emails, and phone calls between the lead faculty and manager of the shared services department. The lead faculty asked questions to understand the nature of the department's work and sought to understand the Excel skill gaps at multiple levels. The intent was to understand where efficiencies could be gained through increased capabilities with Microsoft Excel and back into the established learning goals.

The initial pilot training course focused on the basic skills of Excel as many of the employees had either never used Excel or barely used the software utility. The course mostly keyed in on the fundamentals of navigating the software, managing an Excel workbook, formatting cells, and performing basic calculations. A full list of the learning goals for the basic skills course are provided in Table 3.

Excel Basic Skills Course Learning Goals
<ul style="list-style-type: none">• Understand how to navigate Microsoft Excel.• Create a basic worksheet using Microsoft Excel.• Insert and modify cell contents within an Excel worksheet.• Format data appropriately in an Excel worksheet.• Modify the appearance of data within an Excel worksheet for viewing and printing.• Manage Excel workbooks.• Perform basic calculations in an Excel worksheet.

Table 3

Four intermediate skills courses were offered in 2015 along with two in 2016. This second-level look at the application focused on the intermediate use of formulas, charts and graphs, data tables, and external data sources. A full list of the learning goals for the intermediate skills course can be found in Table 4.

Excel Intermediate Skills Learning Goals
<ul style="list-style-type: none">• Calculate data using conditional and lookup functions.• Create formulas that reference data from another worksheet.• Create charts and graphs.• Analyze data using Data Tables and Goal Seek.• Analyze data using PivotTables and PivotCharts.• Import data from external sources.

Table 4

The instruction style of the training course was intentionally designed to demonstrate various features of Excel that were tied to the learning goals of the course while allowing participants to practice the skill in a hands-on lab environment. Along with this method, instructors worked with department leadership to understand the nature of the work and the types of tasks performed so that relevant work examples could be used to demonstrate the Excel feature. This model helped participants understand the value of the software application. Instructors dedicated blocks of time within the two training days to allow students to synthesize their learning on their own through the completion of specific lab exercises with the instructor circulating the lab for questions, coaching, and checking of work. This instruction model actively engaged participants to reinforce learning of the software application.

5. METHODOLOGY

Prior to a training course, participants received a welcome email from the instructor with the agenda for the two-day training along with work files for the course in addition to a pre-assessment survey. Following Meister's CU model, a measurement system was developed to assess the level of effectiveness of the training programs (2003). The anonymous and voluntary survey, administered through SurveyMonkey, contained five questions asking questions regarding their level of comfortability performing different functions on a PC, how

often they used Microsoft Excel, to what extent certain features of Microsoft Excel was being used, and their level of confidence with specific features of Microsoft Excel that were specific to either the basic or intermediate course. When asked about their confidence regarding specific Excel features related to the course learning goals, participants rated their confidence level on a one to five Likert scale from Don't Understand the Feature to Very Confident. Participants were also asked what the top three goals they wanted to achieve from the Excel training.

Following the training course, participants were asked to complete an anonymous and voluntary post-assessment survey that was administered through SurveyMonkey. Participants were asked about their level of confidence for Excel features taught, rated their instructor using standard evaluation questions from the University instructor survey instrument, what they liked most about the training session, and what they felt could be improved in future iterations. When asked about their familiarity of specific Excel features, participants rated their confidence level on a one to five Likert scale from Don't Understand the Feature to Very Confident. Participants were asked about the same Excel features as in the pre-assessment survey.

Both pre-assessment and post-assessment surveys from the basic-level and intermediate-level Excel courses were summarized using comparisons made between the Excel features questions from both survey instruments and analyzed for a positive or negative difference of means between the pre and post-assessment results. Means for each question from the pre-assessment and post-assessment were calculated along with standard deviations and 95% confidence intervals ($p < .05$) assuming a normal distribution. The difference between the means from the post-assessment against the pre-assessment were used to determine the level of confidence increased as a result of the training course. While these responses were self-reported, they can be used as a gauge of effectiveness before and after the training courses.

6. RESULTS

Of the participants in the basic skills Excel training course, there were 23 respondents who completed the pre-assessment survey and 20 respondents who completed the post-

assessment survey. The variance in the number of respondents is due to the voluntary nature of the survey. Of those who took the pre-assessment survey, 52.2% use Excel on a daily basis, 17.4% on a weekly basis, and 30.4% use Excel less than once per month. Additionally, when asked to what extent the individual currently uses Microsoft Excel, the top three features identified were: entering numbers into cells (69.8%), entering text into cells (65.2%), and using pre-made Excel templates (52.17%), as seen in Table 5. When asked what they wanted to learn from the basic Excel training, open-ended responses were general in nature, such as: start an Excel spreadsheet from scratch, sort data, create formulae, and become better at navigating the software application.

Excel Basic Skills Current Application Usage	
To what extent do you currently use Microsoft Excel? Check all that apply (n=23)	Pct. Response
Enter numbers into cells	69.6%
Enter text into cells	65.2%
Using pre-made Excel templates	52.2%
Modifying data in an existing Excel Workbook	43.5%
Creating multiple worksheets within a workbook	39.1%
Sorting data	39.1%
Creating formulae to add/subtract/multiply/divide numbers	26.1%
Formatting data for reporting	17.4%
Creating charts and graphs	0.0%

Table 5

Participants were asked in both the pre-assessment and post-assessment surveys their level of confidence on certain Excel features. The top three Excel features where reported confidence levels displayed the greatest increases in difference of means were: formatting cells using Format Painter (+2.37), creating formulae that use absolute and relative cell referencing (+1.87), and formatting a worksheet to print only certain cells (+1.41). All Excel features had an increase in the mean score by at least 0.96 and 0.97 for using basic math functions as formulae and using the SUM and AVERAGE functions, respectively. Complete results can be found in Table 7, Appendix A.

Of the participants who took the intermediate skills Excel course, there were 61 respondents who completed the pre-assessment survey and 37 respondents who completed the post-

assessment survey. Unfortunately, not all of the participants who took the pre-assessment survey completed the post-assessment survey despite multiple requests. Of those who took the pre-assessment survey, 77% indicated that they use Excel on a daily basis while 14.75% indicated that use Excel at least weekly. 8.25% of respondents indicated that they use Excel at least once per month. When participants of the intermediate course were asked to what extent they used Microsoft Excel, the top three features identified were: entering numbers into cells (93.4%), entering text into cells (90.2%), and modifying data in an existing Excel workbook (77.0%). A complete list of feature usage can be seen in Table 6. When asked what participants wanted to learn from this intermediate Excel course, the open-ended responses focused on Excel-specific features such as: VLOOKUP, PivotTable, Goal Seek, SUMIF, and other formulae.

Excel Intermediate Skills Current Application Usage	
To what extent do you currently use Microsoft Excel? Check all that apply (n=61)	Pct. Response
Enter numbers into cells	93.4%
Enter text into cells	90.2%
Modifying data in an existing Excel Workbook	77.0%
Creating formulae to add/subtract/multiply/divide numbers	65.6%
Sorting data	60.7%
Creating multiple worksheets within a workbook	59.0%
Formatting data for reporting	49.2%
Using pre-made Excel templates	47.5%
Creating charts and graphs	21.3%

Table 6

As in the assessment instruments for the basic skills course, participants in the intermediate Excel course were asked in both the pre-assessment and post-assessment surveys their level of confidence on a variety of Microsoft Excel features. The top three features where the biggest increase in confidence levels, based on a difference of means, was displayed were: using data analysis tools such as Goal Seek (+2.99), working with Sparklines (+2.67), and importing comma-separated value (CSV) text files into a worksheet (+1.77). All features indicated an increase in difference of means by at least 0.86 for using data tables to format, sort, and filter data, as seen in Table 8, Appendix A. While there is a large discrepancy

in the number of respondents between the pre-assessment and post-assessment surveys, these responses were spread out across four different training sessions, which may normalize the results.

Participants in both the basic and intermediate Excel courses were given the opportunity to provide open-ended feedback through the post-assessment survey. Comments, in general, cited the engagement of the faculty and hands-on approach, and that the instruction was relative to their work. Participants appreciated the thorough explanation of features and that time was provided to allow for practice. In contrast, the material went too fast for some individuals and longer time allotment for the training sessions was suggested. Results from each of the training sessions were summarized and shared with the governance committee within the University and the leadership from the corporate partner. This oft-missed step is important to close the loop in the process and communicate the level of effectiveness the program has had for the employees and business unit. For instance, written comments from the survey instrument and verbal comments to company supervisors related to the intermediate course indicated that little value was gained from learning the intricacies of charts and graphs. After discussions between the department manager and the lead faculty, it was decided that there should be a stronger emphasis placed on importing data from text-based files and external systems. This feedback loop is necessary to iterate the training courses as the company's needs change.

7. DISCUSSION AND CONCLUSIONS

This Excel training program for a globally recognized Fortune 50 company has been successful through the use of the Corporate University model and developing a strategic partnership that addresses specific training needs tied to business objectives. When management was asked how their department has benefited from these training courses, their response cited the ability to save the company time and money:

"Some of our colleagues had never used Excel at all, and were therefore not even aware of the many ways in which the program could assist in their work. Processes that could be automated were being done manually, costing them time and the company money."

In an era when budgets are tight and academic areas are vying for resources, the program has been successful in generating creative sources of revenue to support faculty development for the business school. To date, the partnership has grossed approximately \$40,000 in revenue and the partnership remains strong. The shared services department is looking beyond Excel skills towards database skills such as Microsoft Access and SQL in addition to macro development and Visual Basic for Applications (VBA) within Microsoft Excel. The University's corporate partner understands that the technical skill level will need to increase over time as data and systems become an increasing part of their work. The leadership in the shared services department also recognizes that it is resource intensive to dedicate internal staff to training when other pressing priorities take precedence.

However, there are challenges to implementing this model. Faculty and university leadership must be willing and have the time to engage in the conversation and consulting tasks with the business partner to ensure that training needs are customized and relevant to job duties. The question facing this University is understanding the capacity for training and how well this model can be scaled to other corporate partners in the area. Faculty time is precious and, if growth occurs, additional faculty will be needed to instruct additional courses. Attracting and retaining faculty for this CU model becomes a challenge in certain markets in order to maintain quality. While this program has been successful for this one particular client, growing into additional markets is being tested with caution.

Ultimately, this Corporate University model is a "win-win" for both the University and the business. The University is able to forge stronger partnerships in the community while generating a creative source of revenue. For the business, important skills are being developed to increase the capabilities of its workforce and increasing its efficiency in business processes through software applications. In the future, courses will change based on the demands of employers and its workforce. Additional research is needed to understand the long-term implications of these training sessions and its effect on the employees and the business.

7. REFERENCES

Aronowitz, S. (1998, March). The new corporate university: Higher education becomes higher training. *Dollars & Sense*. p. 32.

- Cantor, J. A., George Washington Univ., W. D., & ERIC Clearinghouse on Higher Education, W. D. (2000). *Higher Education outside of the Academy. ERIC Digest.*
- Goldstein, J. (2015, Feb 25). Spreadsheets! *NPR Planet Money Podcast.* Podcast retrieved July 17, 2015, from <http://www.npr.org/sections/money/2015/02/25/389027988/episode-606-spreadsheets>
- Kyng, T., Tickle, L., & Wood, L. (2013). Perceptions of the software skills of graduates by employers in the financial services industry. *International Journal of Mathematical Education in Science and Technology*, 44(8), pp. 1224-1238.
- Largest U.S. Corporations.* (2016, June 15). *Fortune*, 173(8), pp. F1-F22.
- Maliszewski, C., Nespoli, L., & Rosa, R. (2013). Training on Demand. *Community College Journal*, 83(3), 42-46.
- McCoskey, D. & Bussom, L. (2011). Using Excel in Business Curricula: An Opportunity to Combine Student Engagement with Active Learning. Proceedings of the Northeast Business & Economics Association, 2011, pp. 59-62.
- Meister, J. C. (1998). Ten steps to creating a Corporate University. *Training & Development*, 52(11), 38.
- Meister, J. C. (2003). The Latest in Corporate-College Partnerships. *Training & Development*, 57(10), 52
- Meister, J.C. & Willyerd, K. (2010). *The 2020 Workplace.* New York, NY: HarperCollins.
- Microsoft. (2012). Super Powers for Excel – Offloading Excel Calculations to a Cluster or the Cloud. Retrieved March 11, 2016, from https://blogs.technet.microsoft.com/hpc_and_azure_observations_and_hints/2012/05/04/super-powers-for-excel-offloading-excel-calculations-to-a-cluster-or-the-cloud/
- Nash, N. S., Hawthorne, E. M., Association for the Study of Higher, E., & ERIC Clearinghouse on Higher Education, W. D. (1987). Formal Recognition of Employer-Sponsored Instruction: Conflict and Collegiality in Postsecondary Education. ASHE-ERIC Higher Education Report No. 3, 1987.
- National Association of Colleges and Employers. (2015). Job Outlook 2016: Attributes Employers Want to See on New College Graduates' Resumes. Retrieved April 14, 2016, from <http://www.nacweb.org/s11182015/employers-look-for-in-new-hires.aspx>
- Rademakers, M. (2005). Corporate Universities: Driving Force of Knowledge Innovation. *Journal of Workplace Learning*, 17(1-2), 130-136.
- Scaffidi, C., Cypher, A., Elbaum, S., Koesnander, A., & Myers, B. (2007). Scenario-based requirements for web macro tools. In *Proceedings of the IEEE Symposium on Visual Languages and Human-Centric Computing.* (pp. 197-204).
- White, M. C. (2015). This Is Millennial' Most Embarrassing Secret. *Time.Com*, N.PAG.

Appendix A

Excel Basic Skills Pre-Assessment vs. Post-Assessment Results							
Participants rated their level of confidence for each feature on a 1-5 scale from Don't Understand the feature to Very Confident	Pre-Assessment (n=23)			Post-Assessment (n=20)			Difference of Means
	Mean	Std. Dev.	95% Conf. (p < .05)	Mean	Std. Dev.	95% Conf. (p < .05)	
Format a worksheet to shade	3.43	1.16	2.96, 3.91	4.55	0.69	4.25, 4.85	+1.12
Format cells using Format Painter	2.43	1.04	2.01, 2.86	4.80	0.41	4.62, 4.98	+2.37
Format a worksheet to print only certain cells	3.04	1.33	2.50, 3.59	4.45	1.00	4.01, 4.89	+1.41
Create file properties for an Excel Workbook	2.26	1.14	1.80, 2.73	3.45	1.47	2.81, 4.09	+1.19
Freezing and Unfreezing rows and columns	3.00	1.21	2.51, 3.49	4.40	0.94	3.99, 4.81	+1.40
Apply specific date/text/number formats to cells	3.39	1.20	2.90, 3.88	4.55	0.76	4.22, 4.88	+1.16
Add/Subtract/Multiply/Divide values from cells	3.39	1.23	2.89, 3.90	4.35	0.75	4.02, 4.68	+0.96
Using the SUM and AVERAGE functions	3.43	1.24	2.93, 3.94	4.4	0.68	4.10, 4.70	+0.97
Creating formulae that use absolute and relative cell referencing	2.48	1.12	2.02, 2.94	4.35	0.75	4.02, 4.68	+1.87

Table 7

Excel Intermediate Skills Pre-Assessment vs. Post-Assessment Results							
Participants rated their level of confidence for each feature on a 1-5 scale from Don't Understand the feature to Very Confident	Pre-Assessment (n=61)			Post Assessment (n=37)			Difference of Means
	Mean	Std. Dev.	95% Conf. (p < .05)	Mean	Std. Dev.	95% Conf. (p < .05)	
Using absolute and relative cell references	3.11	1.24	2.80, 3.43	4.43	0.65	4.22, 4.64	+1.32
Use lookup functions such as VLOOKUP	3.07	1.84	2.60, 3.53	4.24	0.89	3.95, 4.53	+1.18
Using data tables to format, sort, and filter data	3.82	1.12	3.54, 4.10	4.68	0.67	4.46, 4.89	+0.86
Creating charts and graphs	3.46	1.08	3.19, 3.73	4.43	0.60	4.24, 4.63	+0.97
Working with Sparklines	1.57	0.99	1.32, 1.82	4.24	0.98	3.93, 4.56	+2.67
Using PivotTables and Pivot Charts to filter and analyze data	2.79	0.90	2.56, 3.01	4.16	0.80	3.90, 4.42	+1.38
Importing CSV text files into a Worksheet	2.48	1.08	2.20, 2.75	4.24	0.86	3.97, 4.52	+1.77
Using logical functions such as IF and SUMIF	2.87	1.22	2.56, 3.17	4.57	0.50	4.41, 4.73	+1.70
Using Named Ranges to specify a range of cells	2.92	1.26	2.60, 3.23	4.38	0.83	4.11, 4.65	+1.46
Using data analysis tools such as Goal Seek	1.69	1.27	1.37, 2.01	4.68	0.67	4.01, 4.48	+2.99

Table 8