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Ten Reasons Schools Should Offer Microsoft Certification to Students

WHITE PAPER

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Credits and Acknowledgements

This document presents the opinions of Certiport, a Pearson VUE business. Some of these opinions are supported through findings gathered through primary and secondary research and through other artifacts found via the Internet. The scholarly works used to support the opinions expressed are listed in the references section of this document.

This document was prepared by Michael Lane Call, Senior Research Analyst at Certiport. All questions and comments relating to the document or its content may be forwarded to him via e-mail (mike.call@pearson.com).

The photograph on the front cover was taken by Ruben Alvarado (www.ralvaradophoto.com).

This document was created entirely using Microsoft applications (Word, PowerPoint, and Publisher).

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Introduction

CTE decision makers must often grapple with whether their schools should offer IT certifications to their students. They must determine whether such offerings provide an adequate return on investment (ROI) for their students and school(s) alike—the ultimate ROI, of course, being whether IT certifications increase students' career and college readiness. Further considerations relating to a certification's focus, its sponsor, and whether it has any distinct advantage over a skills assessment may further obfuscate the issue.

In this paper, we describe what Microsoft certification is. We make the case why schools, whether secondary or postsecondary, should offer Microsoft certification to their students. We explain why Microsoft certification and the technologies they are built around provide a large ROI for students, schools, and employers.

Part of our discussion is in regard to the technology skills gap and why it is a serious problem for individuals, households, organizations, and nations. We discuss how Microsoft certification provides an effective way for schools to help remedy this skills gap.

Our discussion centers around 10 specific reasons why schools should offer Microsoft certification. While each reason is worthy in its own right, all 10, when considered collectively, make for a compelling case. We encourage CTE decision makers to carefully weigh these arguments when considering Microsoft certification for their students.

Microsoft certification defined

Microsoft certification refers to any specialized computing credential within any of these three main Microsoft programs: (1) Microsoft Office Specialist (MOS), (2) Microsoft Technology Associate (MTA), and (3) Microsoft Certified Professional (MCP). The relationship between these three certification programs is shown in the Figure 1 below.

Microsoft certification pathway

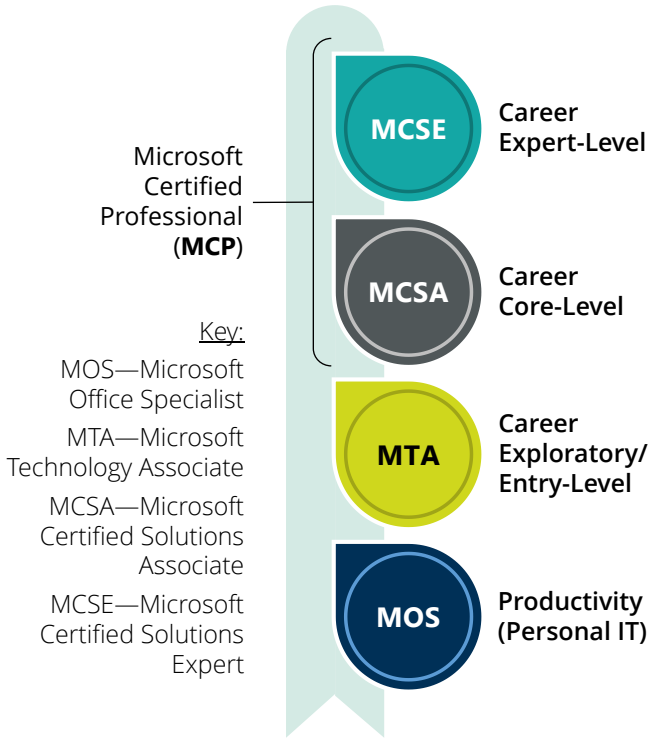


Figure 1

Each of the three programs is situated at a certain point or area along the IT skills continuum. The MOS program, for instance, corresponds to personal IT skills (sometimes also referred to as desktop-computing or office-computing skills) and validates such. MOS certifications are available for each of the applications that comprise Microsoft Office.

The MTA program corresponds to basic or fundamental skills relating to either application development, database management, or information systems/infrastructure and validates such. This program helps students explore possible careers within IT. The skills and knowledge acquired through MTA certification are sometimes sufficient for many entry-level IT jobs.

The MCP program corresponds to professional-level IT skills (also pertaining to either application development, database management, or information systems/infrastructure) and validates such. Individuals obtain a certification through this program so they can get a job within IT or move up through the ranks if already employed within the field. The MCP program has multiple certification titles, such as the Microsoft Certified Solutions Associate (MCSA) and the Microsoft Certified Solutions Expert (MCSE). The different titles correspond to differing skill levels and abilities.

The MOS and MTA programs are generally well suited for high schools, two-year colleges, and workforce training programs. The MCP program is generally suited for career colleges, universities and four-year colleges, and organizations that specialize in professional IT skills training and testing.

1 IT skills are in ever-increasing demand

We begin discussing this first reason by first addressing MOS certification and then, afterward, will shift the discussion toward more advanced IT certifications such as MTA, MCSA, and MCSE.

Microsoft Office skills

Being able to effectively use Microsoft Office to increase work efficiencies and productivity is valuable in the job market. Employers want their employees to have these skills. They expect employees to have these skills. Companies and organizations everywhere, every day, conduct business using Microsoft Office. It is the backbone of many business operations.

If schools are to give their students a practical work-based education and serve their communities well, and contribute to the well-being of the local, state, and national economies, they need to provide students with opportunities to become skilled at using Microsoft Office. It behooves them to do so. Participating in the Microsoft Office Specialist (MOS) program is a way for schools to fulfill this obligation.

Current data from O*NET (short for 'Occupational Information Network'), an online occupation-information repository operated by the U.S. Department of Labor's Employment and Training Administration (DOLETA), shows that 67 percent and 75 percent of all occupations require the use of word-processing software and spreadsheet software respectively (see table below)[1]. Microsoft's sheer dominance in the desktop-based as well as cloud-based office-productivity-software market gives reason to believe that most of the software alluded to in these O*NET figures is Microsoft Word and Excel[2, 3].

Saying that using Microsoft Office effectively and productively are valuable skills students should learn should seem self-evident. Nonetheless, findings from scholarly research really drive home the idea that schools really ought to teach Microsoft Office to their students. A few such findings are summarized on the next page.

Estimated percentage of select occupations that use office-computing software (USA)

Occupations	Word processing	Spreadsheet	DBMS	E-mail/PIM	Slide presentation
All	**67%**	**75%**	**28%**	**34%**	**45%**
'Bright outlook' designated	74%	82%	36%	35%	52%
Business/Marketing	85%	87%	58%	73%	76%
Finance	74%	79%	41%	46%	69%
Health Science	65%	75%	21%	21%	30%
STEM-specific	79%	86%	50%	24%	79%
Information Technology	81%	96%	85%	46%	88%

Source: O*NET (Occupational Information Network)

Scholarly Findings: Employers Want College Grads with Broad MSOffice Skills

Formby, Medlin, & Ellington (2017): Reports on findings collected through multiple research (i.e., interviews with university advisory board, content analysis of job-ad postings, survey of area employers). Twenty-one specific 'must have' Microsoft Excel skills were identified as necessary for university graduates. (These skills were also validated through additional research.) The authors suggest the need for colleges and universities to provide opportunities for students to learn these Excel skills in order to better meet employer expectations for new hires.

King, Miller, & Bayerl (2017): Reports on findings from a survey sent to 20 employers from a large metro area in the upper Midwest (USA) that regularly hire graduates from the local university. Employers were asked which technology skills they expect new hires to have (Findings were to help determine course offerings at a new campus student resource center.). MSOffice skills obtained the highest frequency of responses among the 13 separate technologies covered. It was also the only technology among those listed where more respondents indicated that graduates need these skills versus the number who indicated otherwise.

Jones, Leonard, & Lang (2016): Reports on findings from a survey sent to 73 large-enterprise employers throughout the world. Employers were asked which skills are most needed for entry-level IT positions. Findings show that soft skills were cited as most important. However, MSOffice skills were rated among the top hard skills needed (along with database/SQL and information security). (Top soft skills reported include willingness to learn, critical thinking, and attitude.) The authors suggest these findings can help guide universities in setting up IS course curriculums.

Prachyl & Sullivan (2016): Recommends a strategy for schools with accounting programs to follow, consisting of offering select industry certifications that students can earn to verify their knowledge of business and accounting principles and procedures. The authors specifically recommend Microsoft Excel as a proposed starting point since it is the least expensive of the certs mentioned and provides the most immediate opportunities for students. The rationale they provide is that certs allow students who attend less prestigious schools to better stand out and come onto more-equal grounds with their counterparts. The authors also express the importance for students to get accustomed to taking 'high stakes' exams.

Cooke & Zaby (2015): Reports on findings obtained through interviews and surveys directed at startup companies in Berlin that frequently hire business school grads. Employers were asked which skills are most important for new hires to have. Results show that soft skills are generally considered as most important. However, the interview group indicated MSOffice skills are the most important of all the skills, soft of hard. The survey group indicated that spreadsheet, word processing, and slide presentation skills (all hard skills) are among the top 10 skills overall.

Elrod, Pittman, Norris, & Tiggeman (2015): Reports on findings from a research experiment involving accounting students at a university in the Deep South (USA). Students were assigned to one of two groups: (1) a treatment group in which they underwent the MOS certification process (for Excel); (2) a control group that did not receive certification. Both groups then took an assessment designed to measure spreadsheet skills deemed relevant to accounting professionals. The MOS group statistically outperformed the control group at highly significant levels. The authors suggest that MOS certification might be useful for accounting programs by helping student meet learning outcomes desired by accounting firms.

Rassuli, Bingi, Karim, and Chang (2012): Reports on findings from a survey directed at many major corporations located in a prominent industrial region in the Midwest (USA). Employers were asked to rate, from among an extensive list, which skills business school grads need upon entering the workforce. Skills deemed relevant to several business functions were identified. Microsoft Excel and Word, along with five other specific skills, were rated highest across all the functional areas.

Professional-level IT skills

Every year hundreds of thousands of IT jobs go unfilled in the United States. Reported estimates from the federal government put this figure somewhere between 500,000 and one million[4]. Some industry analysts reportedly put this figure even closer to two million[5]. The IT skills gap is reportedly even greater in Europe[6]. Regional concerns over what seems to be an ever-widening skills gap and worries that perhaps millions of European citizens may be left out of the job market because they lack relevant IT skills[7, 8] has spurred the formation of the Grand Coalition for Digital Jobs (GCFDJ), a EU-sponsored initiative aimed at retooling the masses and helping the EU gain a more prominent position within the world economy through IT education and training[9].

Jobs that require advanced IT skills are generally well paying with the potential of providing good employment security to individuals. Many jobs within IT are 'bright outlook' occupations according to O*NET. 'Bright outlook' occupations are defined as those projected to be in great demand over the next decade[10]. They are anticipated to have many job openings, be in technical areas with rapid growth, or be in new and emerging technical areas that appear particularly promising. Twenty such IT occupations are identified as 'bright outlook' occupations and are listed at the bottom right[11].

MTA, MCSA, and MSCE certifications help prepare students and other persons for the types of IT occupations listed. These certifications narrow the IT skills gap both at the micro (individuals) and macro (economy) levels. High schools and colleges/ universities can play a vital role in this effort by providing these certifications to their students.

Average number of IT jobs that go unfilled every month (USA)

Title	Count
Software Developers, Applications	83,649
Network and Computer Systems Admins.	51,068
Computer Systems Analysts	46,852
Web Developers	45,790
Information Security Analysts	27,512
Computer and Information Systems Mgrs.	21,758
Computer User Support Specialists	30,937
Total	307,566

Source: 2015 Report from CareerBuilder and Economic Modeling Specialists International (EMSI)

(http://www.careerbuilder.com/share/aboutus/pressreleasesdetail.aspx?sd=12%2f3%2f2015&siteid=cbpr&sc_cmp1=cb_pr924_&id=pr924&ed=12%2f31%2f2015)

IT occupations with a bright outlook (USA)

O*NET-SOC Code	Title
15-1199.08	Business Intelligence Analysts
15-2041.02	Clinical Data Managers
15-1121.00	Computer Systems Analysts
15-1199.02	Computer Systems Engineers/Architects
15-1151.00	Computer User Support Specialists
15-1199.07	Data Warehousing Specialists
15-1199.06	Database Architects
15-1199.05	Geographic Information Systems Techs.
15-1199.04	Geospatial Information Scientists and Techs.
15-1121.01	Informatics Nurse Specialists
15-1122.00	Information Security Analysts
15-1199.09	Information Technology Project Mgrs.
15-2031.00	Operations Research Analysts
15-1199.10	Search Marketing Strategists
15-1132.00	Software Developers, Applications
15-1133.00	Software Developers, Systems Software
15-1199.01	Software Quality Assurance Engineers and Testers
15-1199.11	Video Game Designers
15-1199.03	Web Administrators
15-1134.00	Web Developers

Source: O*NET (Occupational Information Network)

2 Millennials and Gen Z'ers are not inherently IT smart

A common misconception among some school administrators and teachers is that students nowadays—by virtue of their growing up in an era marked by the proliferation of smart phones, tablets, apps, and easy-to-access information over the Internet—already know how to use a PC or at least can figure it out fairly quickly. However, repeated findings from scholarly research show that students, despite being so-called 'digital natives', generally cannot demonstrate basic proficiency using Microsoft Office, unless first receiving effective course instruction enabling them to do so. Idiomatically speaking, a digital device user does not a skilled Microsoft Office user make. Logic dictates this is also true when it comes to advanced IT skills such as creating a web page, developing an app, replacing a motherboard, or configuring a server.

A digital device user does not a skilled Microsoft Office user make...nor a competent wielder of IT for that matter.

The younger generation has often been thought of as being particularly adept to learning and using technology but research suggests that this is not necessarily true, generally speaking, when it comes to information technology[12]. Millennials and post-millennials, just like members of other generational cohorts, often lack skills at various points along the IT skills continuum, be it personal IT, basic IT, or professional-level IT skills.

That students often lack personal IT skills is evidenced through the six scholarly research papers summarized on the next page. Three dominant themes are represented through these selections: (1) students generally perform well below proficiency when using Microsoft Office despite sometimes rating themselves as being proficient users[13]; (2) schools' attempts at teaching Microsoft Office sometimes do not lead to retention of skills over an extended period[14]; (3) the proliferation of PCs and application software over the past decade and even beyond have not necessarily resulted in increased personal IT skills or confidence in using a PC[15].

The claim that students also generally lack advanced IT skills is supported through statistics provided by the U.S. Department of Education. Such statistics show that between 1990 and 2009 (the most recent year data is available), the percentage of high school graduates who earned credits in computer and information sciences and engineering technologies changed by -3.9 percent and -2.6 percent respectively[16]. Similarly, the percentage of high schools that offer computer science has dropped from 25 to 19 percent over the past 20 years[17].

In recent years, there have been huge strides made at increasing millennials' and post-millennials' computing skills with a particular emphasis on coding (through the efforts of Code.org, National Science Foundation, MIT, Google, and others)[18] but there is still a long way to go. Microsoft certification complements and expands on these efforts.

Scholarly Findings: Students are not Generally MSOffice Knowledgeable

Grant, Malloy & Murphy (2009): Business undergrads at a public university in the Southeast (USA) estimated their proficiency using Microsoft Excel, Word, and PowerPoint on a questionnaire. The students then took a skills assessment for each of these applications. Students generally estimated their Microsoft Office skills much higher than what their performance on the assessments demonstrated. Assessment scores for Excel were typically well below basic proficiency; scores for Word and PowerPoint were typically slightly below basic proficiency. The authors of the study comment that even when a state mandates a certain minimum digital literacy threshold for all high school graduates, students who go on to study business in college still often lack the level of Microsoft Office proficiency needed to complement their learning and enrich their understanding of key business concepts.

McLennan & Gibbs (2008); Karsten & Schmidt (2006): These were two different studies conducted by different sets of researchers, yet both studies are similar in that both compared two cohorts of students separated 10 years apart from each other (in the mid-1990s and in the mid-2000s). The first study showed that even though a latter cohort had much more exposure and experience than an earlier cohort at using a PC (on account of the overall increase in PC ownership), the latter cohort did not report greater computer self-efficacy than the first cohort. In fact, their computer self-efficacy ratings were even lower (Note: computer self-efficacy is discussed in more detail under Reason #7 below.). The second study showed that even though a latter cohort had much more exposure and experience than an earlier cohort at using a PC, along with having access to the Internet, the latter cohort did not perform any better, statistically, than the earlier cohort on a skills assessment that measured proficiency across a variety of computing tasks—including the use of office software. Both studies suggest that the increase in PC ownership/use and Internet connectivity has not resulted in more students becoming more computer proficient or confident.

Johnson, Bartholomew, & Miller (2006): Business majors at a four-year public college in the Mountain West (USA) took a Microsoft Excel skills assessment at the end of a required intro to computers course during their freshman year and then retook the same assessment again during their junior year. Surprisingly, students only averaged 62 percent the second time around (80 percent had been required to pass the course/assessment). A survey was also administered to freshmen, juniors, and seniors, wherein each group was asked to rate their confidence in their ability to use MSOffice effectively. A between-groups comparison of the survey results showed diminished confidence at each successive grade level. The authors surmised that even when schools provide instruction in MSOffice, sometimes it is not effective at helping students retain this knowledge so as to benefit them later in the workplace. They suggested the need for a more effective solution for learning MSOffice.

Wilkinson (2006): Business undergrads at a public university in the Midwest (USA) estimated their proficiency using all four core MSOffice applications on a survey. They then completed skills assessments for each of these applications. Students generally estimated their MSOffice skills much higher than what their performance on the assessments demonstrated—most students scored below proficiency. Students then completed a business applications course and then retook the same assessments, this time averaging an improvement of 13.0–18.2 points. The findings show that students, as a whole, typically have much more to learn about MSOffice than what they and educators initially tend to believe.

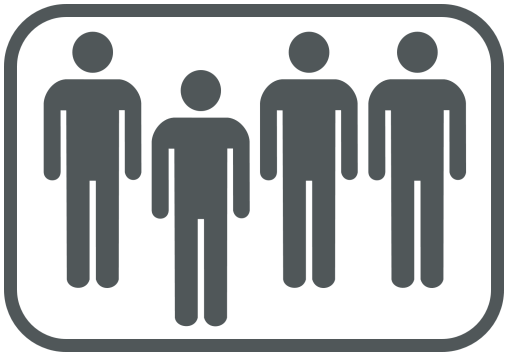
Wallace & Clariana (2005): Undergraduates enrolled in a business applications course at a public university in the mid-Atlantic region (USA) took an Excel skills assessment at the beginning of the semester and then again at the end of the semester (after learning had occurred). Most students scored below 60 percent the first time around (which was being considered by school administrators as a cut score which would allow students during future semesters to test-out of the course). However, scores improved dramatically during the second assessment, increasing by 23 points on average. The findings show that students, typically, have much more to learn about Microsoft Excel than what they and educators initially tend to believe.

3 Allows students to stand out, demonstrate professional commitment

At the very least, earning a Microsoft certification is a way for students to differentiate themselves by showing they meet certain skills competency thresholds within specific IT areas. It also shows that they have demonstrated some personal ambition by earning such a credential.

However, in actuality, as confirmed through findings from secondary research, IT hiring managers generally favor real-world experience over certification[19]. Still, realizing that many available IT positions often go unfilled due to shortages of qualified applicants (as discussed previously), that most students lack real-world experience within IT, and that there is always the need for some entry-level positions within IT, certification attainment can and does often become a default basis for discrimination in candidate selection[20, 21].

Microsoft certification often provides students with a more concrete way to validate their IT skills beyond the letter grades they receive from their courses or the final end-of-program award they obtain (diploma, certificate of completion, degree, etc.). Because it is often difficult for hiring managers to accurately appraise candidates' IT skills based on academic achievement alone, due to between-school differences in school/program accreditation and occurrences of grade inflation, Microsoft certifications can provide a more tell-tell way for verifying IT skill competency.



Reported findings from a 2016 survey of nearly 300 IT leaders conducted by TEKsystems show that 62 percent of respondents indicated that they consider IT certifications as "important" in making hiring decisions[22]. Other findings from the same survey show that 69 percent of respondents indicated that they factor in certifications when coming up with employees' salaries, and 30 percent indicated doing this "always" or "often"[23].

IT hiring managers often look on certification attainment as an outward commitment to stay technically relevant[24]. There are few better ways of assuring a potential employer, hiring manager, work supervisor, etc. that one is committed to stay abreast of technology shifts than through IT certification. After all, when one has earned at least one certification, they are more likely to earn another.

4 Results in better student engagement

Independent data analyses conducted by the National Research Center for Career and Technical Education (NRCCTE) and various state and local education agencies show that student participation in Career and Technical Education (CTE), as compared to non-participation, is associated with higher GPA, lower absenteeism, fewer disciplinary actions, lower dropout rates, and greater enrollment in accelerated or STEM courses[25, 26, 27, 28]. What's more, the between-group differentials for many these measures are typically statistically significant.

While such findings are reported for CTE generally and not Microsoft certification specifically, a case can be made that some findings do heavily skew toward Microsoft certification. Take, for instance, the 2015–16 Florida (USA) CAPE Enrollment and Performance Report (CAPE is short for Career and Professional Education Act), which shows a direct link between industry-based certification attainment and increased student engagement. An analysis of the data from the report shows that a large plurality of certifications earned by students (between 21 and 24 percent) were Microsoft certifications (MOS and MTA specifically)[29].

Given that such a large percentage certifications attained by students in Florida were Microsoft certifications, it logically follows that when students undergo the process of becoming MOS or MTA certified, they become more engaged in their education.

The data shown in the box below highlights some of the findings from the 2015–16 Florida CAPE Enrollment and Performance Report associating certification attainment with student engagement.

Student engagement from certification attainment—gains for cert holders

Average GPA:	.37 to .39 points higher
Absenteeism rate:	9 to 12 percent lower
Disciplinary actions taken:	5.2 to 7 percent fewer
Dropout rate:	2.4 to 2.5 percent lower
12th graders earning a H.S. diploma:	24 to 26 percent more
Enrollment in at least one accelerated course:	18 to 27 percent more

Source: Florida CAPE Report, 2015–16 school year

5 Facilitates and complements interdisciplinary learning

Some courses, taught both at the secondary and postsecondary levels, are not technology courses per se but, nonetheless, integrate technology into the curriculum as a way help teach important concepts relating to those courses. For example, Microsoft Excel and Access are often used as 'learning facilitators' (functioning as bona fide ed-tech solutions[30]) for teaching principles associated with accounting/finance, statistics, operations management, health sciences, and marketing research, among other academic courses (In fact, it is difficult to imagine how some concepts from these disciplines could be taught otherwise). The knowledge acquired through MOS certification, therefore, can facilitate learning in other, non-technology disciplines.

More and more concepts previously considered exclusive to IT or engineering are making their way into other course curricula. This is because the need for certain types of technology-based knowledge and skills now extends beyond STEM and IT to other disciplines. The most prevalent example of this in recent years is information security becoming an essential part of the learning domain within business education, since "information security is just as much a business issue as it is a technical one" (Cram & D'Arcy, 2016) and "a growing number of organizations now demand that employees understand security fundamentals related to business processes, regulatory compliance, and customer data" (White, Hewitt, & Kruck, 2013, as cited in Cram & D'Arcy, 2016). The knowledge obtained through MTA certification—and more particularly, through the Security Fundamentals exam—is fitting for many business education programs.

Coding is another area with increasing relevance within business education, not just within STEM and IT. Deliberate in its prevalence over the word 'programming', the word 'coding' denotes a broader category of participants than mere professional software programmers (Krauss & Prottsman, 2016). Some examples of coders and coding could also include business-intelligence specialists who use SQL, marketing researchers who use R, and financial analysts who use VBA.

The activity of coding essentially involves creating a computing algorithm that solves a problem or performs a task using a certain command language and syntax structure. Various command languages might be different from one another in terms of syntax but the underlying principles are often the same. A person who has already mastered one coding language usually has an easier time learning a second one. For this reason, the learning obtained through MTA, MCSA, and MCSE certifications—and more particularly, those that focus on a specific coding language—can have a carry-over effect that benefits workers who practice coding in all forms.

6 Reduces knowledge gaps and computing mistakes

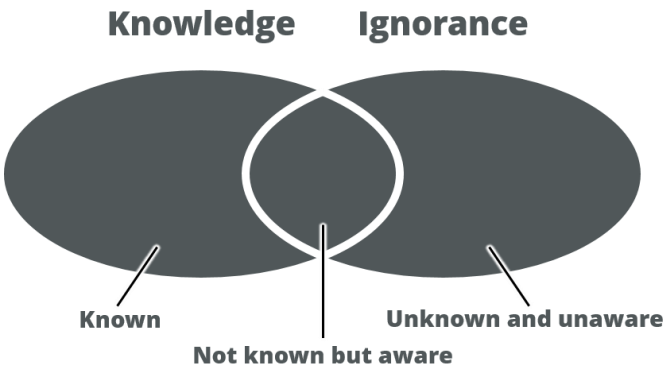
The discussion presented here focuses on MOS certification. It is practically impossible to enumerate all the possible ways one can use Microsoft Office for solving problems and performing tasks. Conversely, one is severely limited in what they can do with Microsoft Office if they are unaware of the breadth of functionality that exists with the software suite (see Insights on Using Microsoft Office from a Power User on the next page). Information workers who claim 'I don't need all these tools and features' are likely oblivious to the efficiency benefits that could be realized if they incorporated these tools and features into their normal work flow. The old adage, 'You don't know what you don't know' typically rings true in these types of situations.

Because MOS exams cover a large knowledge and skills domain, preparing for an exam requires a very structured learning approach (which we touch on in Reason #9). This structured approach obviates the occurrence of knowledge gaps which often result when students learn Microsoft Office in a desultory, less structured fashion. This is important because using Microsoft Office incorrectly is often worse than not using it at all. Such incorrect usage can end up having steep consequences.

For instance, a 2007 article titled 'Beware the Hidden Costs of Bad Formatting', which is available on the Law.com website, illustrates this cost through some examples identified with the type of work performed by legal secretaries and paralegals[31]. According to the article, poor use of formatting in legal documents can cost a law firm nearly $20,000 per year per secretary in rework and lost casework due to rework. The estimated cost is much higher for associates and partners.

Spreadsheet errors involving the incorrect or incomplete use of Microsoft Excel are usually more highly publicized than mistakes from using Microsoft Word. There are virtually hundreds of documented examples of how simple spreadsheet errors have ended up costing organizations dearly in terms of miscalculated revenue and expenses and their public reputations. The magnitude of some of these consequences is so great that one writing contributor for Forbes magazine has mused that "Excel might be the most dangerous software on the planet"[32]. Research studies from the field of operations management/management sciences have shown that undetected errors could inflict a whopping 91 percent of all operational spreadsheets[33]. A few case examples from some of these 'innocuous' spreadsheet errors are described on the next page.

Microsoft Office is a sophisticated suite of applications, each having its own unique tool and feature set, of which the mastery thereof, requires more than mere casual exposure. We show through the examples mentioned above and on the next page that mere casual exposure can have serious consequences in the workplace. MOS certification is among the best ways for ensuring that students close their Microsoft Office knowledge gaps and increase their job readiness.



Insights on using Microsoft Office from a power user

“I use Microsoft Office for two types of tasks—the ones common for my job function or that meet a common objective, which are pretty straightforward, and those that are more ad hoc in nature when dealing with a unique problem. This latter approach relies on my deep knowledge of Microsoft Office and reflects my idiosyncratic approach to problem solving. For instance, to complete the given task, I may pick and choose from among the different tools from multiple applications such as Word and Excel. Each application tool adds some enabling capability to the task. I couldn’t do this without knowing Microsoft Office inside and out.”

Mike
Marketing Researcher
Eagle Mountain, UT (USA)

Examples of high-profile spreadsheet mistakes, both costly and embarrassing

Organization	Description
London 2012 Olympics Committee	Manually inputting the wrong data into a spreadsheet caused the London organizing committee to oversell 10,000 tickets to the synchronized swimming events. This resulted in the committee having to apologize to ticket holders and offer them other event alternatives.
City of West Baraboo (Wisconsin, USA)	A bad spreadsheet formula resulted in an inaccurate NPV calculation on a 10-year municipal bond, leading to the issuance of the bond. Now the City of West Baraboo will be paying back $400,000 more than it originally had planned.
Oxford University Faculty of History (Oxford, UK)	Incorrect sorting of columnar data resulted in aptitude test scores being listed incorrectly for all program applicants. As a results, all 1,613 undergraduate applicants to Oxford University’s prestigious Faculty of History program were severely delayed in learning about their acceptance status until the data could be re-tabulated.
Knox County Trustee’s Office (Tennessee, USA)	A bad link within a spreadsheet used in creating the county's financial statements led to the financial statements being off by $6 million and the Knox County Trustee's Office being slapped with a $12,500 audit fee.
Town of Framingham (Massachusetts, USA)	The Town of Framingham mistakenly overestimated their budget by $1.5 million after a figure went missing in ‘monstrous’ spreadsheet. Now the town will be relying on $600,000 in unplanned/unexpected state aide to fill the gap.

Source: European Spreadsheet Risk Interest Group (http://www.eusprig.org/horror-stories.htm)

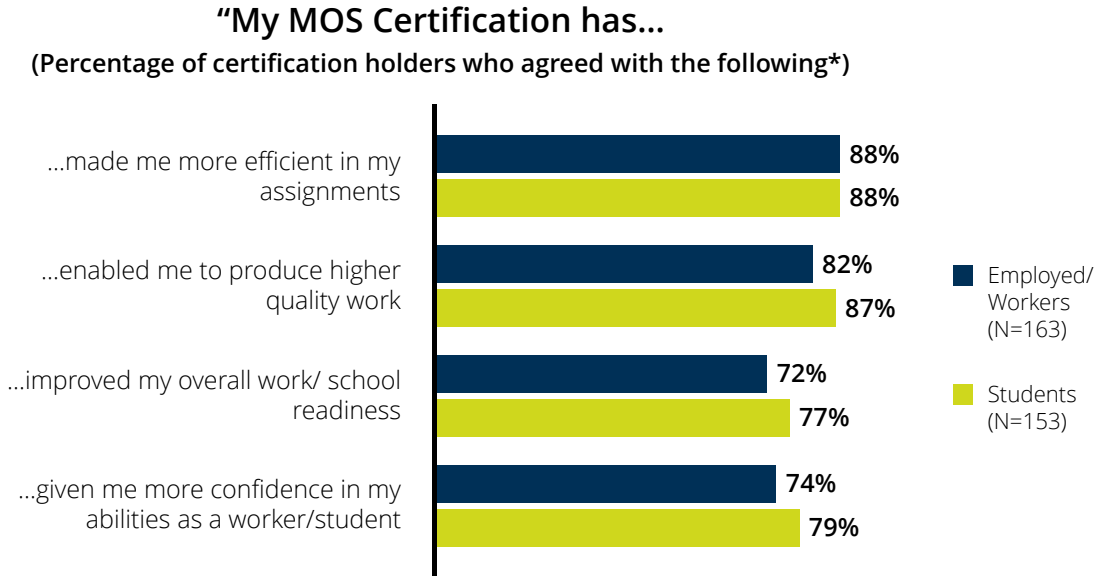
7 Increases computer self-efficacy

For many students, achieving a Microsoft certification marks the beginning of many future personal achievements. A credential's short timeframe to attainment—usually within a semester—coupled with its job-readiness notoriety, often help students 'light the fire within' for other credentialing pursuits. This level of enthusiasm is manifest in the various 'My MOS Story' and 'My MTA Story' accounts of select certification holders featured on Certiport's website[34, 35], and through the hundreds of high school students from around the world who complete every year in the annual Microsoft Office Specialist World Championship[36].

Stronger confidence and increased capabilities attributed to Microsoft certification are further manifest through the findings of a 2012 Certiport survey of MOS certification holders. The survey was administered to two main demographics—employed workers and students—located throughout the United States approximately three months after successfully completing their first MOS Excel or MOS Word exam. Select survey results are shown in Figure 2 below.

As is shown, the vast majority of respondents from both groupings indicated being more task efficient, work-quality enabled, job or school ready, and personally confident as a result of becoming MOS certified. No significant differences in agreement ratings were found among respondents with regard to exam focus (Excel or Word).

These are examples of how Microsoft certification fosters computer self-efficacy within students. No essay elaborating on the importance of Microsoft certification for students would be complete without specifically calling this out, since computer self-efficacy is a key subject to which a vast amount of scholarly literature has been dedicated. For a brief description of computer-self efficacy, please refer to the following side note on the next page.



* Results of a three month post-exam follow-up survey conducted by Certiport; items only administered if respondents indicated using MSOffice regularly

Figure 2

Side Note:

What is computer self-efficacy?

Computer self-efficacy is an outgrowth of the psychological construct, self-efficacy (defined by noted psychologist, Albert Bandura) and is an important concept within the field of industrial-organizational psychology. It refers to the belief a person has about his/her ability to successfully complete a particular computing task or group of computing tasks.

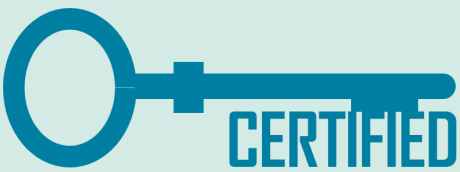
Particularly noteworthy is that the task—whether it is completed adequately, effectively, or even at all—is incidental to this construct. The focus is squarely on a belief. Even if a person is unable to successfully complete the task initially, the belief they can ultimately figure it out if they set their mind to it is presumably a determining factor between such things as achievement and idleness, perseverance and abandonment, and success and failure.

A large body of scholarly literature exists on this topic and on closely related topics such as software self-efficacy and technology self-efficacy (but we consider these to be fairly synonymous with each other and therefore not worth articulating what the distinctions are among them). Much of the research findings reported in this literature focus on how training and skills attainment increase computer self -efficacy in research study participants. Findings also often show a direct linkage between computer self-efficacy and problem solving and risk assessment/ risk taking in the workplace. Much mention is also made on possible applications for increasing computer self-efficacy—particularly, how doing so might help to improve the occupational outcomes for females, minorities, older individuals, and low-income individuals.

Sources:

Agarwal, R., Sambamurthy, V., & Stair, R. M. (2000). The evolving relationship between general and specific computer self-efficacy—An empirical assessment. *Information systems research*, 11(4), 418-430.

Torkzadeh, G., Koufteros, X., & Pflughoeft, K. (2003). Confirmatory analysis of computer self-efficacy. *Structural Equation Modeling*, 10(2), 263-275.



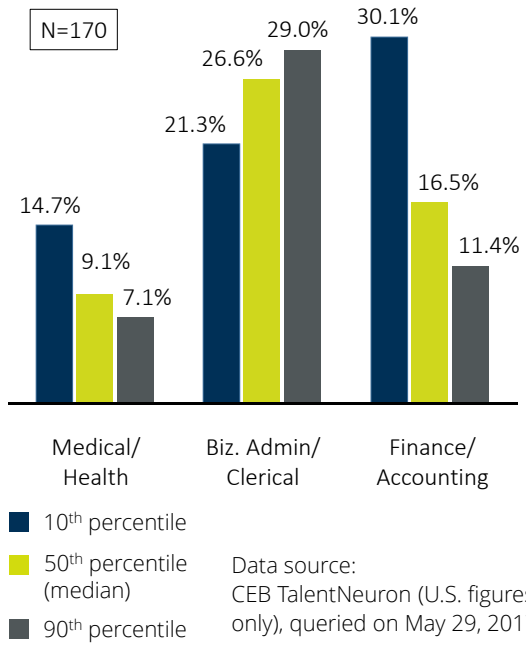
8 Certs are associated with higher pay

While MCSA and MCSE certifications often command above-median job salaries, known largely through salary research conducted by organizations such as Robert Half, Foote Partners, and others, it has often been difficult, historically, to determine whether MOS and MTA certifications are likewise associated with higher salaries. This is due to a variety of reasons. For one thing, it is difficult to track certification holders (mostly students) over an extended period of time to see how their credentials have benefited them. Contact information sometimes has a relatively short lifespan. Secondly, it is difficult to test for statistical effects while holding all other influencer variables constant. A person's salary is likely to be a result of several factors, not just their certification attainment status. These other factors may include the person's particular field of study, education level, work ethic, and negotiating skills, among other things.

However, web applications that scrape job-posting websites for data showing what salaries employers are willing to pay new hires who are MOS and MTA certified is a way to overcome some of these obstacles. Such a tool was used on several of the leading career websites[37]. The findings are presented graphically in Figures 3 and 4.

The analysis for MOS shown in Figure 3 uses an ad hoc measure we refer to as, 'pay premium', which is the additional salary amount reported for jobs where MOS certification is specified as a percentage of the overall salary amount reported for jobs where MOS certification is not specified[38]. As shown, the jobs where MOS certification was specified yielded some pretty respectable pay premiums, the highest being those in the job categories, business administration/clerical and finance/accounting (29.0 and 30.1 percent respectively).

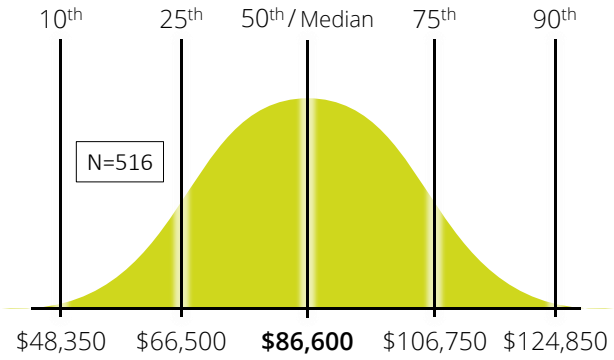
Pay premiums for select jobs specifying MOS (in want-ads)



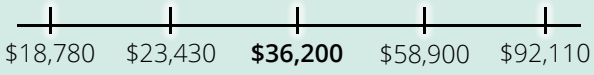
Data source:
CEB TalentNeuron (U.S. figures only), queried on May 29, 2017

Figure 3

Salaries for jobs specifying MTA (in want-ads)[a]



Comparison: salaries across all occupations[b]



Data sources:
(a) CEB TalentNeuron (U.S. figures only), queried on June 12, 2017;
(b) U.S. Bureau of Labor Stats., Occupational Employment Stats., May 2015

Figure 4

The analysis for MTA shown in Figure 4 compares the average median salary for job-ad postings where MTA is specified versus the average median salary for all occupations as reported through data provided by the U.S. Bureau of Labor Statistics. As shown, the average median salary of $86,600 for job -ad postings where MTA is specified is quite impressive relative to the corresponding figure provided through the BLS data.

Admittedly, these two analyses are not without their shortcomings. However, we feel the web application, as opposed to using survey data, allowed us to mitigate some of the concerns previously mentioned[39]—enough so to be able to show to an adequate degree that MOS and MTA certifications are associated with higher pay in the job market.

Photo by Christof van der Walt (http://www.waltphotography.co.za/)

9 Part of a scalable, full-package learning solution

Microsoft certification entails both medium- and high-stakes exams, none of which are for the faint of heart. Candidates must really know their stuff to obtain a passing score. To increase the likelihood of exam success, Microsoft and Certiport have each assembled their own comprehensive learning solution aimed at helping students quickly acquire employment-grade IT knowledge and skills. Both learning solutions bundle curriculum with exams. Both may either complement or altogether form the basis of an academic course, or courses, that schools offer their students. Descriptions of both solutions are provided as follows.

Microsoft Imagine Academy (MSIA)

Schools or their parent entities, secondary or postsecondary, may purchase a volume license directly from Microsoft. This not only gives licensees access to Microsoft Office for their students but also lets them become a registered Microsoft Imagine Academy. MSIAs are able to participate in all three Microsoft Certification programs (MOS, MTA, and MCP). Students are given full access to official Microsoft online curriculum and digital study guides mapped to the various Microsoft certifications. Teachers are given access to professional development resources and customizable lesson plans.

Certiport full-product learning pathway

Certiport's packaged learning solution is intended primarily for secondary schools and is limited to the MOS and MTA programs. This solution, like MSIA, includes student access to e-learning and digital study guides from top publishers. Though, perhaps the most distinctive and valuable element to this solution are online practice tests which mimic actual MOS and MTA exams and simulate the overall certification experience for candidates.

Relatively recent and Influential findings from the field of cognitive psychology of a phenomenon referred to as the testing effect (or test-enhanced learning) show that you are much more likely to remember content you are tested on over content you learn solely through repeated studying[40, 41, 42]. These findings further show that if there is a time crunch in which learning needs to occur, testing, again, typically trumps repeated studying at ensuring effective transfer of knowledge takes place[43]. Assuming these findings are generalizable to IT education, they show the valuable role practice tests play in the learning process and why they are included in the Certiport full-product learning pathway.

Certiport Full Pathway Model

Figure 5

10 There are no substitutes, Microsoft certs are hallmark for IT knowhow

There are certainly other lesser-known skills assessments and credentials available that purport to measure and validate IT skills using Microsoft technologies but these are not officially tied to Microsoft. Because the MOS, MTA, and MCP programs are owned by Microsoft and are therefore widely recognized and highly trusted, they are the only sensible Microsoft technology skills-validation solution for helping students (graduates) to stand out in the open job market.

Using any other solution is akin to verifying whether a particular used car is a safe-bet purchase by seeking the 'authorized opinion' of a motorcycle mechanic or verifying that you are a great dancer based on the 'authorized opinion' of someone who teaches yoga. Why would you use an unauthorized, non-Microsoft assessment or certification exam to verify that your students are Microsoft technology proficient? Schools can help students make their certifications count when the certifications are Microsoft certifications.

Conclusion

In this paper we have presented information intended for CTE decision makers, both at the secondary and postsecondary levels, to consider. This information is especially pertinent for CTE decision makers who are grappling with the decision of whether their schools should add Microsoft certification to their CTE lineup, or if their schools currently offer such, whether Microsoft certification should continue as an established offering for their students. We have provided artifacts and commentary showing that a substantial technical skills gap exists between the level of knowledge and skill required for participating in today's job market versus the actual level of knowledge and skill possessed by most students upon their exit from the public education system. Furthermore, we have asserted the Microsoft certification provides an effective way for schools to help remedy this skills gap. We have articulated 10 compelling reasons, or arguments, why schools should offer Microsoft certification to their students. We encourage CTE decision makers to carefully consider these arguments when considering Microsoft certification for their students.

Learn more by contacting a Certiport representative at **www.Certiport.com/sales** (telephone: 888-999-9830; international telephone: +1 (801) 847-3100) or visit **www.Microsoft.com/certification**

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End notes

[1] http://www.onetonline.org/

[2] http://www.sci-tech-today.com/news/Microsoft-Office-Still-Tops-the-Charts/story.xhtml?story_id=11300CMAFY18

[3] https://www.onmsft.com/news/office-365-overtakes-google-apps-in-business-market-triples-share-in-a-year

[4] http://www.computerworld.com/article/3147427/it-skills-training/10-hottest-tech-skills-for-2017.html

[5] Ibid.

[6] https://qz.com/958759

[7] http://www.politico.eu/article/report-reveals-eu-skills-gap/

[8] http://www.euractiv.com/section/digital/news/employers-tackle-unpredictable-skills-mismatch-in-ict-sector/

[9] https://ec.europa.eu/digital-single-market/en/digital-skills-jobs-coalition

[10] https://www.onetonline.org/find/bright?b=0

[11] https://www.onetonline.org/help/bright/

[12] http://fortune.com/2015/03/10/american-millennials-are-among-the-worlds-least-skilled/

[13] Grant, Malloy, & Murphy, 2009; Wilkinson, 2006; Wallace & Clariana, 2005

[14] Johnson, Bartholomew, & Miller, 2006

[15] McLennan & Gibbs, 2008; Karsten & Schmidt, 2006

[16] https://nces.ed.gov/fastfacts/display.asp?id=43

[17] http://www.exploringcs.org/resources/cs-statistics

[18] http://www.blufftontoday.com/opinion/2017-07-18/coding-movement-sweeping-world

[19] Robin, 2011

[20] Reinicke & Janicki, 2013

[21] Stackpole, 2016

[22] http://www.cioinsight.com/it-management/careers/slideshows/do-it-workers-lie-about-tech-certifications.html

[23] Ibid.

[24] Stackpole, 2016

[25] https://www.acteonline.org/uploadedFiles/What_is_CTE/Fact_Sheets/CTE_Works_Research_2016.pdf

[26] Castellano, Sundell, Overman, Richardson, & Stone, 2014

[27] Drage, 2009

[28] Florida Department of Education, 2016

[29] Ibid.

[30] The term ed-tech, short for 'education technology' and sometimes appearing unhyphenated as 'EdTech', is often used to denote the use of technology to aid learning within educational contexts. Some often cited examples of ed-tech solutions include educational apps and interactive games, interactive whiteboards, learning management systems (LMS), and netbook and tablet PCs. Given that Microsoft Excel and other Microsoft Office applications also often aid in the leaning of educational concepts, it can be argued that Microsoft Office is just as much an ed-tech solution as these other often cited examples.

[31] http://www.chelseaofficesystems.com/resources/Beware_of_Bad_Formatting.pdf

[32] https://www.forbes.com/sites/timworstall/2013/02/13/microsofts-excel-might-be-the-most-dangerous-software-on-the-planet/#78f15d61633d

[33] Caulkins, Morrison, and Weidemann, 2005

[34] http://mos.mycertiportstory.com/

[35] http://mta.mycertiportstory.com/

[36] http://moschampionship.com/

[37] We used the online subscription-based tool, CEB TalentNeuron, which is a data aggregator service for HR professionals that pulls real-time salary and other job-specific data from CareerBuilder.com, Indeed.com, Monster.com, and a host of other similar career websites.

[38] Foote Partners, LLC., a research firm that monitors current demand for professional IT skills and certifications, uses the term 'pay premium' as the featured metric in its annual ITSCPI report ("IT Skills and Certification Pay Index"). It should be noted that while we use the same phrase in this report, the metric we use, and how it is calculated, is different from that which is used in the Foote report.

[39] For the MOS analysis, we only included cities for which there were job postings specifying MOS certification. Were we also to include cities for which there were job posting that did not specify MOS certification, it would not have been an 'apples-to-apples' comparison.

[40] Roediger and Butler (2011)

[41] Roediger and Karpicke (2006)

[42] Roediger, Putnam, and Smith (2011)

[43] Ibid.

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