An Industry Survey of Analytics Spreadsheet Tools Adoption: Microsoft Excel vs Google Sheets

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Abstract

Spreadsheets have long played a key role in business operations. The use and adoption of data analytics has significantly increased over the last few years and amplified this role. Spreadsheets are often a first tool for data analytics as such applications provide ease of calculation of basic statistics and chart development. For much of the last two decades universities have provided training in Microsoft Excel because that was what companies used and wanted. Since mid-2020, there has been an increase in use of Google Sheets causing some faculty to believe that MS Excel should be replaced. Faculty must always be aware of current and future employers demands and ensure programs meet the expectations of employers especially expectations for recent graduates. This study reviews business job postings seeking employees with two years or fewer years of work experience between 2019 and 2021 and examines demand for spreadsheet application experience. Results overwhelming indicate that Microsoft Excel still is the most required spreadsheet application by employers and faculty should pause before changing MS Excel training or removing certifications.

Keywords: Curriculum, Spreadsheets, Skills, Position Analysis, Business Education, MS Excel, Google Sheets

1. INTRODUCTION

Graduate employability is a concern for all academic programs as graduate employability such tool that is popular in job descriptions is spreadsheet.

Lawson et al. (2009) reported electronic spreadsheet usage in business and education had been around 25 years. Since their study was published in 2009, it is feasible to extend the length to almost 38 years. According to Melissa James from GreyCampus (2015) spreadsheets are important to business as financial accounting tools, for tracing product sales, customer data, for analyzing return on investment, and work scheduling. According to Rahman et al. (2020) and Mack et al. (2018) "spreadsheets are everywhere" and in addition to business applications they are used for a wide range of activities such as but not limited to managing diets, scientific experiments, real estate inventory, managing grades, managing financial portfolios, and managing real estate inventory. Thus, having good spreadsheet skills is beneficial beyond just knowing how to use them for their business applications. Higher education business programs play a role in developing students' spreadsheet skills. A recurring question when performing curriculum review is whether faculty are teaching the right skills for employability and the right tools. To help shape curriculum, it is not uncommon for faculty to review recent position descriptions, survey employers and recent graduates, and review other external sources to ensure that the curriculum provided meets the current and future expectations for both students and employers. Spreadsheet tool and concomitant skills are an area of interest,

has become a measure of program health for program investment at many colleges (AACU, 2021). For business, tools knowledge and expertise are prominent in job descriptions. One especially since spreadsheet dominance has changed through the years. For example, Lotus 1-2-3 replaced VisiCalc, Microsoft Excel replaced Lotus 1-2-3, and now Google Sheets is emerging as a potential tool to replace Microsoft Excel. Understanding how spreadsheet interest is changing in the marketplace helps faculty know when or if the switch tool emphasis in the curriculum.

This study examines position descriptions posted on indeed.com between January 1, 2019, through December 31, 2021. The descriptions were limited to business program titles and requiring a bachelor's degree, and two years or less of work experience, and focuses on analyzing position descriptions for spreadsheet knowledge, skills and abilities. The paper is structured as follows.

The remainder of this study is organized as follows. First is the literature review which includes a discussion and comparison of Excel and Google Sheet. It also includes information regarding using position descriptions to examine knowledge, skills and abilities. The literature review is followed by the research methodology and study, results, and then conclusions and next steps.

2. LITERATURE REVIEW

Spreadsheets have existed for several decade. Many years before the first electronic spreadsheet program, LANPAR (LANguage for Programming Arrays at Random, Wikipedia, 2022), businesses

used paper-based ledger systems to manage their financial operations. According to Dan Power of DSS Resources.com (2004), "[i]n the realm of accounting jargon a "spread sheet" or spreadsheet was and is a large sheet of paper with columns and rows that organizes data about transactions for a businessperson to examine, it shows all the costs, income, and taxes for a manager to examine when making a decision." Accountants primarily used these ledgers to handle budgeting, accounts receivables, and payroll. Accountants found spreadsheets were importance as they allowed for better organization of data which enhanced decision making.
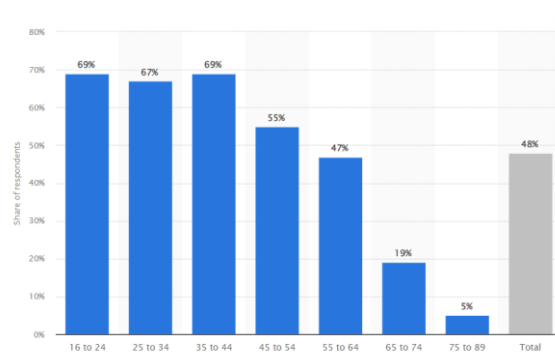
Spreadsheets

Since 1969 there have been many spreadsheet applications. Some programs got their start as in-house programs such as Autoplot (General Electic), APLDOT (US Railway Association), while others obtained more commercial success and adoption such as VisiCalc, SuperCalc, Lotus 1-2-3, Microsoft Excel, and Google Sheets. It seemed as if the spreadsheet software world was like that of worldwide boxing champion which each newcomer knocking off the reigning king.

Research and practice have demonstrated that spreadsheet software can be robust and versatile. For example, Grossman et al. (2007) investigated 18 different cases in the areas of application software development, executive information systems, financial risk management, sales and marketing business processes, business operations, and complex analytics. They found that spreadsheets were more multifarious with remarkable challenges regarding source code protected. Large complex spreadsheet can require programming skills similar to a Fourth Generation and Rapid Development Language operating in an Integrated Development Environment. Reschenhofer and Matthes (2015) discussed how spreadsheets have capabilities like formulae and macros to support complex calculations or automate processes, spreadsheets become indispensable as a comprehensive medium for data management and analysis. Frownfelter-Lohrke, (2017) reported that if companies did not create good spreadsheets or conduct thorough spreadsheet analysis then their businesses could suffer from loss of profit or market share.

Microsoft Excel vs Google Sheets
The exact current number of spreadsheet users is debatable and still by all counts considered to be large. Statistia (2019) did a study in Finland in 2019 and found that a little under 50% of their

population used spreadsheet software and it was relatively evenly spread over different age demographics (Figure 1).


Figure 1 Share of people who use spreadsheet software in Finland, 2019

A few others have tried to come up with actual number of users for spreadsheet software programs. For example, in 2017 Simon Cocking from Irish tech news wrote about seven reasons a half a billion people still used Excel. Joseph N from Wonder (2021), estimates that there are 750 million to 1.2 billion Microsoft Excel users and over 2 billion Google Suite users. Elizabeth Gration (2022) reported that 1 in 8 people used Microsoft although her numbered quote included the entire office suite. In fact, one of the challenges with determining actual Excel and Google Sheets numbers stems from difficulties making determination of which exact product in the Microsoft or Google Suite is being used. Hjalmar Gislason (2018) discuss one of the how it is hard to differentiate between paying and free accounts as well as the inclusion of GMAIL in the Google suites. To address this Gisalsson applies a 2/3 estimate reduction in numbers when comparing MS Excel (800 million) and Google Sheets (160 million).

Gilasson (2018) also provides an enlightening description of the Microsoft Excel and Google sheets users and is visually summarized in Figure 2. He talks about how more young people and young companies use Google Sheets while older and more mature companies use Microsoft Excel. He reports that Excel is more sophisticated and preferred by 'pros' where Google sheets is more sluggish but good for quick and simple items. He also did note that Google sheets works better for collaboration and that even the pros were found to 'sneak' using Google sheets from time to time. Nina Semczuk (2020) provides support for Gilasson's claims by confirming the benefits of collaboration in Google Sheets as well as pointing

out how frequently Google Sheets gets updated and works well with real time data.
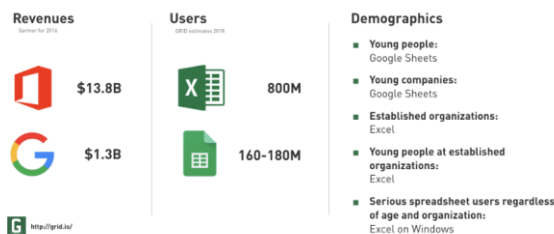
Figure 2 Comparison between Excel and Google Sheets (source)

Perhaps examining the technical differences between the two programs might shed some light on use and adoption. Appendix 1 presents a comparison of the technical differences taken from three diverse sources: Simpliiearn, EDUCBA, and WallStreetMojo.com.

For the most part all three sources provide the same pro and cons of the two programs. Their analysis reinforces previous research that Excel is more robust by being able to handle more cells and data, whereas Google sheets is better for sharing, collaborations and for updating data. Excel tends to be faster and much better at data visualization (especially the newer versions of Excel contain PowerBI and they connect to Tableau seamlessly) but more complex and there are different versions that impact collaboration. However, the newer versions of MS Excel (such as Office 365) contain the Microsoft One Drive feature which is aimed to address collaboration and sharing issues. One Drive still has it limitations as it does require more setup than Google sheets.

Google is much simpler, always updated, always saved, and always showing track changes. Investintech.com (2022) conducted personal interviews among 27 spreadsheet experts and asked them to predict the future of excel in Business Intelligence. Appendix 2 presents a few of the quotes from the experts. 25 out of 27 felt that excel would always be important, at the heart of data analytics and highly used and valued.

Overall, the main differences between MS Excel and Google Sheets were cost, number of cell quantum, the robustness, automatic file saving, large datasets, the ability to collaborate

effectively and certification.

In 2007, Grossman et al, lamented at how spreadsheet research was lacking in comparison to other traditional research on other programming languages despite its wide use and impact on business. Fifteen years later there are still some surprising gaps in spreadsheet research, specifically as it relates to this study which is a determination on the more preferred spreadsheet software language of business. In addition to research studies on specific software skills required by employers, our literature review found that studies on spreadsheet focused two other areas. The two areas could be classified as group focusing on how to 'teach' spreadsheet software to students in specific domains (i.e. economics, statistics), or as group focusing the value of certification in spreadsheet. Most of the articles were focused on Microsoft Excel, although there were some older articles on VisiCalc and Lotus 1-2-3. Those articles were not included because the software is retired. Articles on Google sheets are starting to appear and the ones that have focus on how to use and introduce Google sheets either in general terms or towards a specific domain. There was little in term of direct comparison between MS Excel and Google Sheets

Formby et al. (2017) found that 94% agreed or strongly agreed that being able to create spreadsheets, charts and analyze data was especially important skills and that data analytics was also an important skill for students. They reviewed job postings for 5 different states and found that on average approximately 50% of employers had a strong spreadsheet knowledge requirement, specifically Microsoft Excel.

Treadwell et al. (2013) found that industry demands were strong for spreadsheet skills. Their study sought to determine important spreadsheet skills and then test students on Microsoft Excel. They felt the student's performance was declining and that could cause students to have difficulties finding jobs after graduation.

Coleman and Blankenship (2017) attempted to determine the linkage between academia and businesses. They surveyed faculty and area businesses and asked about 18 different MS Excel and MS Access attributes and found many synergies and alignments between what was taught and what was needed by employers. Their study reaffirmed that analytical skills and specifically spreadsheet skills are important to be taught and mastered by students.

Raglan and Ramachandran (2014) investigated student's perception of their MS Excel knowledge and perceived readiness for accounting positions. Their study was helpful in aligning the skills perceived as necessary and important by new hires with those of current students. They also found that Excel is the most common analytical tools used by accounts, that public accounting firms are emphasizing an interest in recruiting accounting students with proficiency in Excel, and they want to hire new staff that know MS Excel.

Lee et al. (2018) reviewed job positing and surveyed accountants. They found that over 50 percent of postings required spreadsheet skills, specifically MS Excel. They found that most accountants felt that spreadsheet skills were very important. Their study even identified specific skills in MS Excel such as "Lookup and Pivot Table', 'Data entry, format, and calculations', and 'Logic' as necessary for new hires. Their results further indicated that "educational institutions should place emphasis on spreadsheet training for accounting students, if they have not already done so" (Lee et al, 2018).

Many of the studies on how to teach spreadsheet to students are predominately focused on MS Excel. Barreto (2015) provided an interesting review of Excel pedagogy history review in the economics classroom and found spreadsheets improve learning outcomes across the economics curriculum and are increasingly being used. His article was relatively unique in that it did not focus on a specific application or example which is more common in the literature. Barreto (2022) also created a paper using Excel to teach microeconomics.

Economics is not the only domain that uses Excel in teaching pedagogy cases; Excel is used in statistics as well. For example, Divisi et al. (2017) presented a paper on statistics and how Excel has functions to help with this learning process. Chaamwe and Shumba (2016) wrote a paper using Excel to teach statistics in an e-learning environment. Khan (2007) wrote about using Excel to teach physics. Al Rawahi et al. (2006) demonstrated Excel in math. Munisamy (2009) showed how Excel could be of benefit to operations research. Willis (2016) implemented Excel in accounting information systems. Mangeiro et al. (2010) provided an example of using Excel in a financial management class. Conant and Chaille (2022) created an excel-based classroom exercise to demonstrate an asset depreciation method comparison.

Clairborne (2017) did a comprehensive review of employers and many certifications. Authors discovered that spreadsheet skills very positively and the MOS Excel Specialist was considered the most valuable out of all the Microsoft Office suite. Rebman et al. (2019) found that certifications help prepare students to compete in competitive job markets and showcase their marketability while they are still in school.

There were a few studies that conducted comparison studies. Lawson et al. (2009) too 1600 subjects and put them into two groups of spreadsheet level and found that people with spreadsheet experiences and training did much better. They also found that corporate culture played a role and those who valued training had more advanced users. It was unclear if other companies relied on new hires to have spreadsheet experience. This was one of a few studies by the Spreadsheet Engineering Research Project (http://mba.tuck.dartmouth.edu/spreadsheet/) and focused on Microsoft Excel.

Most of the studies involving Google Sheets were focused on introducing a new alternative to Excel or how to apply Google Sheets to classroom instruction. For example, Parra et al. (2021) created a teaching case to teach cloud-based Google Sheets using Shippy Express. The goal of the teaching case was to have students use Google Sheets to develop summaries of their financial transactions to help them make decisions. Blair, and Mahoney (2022) present a method for using Google Sheets to provide a step-by-step system for creating graphs for research designs and clinical applications. Ovezmyradov (2020) illustrated a way to use Google Sheets to teach the classic supply chain beer game.

Position Description Analysis and Curriculum Development
Current literature has examined methodologies faculty can use to determine if their programs are adequately preparing students for their current workforce environment. Downey et al. (2008) mentioned that examining job postings as an excellent method to determine the in-demand industry skill and tools. This approach was supported in Harper (2012), McArthur et al. (2017), and Munmun et al. (2022) who similarly found that examining job postings can successfully enhance the understanding of the industry's expectation for particular skills and tools and as well as the employment environment. Harper (2012) and McArthur et al.

(2017) discussed the importance of reviewing position announcements in a specific area where the industry demand is emerging. Overall, job advertisements can successfully show the hiring trends, labor demand analytics, and specific skill requirements, and can be the most effective and reliable resources to design curriculum within and across courses (Carnevale et al., 2014; Templin and Hirsch, 2013, Frankenfeld, 2017; Hirudayaraj & Baker, 2018; Meyer, 2017; Stanton, 2017; Reeves & Hahn, 2010; Ahsan et al., 2013; Carnevale et al., 2014; Rosén, 2014; Diamond et al., 2014; Wellman, 2010).

Desai & Von Der Embse (2001) and Uğur & Hamit Turan (2019) suggest strategies to develop effective curriculum based on practitioner surveys built on the existing curriculum literature and job postings, one of which focused on concentrations and the other on academic departments and industry to collaborations to understand current and future emerging needs. proposed a "synergistic approach" to employ both integrative and intensive strategies in higher education program development. The authors focus on "assessing industry trend for specific IT". This "assess industry trend" means find out the promising tools and skills associated with them, then assessing how complex/ difficult they are, alignment with student body, and local industry needs to determine what should be included in curriculum.

3. RESEARCH METHODOLOGY AND STUDY

This study seeks to understand the trends in employer perception and value of spreadsheet skills and preference using position analysis. Specifically, the study compares employer expectations between Microsoft Excel and Google Sheets. To provide a context, the study also sought to determine the significance of data analysis skills. Given the historical displacement of spreadsheet applications and the emergence of Google Sheets as a competitor in the spreadsheet application market, it is important to study its demand in comparison to the demand for Microsoft Excel in position descriptions and understand how the changing work environment may be impacting employer expectations. Concomitantly, understanding the changing expectations of employers can help faculty in higher education respond to that change to maintain student preparation to perform in the workplace. This study uses position analysis to determine if faculty should consider updating the curriculum to include Google Sheets as part of the future curriculum as well as the demand for

particular analysis skills that can be performed using spreadsheets.

The literature review demonstrated the link between data analysis skills and spreadsheets. Specific skills considered in the literature included the ability to create spreadsheets, charts and data analysis. This led to the question of how important these skills are currently. The first research question and hypotheses are:

1. Do employers consider having the ability to create spreadsheet, charts, and analyze data to be important skill for students and new hires today as compared to 2019?

H1: The prevalence of general spreadsheets knowledge, skills and abilities for new hires is significantly higher in 2021 than in 2019.

H1a. The prevalence of data analysis knowledge, skills and abilities for new hires is significantly higher in 2021 than in 2019.

H1b. The prevalence of developing charts knowledge, skills and abilities for new hires is significantly higher in 2021 than in 2019.

The literature review also discussed the strengths and weaknesses of Microsoft Excel and Google Sheets as tools. These strengths and weaknesses are important based on the expectations of the position. While it is important to study the overall expectations of spreadsheets knowledge, skills and abilities, specific tool knowledge is also important. Given that Microsoft products have been on the market longer, it may be expected that Microsoft Excel would be listed as a required or preferred knowledge, skill or ability than Google Sheets. Thus, the next research question and hypothesis are:

2. Do employers prefer Microsoft Excel skills over Google Sheets skills?

H2: The prevalence of MS Excel knowledge, skills and analysis is significantly higher than Google Sheets in positions posted.

Since Google sheets is considered a stronger collaborative tool than Excel, it is important to analyze if there is correlation between tool and work environment expectations such as collaboration and working remotely. Specifically, remote work and collaboration may be more highly correlated to one application than the other. The next research questions and hypotheses studied were:

3. Do employers who allow for remote work prefer Microsoft Excel or Google Sheets?

H3. There is no significant correlation between remote work environments and preference for Microsoft Excel or Google Sheets.

4. Do employers who list collaboration as a required or preferred skill prefer either Microsoft Excel or Google Sheets?

H4. There is a higher correlation between collaboration skills and Google Sheets than for collaboration skills and Microsoft Excel.

Several statistical methods were used to address and provide a response to the four research questions. We analyzed job postings from Indeed.com for the years 2019 to 2021. Indeed.com is a free service to job seekers, where employers post position openings and applicants can upload a resume, create job alert emails, search for jobs, save them and apply to them directly. (Indeed.com/about, 2022) Positions were extracted from the indeed.com data using the following requirements:

- Position Keywords: accounting, management, information systems, marketing, sales, operations, supply chain, logistics, economics, human resources
- Degree restriction: Bachelors required or preferred
- Experience restriction: Two years or less

This extraction resulted in 21,398 non-duplicated position descriptions of which 5,970 positions for 2019, 7528 for 2020, and 7900 for 2021. There were 284 remote positions posted in 2019, 2160 in 2020 and 1794 in 2021. Table 1 shows the breakdown in position descriptions that requirements for general spreadsheet, data analytics and collaboration skills.

| YEAR	COLLAB-ORATION	DATA ANALYTICS	SPREAD-SHEETS
2019	4047	1061	4378
2020	5502	1426	5777
2021	5672	1646	6402
TOTAL	15221	4133	16557

Table 1. General Skills Requirements 2019-2021

The positions were analyzed using text extraction to identify the keywords relevant to the study. The keywords used for the extraction tool were collabor* for collaboration, remote to identify remote positions, Microsoft+Excel, Google+Sheets, data+analytics, visualization, charts and or graph for charts; pivot+tables, statistics and/or data+analysis for data analysis; and spreadsheets for spreadsheets-general. If a keyword was found in the position description, the observation was coded with a 1 and 0 otherwise. The final list of variables was YEAR, MS EXCEL, SHEETS, REMOTE, COLLABORATION, and DATA ANALYTICS. All the variables except YEAR were coded as binary (0,1). The breakdown in positions that specific Microsoft Excel and/or Google is shown in Table 2. Figure 3 presents the most frequently occurring software requirements overall job postings over the years 2019-2022 and illustrates how Excel and Numbers have held a steady rate while google sheets has an increase between 2020 and 2021 (COVID) that it has managed to keep in 2022.

YEAR	MS EXCEL	GOOGLE SHEETS	BOTH
2019	3587 (28%)	1243 (20%)	957 (24%)
2020	4546 (35%)	2008 (33%)	1395 (34%)
2021	4724 (37%)	2899 (47%)	1715 (42%)
TOTAL	12857	6150	4067

Table 2. Positions mentioning MS Excel, Google Sheet and/or both.
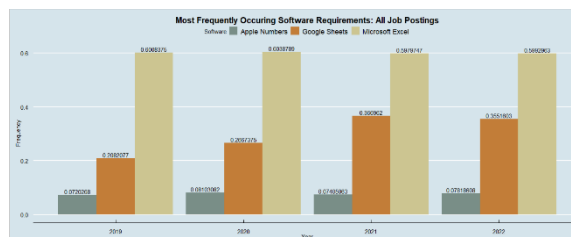
Figure 3 Most Frequently Occurring Software Requirements

The variables were analyzed using parts of the approach in Uğur, & Hamit Turan (2019). Since all the data is binary, the statistical analysis used t-tests for those hypotheses that compared pairs of data and correlation for the hypotheses that focuses on relationships between values.

4. RESULTS

The data variables analyzed in the study were MS EXCEL, SHEETS, SPREADSHEET-GENERAL, REMOTE, CHARTS, COLLABORATION, and DATA ANALYTICS.

A correlation matrix was created for the variables to determine the strength of the relationship between remote work, collaboration and the two tools. The correlation between remote work and Google Sheets was .038 as compared to .014 for remote work and MS Excel indicating that Google Sheets was a more preferable tool than Excel for those working remotely. Similarly, the correlation between collaboration and Google Sheets was .17 as compared to .16 for collaboration and MS Excel indicating that Google Sheets was a more preferable tool than Excel for those positions stating collaboration as a required or preferred skill but not by much. However, when the correlations were performed by year, the correlation between remote work and Google Sheets increased from .002 in 2019 to respectively to .019 in 2021 as compared to .0024 in 2019 to .013 for Excel and remote work indicating that Google Sheets' is growing faster as a correlated skills for remote work than Excel. Similar results were found for collaboration.

The t-tests comparing Google Sheets demand to MS Excel demand had a p-value of .000 with means of .3 and .6 respectively. The t-test comparing Google Sheets demand, MS Excel demand, data analytics demand, and spreadsheet-general demand between 2019 and 2021 found all of the comparisons to be significant with p-values of .000 with higher means for 2021 than for 2019.

The last t-test compared the 2019 and 2021 demands for general spreadsheet skills, data analysis and charts. The results indicate higher demand in 2021 than in 2019 for each as follows:

- Data analysis had p-value of .000 with means of .6 and .45 respectively
- Charts had p-value of .000 with means of .56 and .31 respectively
- Spreadsheets general had a p-value of .000 with means of .7 and .56 respectively.

Based on the results, all hypotheses can be accepted. However, for the question of prevalence of MS Excel or Google Sheets, it should be noted that based on the trend analysis, Google Sheets demand is growing slightly faster than MS Excel as a knowledge, skill or ability and that growth is correlated with growth in remote.

Further, the results also suggest that faculty should be cognizant of the increasing trends for data analysis skills and spreadsheets skills in general as well as the increase in demand for collaboration skills and the number of positions that allow for remote work. There should be

consideration of a balance between face-to-face and remote work in programs to ensure students become comfortable with both. Also, faculty should analyze and ensure sufficient collaborative projects that require online and face-to-face interactions to help students build collaboration skills in both environments. Lastly, faculty should examine the depths and applications of data analysis and spreadsheet skills throughout the curriculum to ensure that students are exposed to a variety of skills including but not limited to statistical analyses such as trend, descriptive statistics and regression; pivot tables; and, effective chart and graph techniques. Whether there should be an emphasis on Microsoft Excel or Google Sheets, though, the answer is less definitive. Although Microsoft Office 365 was introduced in 2011, it has increased its collaborative tools with Teams and OneDrive, and ways to share documents. However, the ability to simultaneously edit documents in the Google Suite is probably one of the reasons demand for Google products is increasing. Further, this analysis was a national view rather than a regional view. Faculty are encouraged to analyze the position descriptions for their regions to determine of the national results hold true for their specific region.

5. LIMITATIONS AND FUTURE RESEARCH

This study provided a US based lens for specific skills for new university bachelor level graduates. While a national view is helpful, individual campuses would benefit from an analysis based on the student population it serves. For example, if the student population is largely regional, then a regional perspectives is needed. If the student population has a large percentage of international student, then a global perspective should be considered. This is perhaps the highest limitation of the study. The data is also from one source. One of our next step is to analyze the data by states or cities and compare regional expectations.

Further, 2020 and 2021 represent the two years with most companies asking workers to work remotely due to a pandemic. This may artificially impacted positions demand for remote work and collaboration. We also intend to examine the 2022 data to determine if the trends found for 2019 through 2021 continued in 2022.

Although the data was validated with three people reviewing a random selection of the observations for algorithm accuracy in extracting results, it is likely there are other keywords that were missed

that might suggest a preference for specific data analytics or analysis skills.

Another limitation is the scope of this study. Examining job postings only partially answers the question of which software program should be taught. Companies have cultures to which have their own norms and behaviors and can influence decision making. Surveying employers on their software preference, value, and adoption could also help provide more answers as to what should be taught.

Lastly, previous studies (Bakir et al, 2019, Tastle et al, 2017, Rebman et al.2021) have discussed Microsoft Excel certification curriculum programs and its impact on producing strong Excel knowledge workers. Future research would be helpful to determine if employers reported the having the same perception and value of MS Excel certified employees. It would be interesting to combine the results of employer preference to employer perceived value of certification and compare it with employer job postings. Such are questions we learned from this study that we plan to address in the future.

6. CONCLUSION

This study was conducted as response to questions regarding curriculum, specifically whether Microsoft Excel should be taught or replaced with Google Sheets. The results reinforce previous studies in that MS Excel is still preferred over Google Sheets, at least in terms of job postings. The increase of remote jobs indicate that Google sheets should not be disregarded. As companies determine their new normal, there may be increased demand for products that promote and support collaboration the way Google products do.

As technology changes, it is important that faculty analyze regional or local trends to determine if their respective curriculums adequately address knowledge, skills and abilities required by employers. However, there doesn't appear to be an immediate need to remove MS Excel training and certifications from the curriculum or to replace course work with alternatives such as Google Sheets.

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Appendix 1. Microsoft Excel and Google Sheets Comparison

		Excel		Google Sheets		
				are Developed By	**MS Excel, 1987**	
	Software Developed By	**MS Excel, 1987**		**Google Sheets, 2006**		
				Certification	**YES, MOS**	
	Certification	**YES, MOS**		**Linkage/synced with external data**	Data needs to be imported	
	Languages	91 Languages		83 Languages		
	Price	Expensive, Office online $8.25 a mo				
	Large Data Sets	Ideal for large da		As data size increases, Google		
	Collaboration	No default to share users must set up connection				
	Chatting	Not Available				
	Tracking	Available, but man				
	Online/offline	Can be used on &o				
	Cell Quantum	Around 17 billion available				
	Number of Functions	Supports 400 func				
	Tool for Statistical Analysis & Visualization	Superior for data visualization since formulas are built Microsoft Excel.				
	Seamless and easy to use	Excel is easy to us needs manual file OneDrive setup.				
	Usage of macros	Has built in macros custom macros, V find premade one				

Appendix 2 Sample list of Experts on Predicting Spreadsheet software (Invenstintech.com)

There is a running joke in BI communities. "What is the most used feature in any business intelligence solution?"
It is the Export to Excel button.

Excel continues to be the #1 platform when it comes to analyzing data, finding information, preparing charts and presenting them to decision makers. In that sense, I see Excel playing a strong role in BI workflows in future.
 / -Purna Duggirala */*

Excel will be right where it always has been – at the center, loved by its users, disliked by IT and the target of endless attempts to replace it by third party BI software vendors.
/- Chris Webb*/*

BI makers understand that Excel is here to stay, it is versatile and works excellently with the web and BI systems.
/ – Tom Urtis*/*

The addition and integration of the new Power BI tools within Excel really opens up the possibilities for any type of analyst or everyday user to get involved in Business Intelligence.
/ – Jon Acampora*/*

Not everyone works with millions of rows of data. What matters to everyone, anywhere, is

> *what they can do with the data.*
> */* – Andrew Engwirda */*
>
>
> *The user will ultimately define how Excel fits into the BI workflows. It could happen at any point in the BI process.*
> */* – Jordan Goldmeier*/*
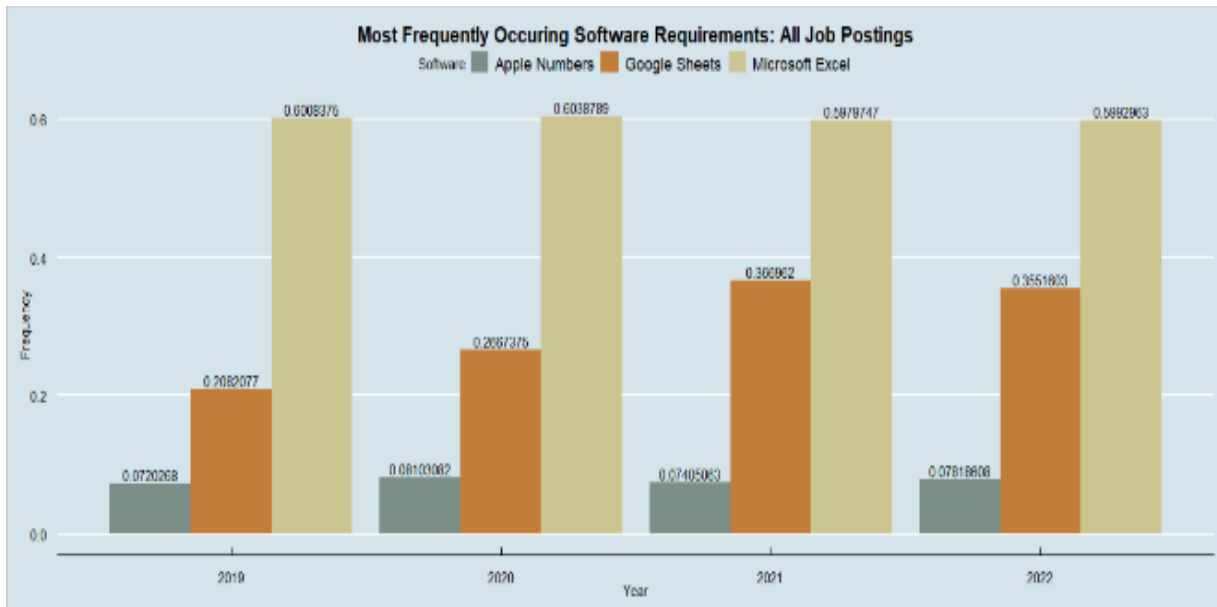
Figure 4 Most Frequently Occurring Software Requirements