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The Development and Implementation of Asynchronous Online Finance Courses

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The article outlines the preparation, development and implementation of asynchronous online finance courses developed at a comprehensive regional university. We share with finance academia our experience of online finance course development, the challenges we faced, and suggestions to tackle those challenges. The article contributes to the body of knowledge of distant education through providing advice and the practice of development and implementation of effective online finance courses.

Keywords: online finance courses, online course development, asynchronous courses development, online course implementation

Introduction

Distance education has been reshaping and redeveloping for the past two decades. It has become a powerful force in higher education. According to the U.S. Department of Education (2019), 35.3 percent of students enrolled in degree-granting postsecondary institutions had taken some distance education courses during fall semester 2018. From fall 2017 to fall 2018, the number of students who enrolled in one or more distance education courses increased from 6.62 million to 6.93 million. With the ever-increasing demand for distance education, more and more universities are racing to provide online courses in an intense competition with other institutions. In recent years, the rise of social media platforms such as YouTube, Tiktok, and Reddit has made learning what was previously unthinkable, possible in our lives. For instance, you can probably find anything that you want to learn on YouTube, whether it is about learning an educational subject, a language, cooking, knitting, exercise, makeup tutorials, fixing things at home, in short, most any subject matter you can imagine. With the rapid technological advances and changes in the field of teaching and learning, coupled with declining enrollment in many schools, universities have felt the extreme pressure of competition and want to recapture market share that was once theirs. Given this hostile external environment, our school has been pushing to offer, and encouraging faculty members to develop, more online courses.

Prior to the Covid-19 pandemic, the online course delivery format offered by faculty in our school was predominately asynchronous in nature. This provided students more flexibility and convenience to accommodate their busy schedules of work, family, community, and other

commitments. The use of Zoom as a teaching tool for synchronous online courses is a relatively recent phenomenon in response to the aftermath of Covid-19 pandemic. With synchronous online courses, students can meet an instructor virtually. For students who choose in-person courses, a synchronous online course, via Zoom, can be a great tool to quickly transition in-person instruction to a virtual format. Given the sudden shock of the pandemic this should be beneficial to students of in-person instruction. For students who juggle with job, family, study, and other obligations, asynchronous online courses will continue to be their preferred choice of instructional delivery. We believe the demand for asynchronous online courses will continue to hold due to the benefits of convenience and flexibility, despite the recent sudden shift from in-person instruction to synchronous online learning. As such, in this paper, we focus on the development and implementation of asynchronous finance courses.

Maguire (2005) reports one of the major barriers to the adoption of online education cited by both faculty and administrators, are lack of technical support and release time, and concerns about workload. Babson Survey Research Group (2013) tracks the opinions of chief academic officers of more than 2,800 colleges and universities and reports the percent of academic leaders who believe it takes more faculty time and effort to teach online courses has increased from 41.4% in 2006 to 44.6% in 2013. Given these obstacles, specific guidelines for the development and implementation of online courses within respective subject areas could be of help to directly address faculty time, effort, and workload concerns.

In this article, we explain, in a "how to" fashion, our process of developing and implementing two asynchronous finance courses. We share our challenges and difficulties and provide suggestions for those who may be charged with the task of developing an asynchronous online finance course.

The remainder of the paper is divided into six sections. We first give a brief literature review, followed by a discussion of asynchronous vs. synchronous courses, comments on preparing for course development, the course development itself, some challenges and suggestions, and some final word advice.

Brief Literature Review

The large burgeoning volume of online education literature is a work in progress, because online education is a work in progress. Since the driver of online education is technology, as it changes, the delivery of online classes changes. It should be noted, however, that distance learning is far from new. Bergmann (2001) provides just one example, from the late 1800s, of efforts to provide education across distances, via mail. The efforts detailed in Bergmann (2001) were focused on furthering educational opportunities of women in the U.S.

The online education of today is also, to a large extent, rooted in expanding educational opportunities. Online classes can make learning more convenient in terms of one's schedule, or location. And while access to, and delivery of, classes change with the intent of being more convenient, the material and learning are much the same. The teaching profession is engaged in the pursuit of determining what works best. This article is a specific example of that pursuit by finance faculty.

Alexander (2017) provides a good summary of online teaching practices across several disciplines. The practices chronicled by Alexander (2017) are unique to the instructors and disciplines included in the book – as are most teaching techniques. And, as with most teaching techniques, others can glean useful information from observing the practices of fellow faculty.

Technology aside, the purpose of online classes is education, and the myriad meanings thereof. For learning to take place, an individual must feel engaged as part of the process (e.g., Wrzesniewski & Dutton, 2001). The more a student feels engaged, the more persistent she will be in pursuing the learning objectives. Engagement of students can be challenging in an online environment. Hyland, Balyeat, and Cagle (2017) report that, in a group of 25 online MBA students, the students, on average, watched approximately 44% of the videos prepared for the class. They also determined that the more the students watched, the higher their final exam score.

One takeaway from Hyland et al. (2017) is something all professors like to hear – paying close attention to the class presentations improves your performance on tests. However, since there is no guarantee that students will be sufficiently motivated to watch the videos and actively participate in the learning, an intuitive course design and convenient collection of videos is of great importance. This idea is consistent with Wu and Hwang (2010) who examine the effectiveness of online learning for blended college courses. Wu and Hwang (2010) argue that a well-designed online learning system with features, such as ease of use and application of appropriate digital media, can help boost students' attention to use the system and improve their learning effectiveness.

A well-designed online course requires significant faculty commitment of time and effort in developing and implementing the course as documented in Maguire (2005) and Babson 2013 Survey. Hayes (2007) outlines the structure and implementation of an online introductory finance course and argues that additional examples of finance course design/development will help reduce faculty time commitment and directly address some of the major barriers of the adoption of distance education.

We contribute to the literature by providing to finance academia an effective procedure to develop and implement an asynchronous online introductory corporate finance course, and a more advanced investment principles course. We summarize the lessons we learned and provide, we hope, a sound practice of online finance course delivery. We also share students' comments and report what aspects of our asynchronous finance courses students appreciate.

Asynchronous vs. Synchronous Course Offering

The general notion of asynchronous course is that it is self-paced. In other words, students' learning journey might not be at the same pace as their classmates as they work toward the course goals in a semester although there are deadlines for submission of assignments, homework, quizzes, exams, projects, and other class activities. Through activities such as reading, watching videos, listening to podcasts, solving exercise problems, etc., students make their own schedules of when, where, and how to complete the tasks assigned by an instructor. Undeniably, such a course provides students benefits of convenience and flexibility as they study around their busy work schedules and other commitments such as family, community, and volunteer work. The main drawback of such a course is the limited interaction between the instructor and students and among students. Due to the nature of the asynchronous delivery format, faculty need to devote a significant amount of time and efforts to develop a course that is well-structured, easy to follow, and interesting to learn. The organization and preparedness on the instructor's end play a vital role in making an asynchronous course at least as effective as, if not more than, an in-person course.

Unlike an asynchronous course, a synchronous course is a real-time event that requires the instructor and students meet at the same time online so that course presentation and discussion can occur virtually. The benefit of such a course is the real-time and direct communication between an

instructor and students. However, it lacks the flexibility provided by an asynchronous course. In many ways, synchronous courses resemble more of an in-person classroom except that students meet in a virtual room rather than a physical classroom on campus. Due to this unique feature of synchronous courses, an instructor can transition an in-person course to an online synchronous course relatively quickly and easily. In response to the aftermath of Covid-19 pandemic, many instructors in our school quickly shifted their in-person classes to synchronous online format. Technological tools such as Zoom nicely facilitate synchronous online teaching for delivering and recording virtual presentations, which lessened the impact of the interruption, arising from the shocks of unforeseeable events, on both students and instructors.

Despite the differences between asynchronous and synchronous instructional formats, both course formats require the use of technological tools to facilitate teaching and learning in a virtual environment, and techniques used in developing an asynchronous course are applicable to a synchronous course. We expect that, as the risk of Covid-19 subsides and life goes back to normal, many educational institutions will revert to predominately in-person instructional delivery format and asynchronous online course format and/or a hybrid course format could take the major form of distance education. We also expect that the number of synchronous courses offered by institutions could drop significantly as these courses can be taught in a face-to-face setting where the situation allows. In this paper, we focus on the development of asynchronous finance courses for three reasons. First, the demand for asynchronous courses will continue to hold due to its flexibility and convenience provided to students and we do not foresee these courses going anywhere, even after the pandemic. Second, the development of asynchronous courses takes longer lead time and, in many instances, is more challenging than synchronous courses. Synchronous courses resemble more of an in-class teaching experience. Third, the techniques and technologies used for asynchronous course development and implementation can be easily applied to synchronous and/or hybrid courses. We believe, if an instructor knows how to develop an asynchronous online course, it will be relatively less challenging for him/her to develop other forms of online courses.

Preparation Of Asynchronous Online Course

Training for Online Teaching

To make online courses a success, faculty need to become comfortable with online teaching and gain necessary skills. According to a survey report by Babson Survey Research Group (2011), based on responses from more than 2,500 colleges and universities, about 94 percent of institutions provide training for faculty teaching online courses. The training approach takes various shapes, including internally and externally run training programs, certification programs, and informal mentoring. Faculty members at our school were offered the opportunity to take a self-paced online education course offered by a well-known institution in the distance learning field. The online training course was five months in length and divided into seven sections. Each section took about one to three weeks. We were introduced to the changing landscape of online education, writing objectives of online learning, the characteristics of learners, the dos and don'ts, to name a few. We also learned the basics of how to apply active learning in designing online activities, how to conduct and assess discussion in an online environment. Technologies that can be utilized in distant learning were also summarized and introduced. Since we registered ourselves as students in the course, we experienced what successful distance education should look like from the students' viewpoint. In addition, we also participated in different activities, such as online discussion,

working on group projects, and commenting on others' work. We observed firsthand how the instructor interacted with us, the students.

Software for Video Recording

Mulig and Rhame (2012) report that video clips created by instructors make lectures more interesting and contribute to instructors' online presence. Hyland et al. (2017) examine student viewing video behavior for an online MBA course and find a positive association between the time spent on viewing course instructional videos and final exam results. Hyland et al.'s (2017) findings are consistent with Terry, Macy, Clark, and Sanders (2015) and Wieling and Hofman (2010). Following these studies, we task ourselves with finding out what software, and technological tools, our university supports for capturing and recording lecture videos.

Our university adopts MyMedia/Kaltura, a platform for educational video creation, hosting, and distribution. Kaltura CaptureSpace Desktop recorder is a screen recording software within MyMedia and available for faculty to download free of charge. CaptureSpace records device screen, voiceover, and webcam simultaneously. Videos created using CaptureSpace are managed and integrated through MyMedia. Additionally, CaptureSpace is integrated with D2L Brightspace, the Learning Management System adopted by our university. A brief training about how to use CaptureSpace was offered by the Academic Technology team at our school. To our surprise, the software is easy to learn and apply. One of us decided to use this tool for the development of lecture videos for investment principles class. Another faculty opted to adopt Camtasia, a third-party tool that is a more complex video editing software. She made the decision after consulting with peers who had used the tool for their online course development. Camtasia was not adopted by our university. As a result, the faculty who bought the software needed to learn how to use the tool herself. To compare the two software, CaptureSpace is more useful for quickly creating and distributing a video but less powerful when editing videos. Camtasia is a more complex tool with advanced editing options that can help users complete video editing process more easily and quickly.

More recently, Zoom conferencing software has been adopted by numerous businesses and educational institutions for video and audio conferencing, chat, and webinars. Zoom beats the other two software in its functionality of video communication with students in a 'Zoom room'. It is a powerful tool for delivering live presentations to students in a virtual classroom. As to which tool an instructor should adopt, it depends on the availability of the tools within the instructor's institution and tasks at hand. We encourage instructors consult with the Academic Technology team of their institutions for options of different tools and get training and support from the team for online course development.

Course Development

Course Schedule

We had taught the introductory corporate finance and investment courses in a face-to-face format for many years, so we are very familiar with the topics to be covered. Our first step in course development is to create a detailed course schedule, which includes information such as how long it takes to complete each chapter, the timing of assignments, quizzes, and exams, and when a project or paper will be due. Once the overall course schedule was established, we filled in the details of each week's workload. A firmly established schedule is of great importance in the online environment.

Lecture Videos Development

Pan et al. (2012) document that lecture videos of three to 10 minutes in length are optimal for difficult subject matters that involve problem solving and math. Finance topics are math-intensive by nature. Following Pan et al. (2012), we recorded our lectures with the length of around 10 minutes for each video. We believe students are more motivated to watch and successfully complete shorter videos than lengthy ones. This is also consistent with Mulig and Rhame (2012) who argue that breaking up a big lecture into small parts of five to ten minutes of videos can help maintain students' attention. As a result, we created around 6-9 lecture videos for each chapter of our online courses. In total, there were 60-65 lecture videos for each course. By the end of the semesters, we receive the following sample comments from students:

> "*The pre-recorded lectures helped (me) tremendously. It was like I was in a virtual classroom. The content was very difficult, I do not think I would have passed if the professor did not provide the lectures and good examples to teach the concepts*" (spring 2019)
>
> *"…for some online courses, the professors do upload video power points with lectures and that is extremely beneficial (to students)*" (summer 2019).

This positive feedback from students reinforces our idea of developing lecture videos for the introductory and intermediate finance courses. Recording these lecture videos, although time-consuming, is a worthwhile effort in helping students learn challenging materials and contributing to their successful completion of the courses.

D2L Course Development

Following the development of lecture videos, we requested a D2L Brightspace (a Learning Management System (LMS)) development course via our university's Information Technology Services. In a development course, we can set up and design the overall structure of the course, try out the functionality, and set up different tools before incorporating them into the regular course. We then can copy components to the online courses in which we have the teacher role. For instance, three months before our five-week, summer session class was offered, we requested a development course. We created five folders (see Figure 1) with each folder containing all the materials for that week, such as the tasks students need to complete, instructor lecture videos for the week, articles or YouTube videos associated with the week's topics, instructor problem-solving presentation videos for students, assignments/quizzes/exams, and other tutorial materials. The folders were managed in such a way that a new week's folder will be published a few days before it is needed by students. Arranging the publication of folders this way reduces students' anxiety so that they are not scared away in the first week of the course. Our experience tells us setting up the courses on D2L is another major task besides making lecture videos. Our goal is to structure the online course clearly and directly so that students know exactly what the expectations are and work on them in an organized and efficient manner. A course overall schedule with all assignments, quizzes, and examinations times, content and rating criteria presented in tabular form could serve this purpose. Appendix 1 shows an example of an overall course schedule for an investment principles class.

Assignments, Quizzes, and Exams Development

The next task is the development of all online assignments, quizzes, and exams. Decisions such as how many questions, what types of questions, and the time allowed for these assignments,

quizzes, and exams should be determined. Once these decisions were made, we then started developing assignments, quizzes, and exam questions. We composed these questions in Respondus or Diploma 6 (see Figure 2), both exam generating software, and export them into D2L. The beginning and ending dates of the exam window as well as the time limit for the assignments, quizzes, and exams are carefully set up in D2L. Finance courses are quantitative in nature, and the introductory corporate finance and investment principles courses are no exception. Through working on assignments and quizzes, students receive detailed feedback from the instructors, which helps them check their understanding of course materials and practice on basic and/or challenging finance concepts and calculations. Through these exercises, students are better positioned to prepare for the upcoming exams.

Finishing Touches

Last, we clearly stated the tasks for each week and organized all the lecture and problem-solving videos, articles, assignments and/or quizzes, exams, and other tutorial materials into corresponding week folders. A thorough check was performed on each of these folders to reduce mistakes and inconsistency. Two weeks before the online course was open to registered students, we copied all the components from the development course to the online course in which we serve the teacher role.

Challenges and Suggestions

Along the way of developing the asynchronous online courses, we faced challenges and difficulties. The biggest challenge we faced was to record a presentation to our level of satisfaction, which may require us to repeat the recording multiple times. It took a lot of time to finish each video satisfactorily. So, making lecture videos for many topics and chapters to cover requires serious time commitment. We would recommend instructors start presentation/lecture recording at least 3-4 months ahead of the delivery of their online courses.

Structuring our online finance course on D2L Brightspace is another challenge we need to face and overcome. How to plan and lay out your course on a LMS in a clear, effective, and straight-forward manner plays an important role in communicating your course expectations to students. Good overall structure and clear layout give students confidence to handle and manage the online class. We suggest you should not be shy of time when developing the overall structure of the online course on an LMS. One good practice is to create week-by-week folders with tasks to be completed in each week.

Final-Word Advice

We offer the following advice to other instructors who are charged with developing an asynchronous online course (but not limited to a finance course). We acknowledge that some of the advice below can apply to both online and in-person courses, but they are of critical importance to an asynchronous online course.

The asynchronous online course should be highly structured and well-organized. Course expectations and instruction should be clear and straight-forward. An instructor needs to set the course up on the chosen Learning Management System of your institution as simply and directly as possible.

Have timely communication with students. If the materials are challenging to learn, the instructor needs to give students a heads-up and let them know the importance of going over lecture videos, reading textbooks, and solving practice and/or end-of-chapter problems. All in all, they need to set aside enough time to study the course materials.

Due to the quantitative nature of finance courses, instructors should prepare problem-solving videos to show students the calculations, step-by-step, required for solving typical problems. This is consistent with Pan et al. (2012) and could be beneficial to students. By the end of the online courses, we got quite a few comments from students to include more problem-solving videos for further improvement of the courses.

Make short videos with timespan of 10 minutes or so, consistent with Pan et al. (2012) and Mulig and Rhame (2012). From students' perspective, a ten-minute video or less is manageable. After finishing one video, they can quickly move on to the next video. This gives students a sense of accomplishment and helps them move forward as the course progresses.

Maintain the consistency of assignment/quiz due time and days of each week. For example, making all quizzes due on Monday at 11:59pm throughout the whole semester. Students have a clear idea of the deadline for each assignment and are less likely to miss assignment deadlines. This is especially important for an online environment where face-to-face communication between instructors and students is limited.

To summarize, students really appreciate the following features of an asynchronous online finance course: organized and concise structure of overall class, clear expectations specified in syllabus, lecture videos for the course, timely and frequent communications/announcements via emails or other means with students, and step-by-step problem-solving videos provided to students.

The recommended practice and advice are based on our experience of developing online asynchronous finance courses, students' comments, and feedback in response to online course survey given to students at the end of the semesters, and prior studies (eg., Baker, 2010; Hyland et al., 2017; Pan et al., 2012; Terry et al., 2015). We presented the survey questions to students in Appendix 2 and sample students' comments and feedback in response to selected survey questions in Appendix 3. In response to the aftermath of the pandemic, many instructors scrambled to switch their courses from in-person instruction to an online format in a matter of one to two weeks. As such, mistakes could be made, and lessons could be learned. This study could provide value to finance academicians who do not have experience of developing asynchronous finance courses and even to those who had the experience but are in the process of reviewing and reevaluating their teaching effectiveness of online courses.

References

Alexander, R. C. (2017). Best Practices in Online teaching and learning across academic disciplines. *George Mason University Press*: Fairfax, VA.

Allen, I. E., & Seaman, J. (2011). Going the Distance: Online education in the United States. *Babson Survey Research Group*.

Allen, E., & Seaman, J. (2013). Changing course: Ten years of tracking online education in the United States. *Babson Survey Research Group*.

Baker, K. (2010). Clinical teaching improves with resident evaluation and feedback. *The Journal of the American Society of Anesthesiologists*, *113*(3), 693-703.

Bergmann, H. F. (2001). "The silent university": The society to encourage studies at home, 1873-1897, *The New England Quarterly*, *74*(3), 447-477.

Hayes, S. K. (2007). Principles of finance: The design and implementation of an online course. *Merlot Journal of Online Learning and Teaching 3*(4), 460-465.

Hyland, D. C., Balyeat, R. B., & Cagle, J. A. B. (2017). Instructional videos in an online MBA finance course, *Journal of Economics and Finance Education*, *16*(2), 40-49.

Maguire, L. L. (2005). Literature review – faculty participation in online distance education: Barriers and motivators. *Online Journal of Distance learning Administration*, *8*(1). Retrieved from: https://www.westga.edu/~distance/ojdla/spring81/maguire81.htm.

Mulig, L., & Rhame, S. (2012). Time requirements in an online teaching environment: how to be more effective and efficient in teaching online, *Journal of Accounting and Finance*, *12*(4), 101-109.

Pan, G., Sen, S., Starrett, D. A., Bonk, C. J., Rodgers, M. L., Tikoo, M., & Powell, D. V. (2012). Instructor-made videos as a learner scaffolding tool. *MERLOT Journal of Online Learning and Teaching*, *8*(4), 298-311.

Terry, N., Macy, A., Clark, R., & Sanders, G. (2015). The impact of lecture capture on student performance in business courses. *Journal of College Teaching and Learning 12*, 65-73.

U.S. Department of Education. (2019). National Center for Education Statistics. *Digest of Education Statistics*. Retrieved from
https://nces.ed.gov/programs/digest/d19/tables/dt19_311.15.asp.

Wieling, M. B., & Hofman, W. H. A. (2010). The impact of online video lecture recordings an automated feedback on student performance. *Computers & Education 54*(4), 992-998

Wrzesniewski, A., & Dutton, J. E. (2001). Crafting a job: Revisioning employees as active crafters of their work, *Academy of Management*, *26*(2), 179-201.

Wu, W., & Hwang L. (2010). The effectiveness of e-learning for blended courses in colleges: A multi-level empirical study. *International Journal of Electronic Business Management 8*(4), 312-322.

Appendix 1
An Example of Course Overall Schedule for an Investment Principles Course for a Five-week Summer Term

Weeks	Tasks	Suggested Problems*	Quizzes and Exams
Week 1 (May 14 – 20)	Chapter 1	Ch 1:1-7, 9-15, 18-20	
	Quiz 1	Cover chapter 1	Quiz 1 due at 11:59pm on Sunday, May 20th
	Chapter 2	Ch 2: 1-11, 13-21, 23-24, 26-27, 30, 32	
	Quiz 2	Cover chapter 2	Quiz 2 due at 11:59pm on Sunday, May 20th
Week 2 (May 21 – 27)	Exam 1	Cover chapters 1 & 2	Exam 1 open dates (May 21st – 22nd)
	Chapter 3	Ch 3: 1-12, 14-21, 23-26	
	Quiz 3	Cover chapter 3	Quiz 3 due at 11:59pm on Sunday, May 27th
	Chapter 4	Ch 4: 1-19, 21, 23-25, 28, 30	
	Quiz 4	Cover chapter 4	Quiz 4 due at 11:59pm on Sunday, May 27th
Week 3 (May 29 – June 3)	Exam 2	Cover chapters 3 & 4	Exam 2 open dates (May 29th – 30th)
	Chapter 5	Ch 5: 1, 3, 5-6, 8, 11-19	
	Quiz 5	Cover chapter 5	Quiz 5 due at 11:59pm on Sunday, June 3rd
Week 4 (June 4 – 10)	Chapter 6	Ch 6: 1-6, 13-19, 21-22	
	Quiz 6	Cover chapter 6	Quiz 6 due at 11:59pm on Sunday, June 10th
Week 5 (June 11 – 15)	Chapter 10	Ch 10: 3-14, 16-17, 20-21, 23-24, 27-28, 30, 32-41, 43	
	Quiz 7	Cover Chapter 10	Quiz 7 due at 11:59pm on Wednesday, June 13th
	Exam 3	Cover chapters 5, 6, & 10	Exam 3 open dates (June 14th – 15th)

Appendix 2
Online Course Survey at the End of the Term

The purpose of the survey is to get feedback from students and to continuously improve the online course based on students' feedback. Please give your fair and honest opinions to the questions given below.

How do you feel about the overall structure of the class? Is it presented in a clear and straightforward way? Please explain!

What part of the course did you find most useful and interesting?

What part of the course did you find most challenging? Any suggestions?

How would you rate the amount of material covered and workload? Was it too little, too much, or just fine?

What was the (average) amount of time you spent on this course? How would you rate the pace at which the course advanced?

Did the course presentation adequately explain the knowledge and concepts? Any suggestions?

What are the strengths of the course?

Identify three ways to improve the online course.

List three important concepts or ideas that you learned in this course.

Would you prefer to take this course online or in the classroom? Why?

I would appreciate any other comments you have about the online course.

Appendix 3
Sample Comments and Feedback from Students from Online Finance Courses

Appendix 3 lists sample comments from students in response to selected survey questions for summer 2018 and spring 2019.

Questions 1: How do you fell about the overall structure of the class? Is it presented in a clear straightforward way? Please Explain!

Sample comment #1: "I think that the structure of the class was well laid out and very clear what the expectations were. I liked how it was divided up into weekly tabs on D2L and that only the current week was available. That made the course less intimidating."

Sample comment #2: "I did find this class was overall structured well and very clear right from the beginning. It can be hard sometimes with summer classes to remember when the work is due. But the quizzes and exams are all set beforehand and usually around the same time, so the schedule is easy to keep up with. I liked how you could not move onto a section sooner than allowed, so it makes you stay at the proper pace and learn as expected.

Sample comment #3: "I think the structure of this course is clear and organized. The quiz and examination time, content and rating criteria are presented in tabular form before the course begins, which gave me a clear understanding of what I need to do every week. The content of each chapter is gradual, which makes my understanding of investment gradually deepened."

Sample comment #4: "I felt like the structure of the class was very clear and straightforward. I was clear what I needed to complete each week and what was going to be on each exam. Also, I felt that the videos were very helpful in explaining the material and being able to go back to them for help was beneficial."

Sample comment #5: "I really liked the structure of this course. Everything was laid out in a way that made it easy to stay on schedule while still allowing me to work ahead. Furthermore, by only allowing students to access a week's work of material at a time it forced me to keep up to date with the course while not overwhelming me. Also, all the necessary information was laid out in the syllabus, so I knew what was expected from me right away."

Question 6: Did the course presentation adequately explain the knowledge and concepts? Any suggestions?

Sample comment #1: "I feel the course did adequately explain the knowledge needed for the future and for the exams in this course. The material covered was very direct in the slides and very direct on quizzes and exams. All the materials were often connected too, which was nice, so one section led to another and the quizzes/exams followed the same pattern and materials as the reading. I would try to keep it all as connected as possible because when reading, quizzes and the exams are all different or in different ways it can be confusing and hard to follow for students in an online setting like this."

Sample comment #2: "Yes, the syllabus was followed throughout the semester, so there were no surprises. The lecture presentations were so helpful. In fact, I don't think I would have been able to do well in the online class if it wasn't for the lectures."

Sample comment #3: “Yes, it did. I don’t’ have any added suggestions. It could be helpful to mention that a lot of the material covered might be used in license exams once we graduate for added motivation.”

Question 7: What are the strengths of the course?

Sample comment #1: “The clear structure and in-depth lectures were the course’s strengths.”

Sample comment #2: “The strength of this course is that it gave me an eye-opening experience on investment because I want to become a financial advisor. It showed me how stocks and bonds work along with reading different graphs and how they correlate with each other. Another strength to this course was applying your power points with the reading from the book because a lot of course don’t relate closely to the book as investment principles course. This way to challenge me and focus on both rather than just using the power point slides.”

Sample comment #3: “The lecture videos were a huge help; usually online classes have weekly quizzes and a lot of book reading by yourself. Without the videos, I would not have been able to finish the course.”

Sample comment #4: “It was a very well-organized course with clear tasks. The exams I felt reflected material we were learning very well. They were not too challenging and not too easy. The professor emailed us frequently reminding us of due dates and making it known that she was available for help.”

Sample comment #5: “Some of the strengths of this course are the structure of the course and the amount of material covered. The structure of the course forced me to keep up to date with the material that was being covered, making sure that I didn’t fall behind. Along with this, the material that was covered was quite extensive, covering large range of concepts. Finally, the videos and presentations and PowerPoints were extremely informative and useful for learning the materials.

Question 8: Identify three ways to improve the online course?

Sample comment #1: “Shorten audios, give more example and how to work through specific problems, and potentially taking the exams at home.”

Sample comment #2: “More practice questions/videos, study guides.”

Sample comment #3: “Adding more explanations on the graphs. Adding subtitle to the presentations.”– Subtitle to the video presentations was added in for spring 2019 and onwards. (instructor)

Sample comment #4: “More examples, discussion for additional points.”

Sample comment #5: “I think a worksheet would be helpful with example problems and then the answers to work out the problems could be available to check them. The quiz answers were helpful, especially when it came to study for the tests. Really, that’s my only suggestion about the course.”

Sample comment #6: “Provide a review sheet or video prior to exams. Videos explaining specific formulas or adding Youtube links.”

Question 10: Would you prefer to take this course online or in the classroom? Why?

Comments from students who would rather take this course in face-to-face class setting:

Sample comment #1: "I think that it is easier to learn in-person, but I would not have been able to sit for the class this summer without online options. Finance classes with calculations often are easiest to learn in person because students can ask questions while working through examples."

Sample comment #2: "I think if I took the class in a classroom I would of benefit a lot more because I am required to attend class and it could potentially add more points to the class. This would be a boost for students that are having a tough time in the course and give them a little grade boost. It also gives the chance to walk through problems and if any questions can be answered at that time and know if students are struggling you can review before the exams."

Sample comment #3: "I would definitely like to take this course in a classroom. The lecture videos were for me to fully understand some concepts. I have taken online courses before, but never a finance class so I wasn't really sure what to expect, I feel that I would have a better understanding of the concepts If I were in a classroom based on the best way that I learn."

Sample comment #4: "I would have preferred taking this class in the classroom as the concepts were challenging for me. It would have been nice to ask questions in class and have discussion with classmates."

Sample comment #5: "I would prefer to take this course in class because I feel like I would get more from the class and understand the material better. I also like the interaction with the teacher and students. I fell this helps when taking a difficult class like this."

Comments from students who would rather take the course online:

Sample comment #1: "Online. To be honest I think online is the way education is moving not only with the advancement of technology but the easy of communication between professor and student. This course was a proof of concept. There was never a time where I felt disconnect, all thanks to the interactive material."

Sample comment #2: "I prefer to take this course online because I can arrange my class time more flexibly."

Sample comment #3: "I would take this class online because a classroom setting is too distracting with so many people in one area. The idea of going with a different pace helps with time management."

Sample comment #4: "I enjoyed taking this course online and found that it is easy to learn with the tools used to teach this class. I was able to really learn when I had time to watch the slides."

Sample comment #5: "I liked taking it online as it gave me the chance to do things for the class whenever I had time. If I had a free hour I could watch some of the lecture on my phone or laptop, which was great."

Sample comment #6: "I would prefer this online. I think it is material that is able to be self-taught and it is fairly straight forward. It has saved me time as I am able to work at my own pace compared to spending an hour and 15 minutes twice a week in a classroom."

Question 11: I would appreciate any other comments you have about the online course.

Sample comment #1: “The online course was challenging but beneficial in many ways. I am working towards my finance degree and found this class helpful for my future career. I would suggest taking the class in a classroom because I feel I would get more out of it instead of try learning on my own time.”

Sample comment #2: “I enjoyed this course. It was difficult but interesting. I could tell that you truly care about your students and their learning.”

Sample comment #3: “I do not have any other comments than thank you for teaching this summer course online and I found it educational and well run. I was a little worried when I signed up but it was an excellent course at a good pace and made the course understandable for me. I wish you all the best.”

Sample comment #4: “Thank you for your organization, attention to detail, and your response time to emails. Although this may not seem as important as actually teaching a class material, this is a huge thing that a lot of professors lack. It is refreshing to have an organized professor.”

Sample comment #5: “I really enjoyed the class overall, and all of the concepts we learned will be very helpful with my finance minor and even my accounting major. I appreciate the time that the professor put into all of the lectures and such, as it was all very beneficial.”

Sample comment #6: “The course is valuable. I do believe that homework will help refine and solidify the information that is taught throughout the course. It will give us some examples of what could possibly be on quizzes or tests.”

Figure 1

Sample D2L Folders for an Investment Principles Course for a Five-week Summer Term

Figure 1A presents the folders created under Content on D2L (a Learning Management System) for an intermediate finance online course offered in summer 2018. The summer course was five weeks in length. Hence, five folders named Week 1 to Week 5 were created with each folder including all the materials for that week, for example, the tasks students need to complete, instructor lecture videos for the week, articles or Youtube videos associated with the week's topics, instructor problem-solving presentation videos for students, quizzes/exams, and other tutorial materials. Figure 1B presents the screenshot of Week 1's folder.

Figure 1A

Figure1B

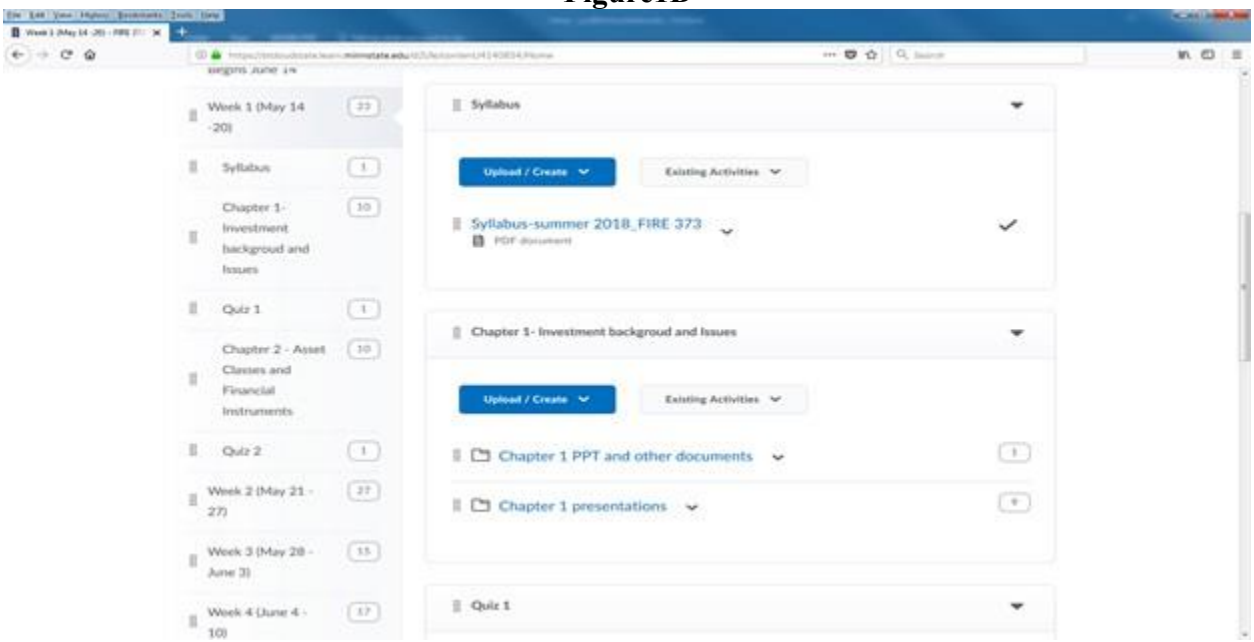


Figure 2

Sample Screenshots of Respondus and Diploma 6

Figure 2 shows the screenshots of Respondus and Diploma 6, both exam generating software. Both tools can be used to create quizzes/exams in the format of multiple-choice, true/false, fill-in-blank, short answer, and essay questions. After the quizzes/exams are created, you can publish them on your school's LMS for students to take. Figure 2A (B) presents a screenshot of using Respondus (Diploma 6).

Figure 2A

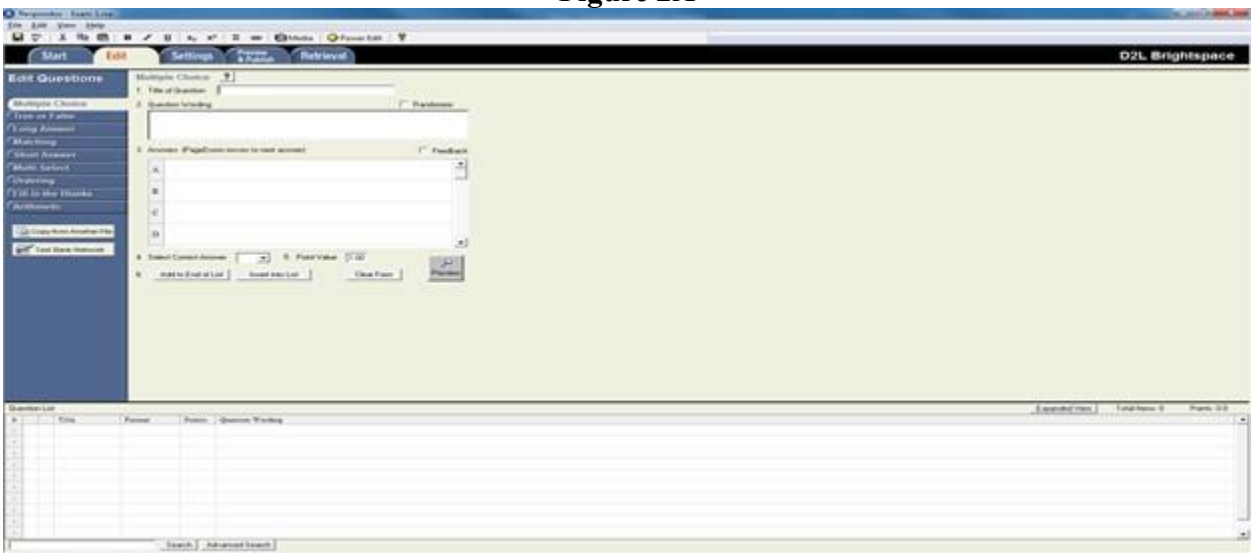
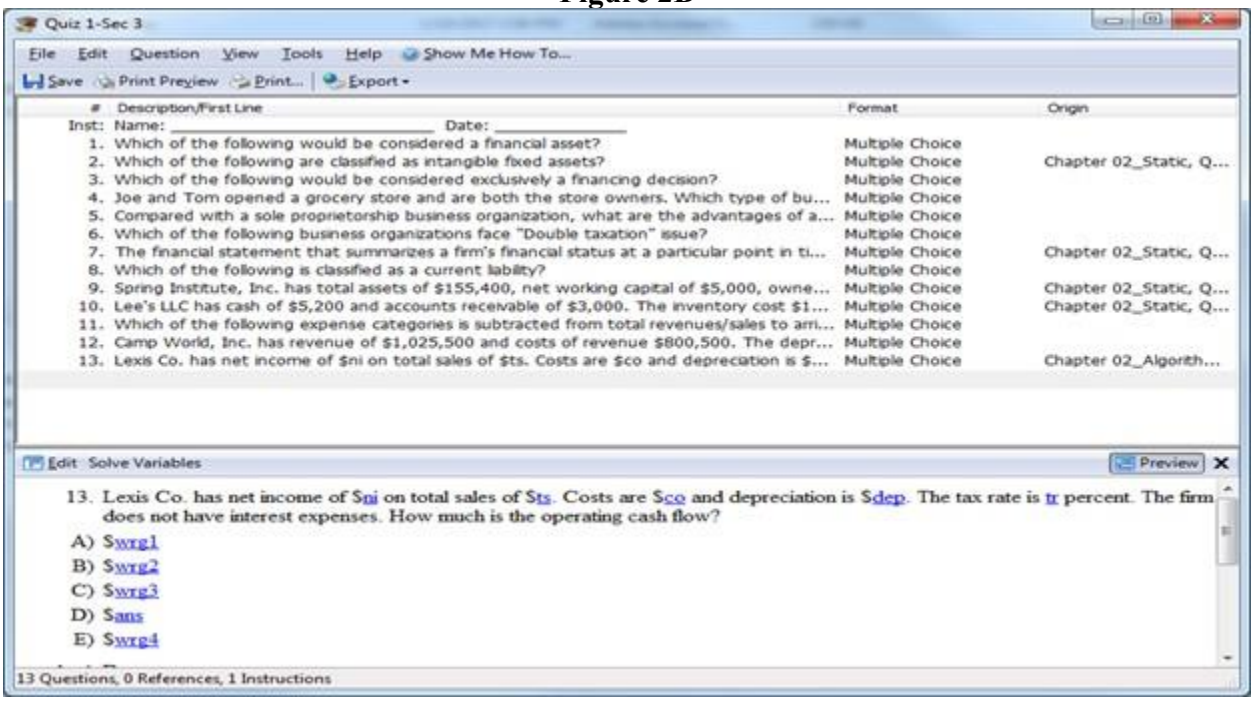


Figure 2B



Let Students Excel! – Developing Career-Relevant Skills Through Excel-Based Individualized Projects

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This paper introduces a novel way in which Microsoft Excel can be integrated into financial education. Practitioners steadily mention career-related Excel skills as a competitive advantage for recent graduates at the start of their professional career. We develop and present three Excel-based individualized projects that can be applied in classes of all sizes and provide students with individualized assignments. The projects teach several functions of Excel and concepts of finance, serving simultaneously as an assessment of students' progress in the course. Using a pretest-posttest study design with control group and comparing collected data with means-difference t-tests, paired t-tests, and propensity score matching analyses, we find that the projects effectively convey knowledge to students and increase their self-efficacy. Students also reported through both qualitative and quantitative data that the projects aided their learning and were engaging.

Keywords: career-relevant skills, financial education, large-classroom assessment, Microsoft Excel, propensity score matching

Introduction

Since the beginning of the millennium, Microsoft Excel skills remain among the most important skills of business graduates, according to employers and business professionals (e.g., Bauer Jr., 2006; Coleman & Blankenship, 2017; Formby, Medlin, & Ellington, 2017; Tietz, Cainas, & Miller-Nobles, 2021; Zhang, 2014). Even though the Excel skills required of graduates evolved and became more complex over time (see Bauer Jr., 2006 and Tietz et al., 2021), and despite the emergence of more advanced and more specialized software, Excel is still considered the standard for graduates of accounting and finance programs (Tietz et al., 2021).

However, research on the application of Excel in accounting and financial education is scarce. Previous studies that discuss using Excel in accounting and financial education focus mainly on the operational aspect of teaching Excel skills to students. For example, Willis (2016) introduces a group project for accounting students. In the project, the class is divided into groups. Each group presents specific Excel functions, including their practical application and results, to the other groups of the class. The effectiveness of the project was assessed by asking students to indicate their agreement with four different statements about the project, thus gauging students' perception of the project. Additional comments were qualitatively evaluated.

Similarly, Zhang (2014) introduces a way to incorporate Excel in financial education. The author describes several Excel applications (e.g., Data Table, Charts) which can be demonstrated

in a traditional lecture setting. Additionally, the described applications can form the basis for homework exercises. To assess the project effectiveness, students rated their agreement with several statements about their perceived Excel proficiency in the context of basic financial topics.

McNeil (2015) focuses on the application of Excel-based assessment in finance classes, and develops an automatic grading macro for basic financial assignments. The effectiveness of the grading macro is assessed based on various dimensions, which include accuracy, setup time, and plagiarism detection. Finally, Bauer Jr. (2006) describes a strategy to teach Excel VBA programming to students in advanced finance courses. He recommends to start with basic functions and provides examples of assignments.

Therefore, an effective method, which is quantitatively assessed, to teach Excel skills to students in accounting or finance courses is still outstanding. Previous literature only examines whether students subjectively perceive that they gained any knowledge through the learning activities involving Excel (Willis, 2016; Zhang, 2014). This examination has two dimensions. The first dimension examines whether students perceive that they have gained any knowledge, or whether they perceive any learning has taken place (e.g., Gagne & Medsker, 1996). However, it is equally important that a transfer of learning and generalization of knowledge take place. Transfer of learning describes students practically applying to their career or in their subsequent education what they have conceptually learned (Broad & Newstrom, 1992). Generalization describes the ability to transfer concepts from one situation to another situation that is different but contains similar elements. Sustainable learning also requires maintenance of knowledge, which describes the continuous application of knowledge over time (Noe, 2020).

The second dimension examines whether students attribute the perceived increase in knowledge to the Excel-related instructional elements. Previous studies do not control for confounding effects. For example, Zhang (2014) argues that Excel can be helpful in demonstrating financial concepts to students, but does not assess the marginal increase in students' understanding relative to traditional instructional methods.

This study seeks to extend research on Excel-based instructional elements and overcome some issues of previous literature. In doing so, we make several contributions to the literature. First, we develop and describe a series of three Excel-based projects. These projects can be adopted by instructors into their curriculum without much effort. The projects contain elements that automatically individualize them for each student and are automatically graded, which makes them an attractive instructional tool in classes with many or few students.

Second, we confirm that the projects are successful in supporting students in their learning, transfer of learning, and generalization. Thus, the projects help students acquire new skills and knowledge that can be applied outside the specific content of the projects and in different scenarios.

Third, we find that the projects create self-efficacy in students. Thus, they are more conscious of their abilities, and are more certain in applying their gained knowledge. Additionally, an increase in self-efficacy will lead to a higher degree of maintenance of knowledge and thus more sustainable learning (Bandura, 1982, 1986; Noe, 2020).

Fourth, we analyze whether the increase in knowledge and self-efficacy is attributable to the Excel-projects by using a pretest-posttest study design with control group (Campbell & Stanley, 1963). We use means-difference *t*-tests, paired *t*-tests, and propensity score matching for our analyses. Our results show that the increase in knowledge and self-efficacy are significantly higher for the students that completed the Excel-based individualized projects over the course of the semester than for the other students.

Description of Projects

The three Excel-based individualized projects cover typical topics of introductory finance courses. In each project, several mechanisms are implemented to deter and detect cheating. Overall, the projects can easily be used in small and large classes, without significantly more effort for the instructor. Each project follows the same basic structure. In the first part, a series of videos instructs and guides students to build demonstrations and applications of concepts introduced during class by using formulas in Microsoft Excel. In the second part, students answer knowledge questions to ensure both the learning transfer of the underlying theoretical concepts demonstrated through Excel, and generalization of the knowledge gained (Broad & Newsom, 1992; Noe, 2020). The Excel portion of each project is automatically graded by a program that compares the formulas entered by each student against the formulas in the source file that was shown in the instructional videos. Since the grading program compares the formulas and not the values, students can change the inputs and try out several scenarios without affecting the grading, which also aids them in answering the knowledge questions. The knowledge questions are delivered in a quiz format and are graded through the quiz or assignment function of the learning management system (e.g., Blackboard, Canvas).

The first project focuses on the time value of money. First, students obtain data on daily Treasury par yield curve rates from the website of the U.S. Department of the Treasury. This ensures that the data is current and helps individualize the project. In the next step, the parameters β_0, β_1, β_2, and τ are estimated in the Nelson-Siegel yield curve model as given in Zdravkovic (2010)

$$y(m) = \beta_0 + \beta_1 \frac{1-e^{\frac{-m}{\tau}}}{\frac{m}{\tau}} + \beta_2 \left(\frac{1-e^{\frac{-m}{\tau}}}{\frac{m}{\tau}} - e^{\frac{-m}{\tau}} \right) \qquad (1),$$

where m equals the maturity. For each maturity with corresponding Treasury par yield curve rate available, the error of the Nelson-Siegel estimate relative to the Treasury par yield curve rate is calculated and all errors are summarized in the total squared error. Then, the Excel Solver is used to minimize the total squared error by iterating the values for β_0, β_1, β_2, and τ. To achieve a more accurate solution, the minimization of the total squared error with Excel Solver is repeated until no further noticeable model improvement can be achieved. The estimated values for β_0, β_1, β_2, and τ are then used to calculate the rate on investments with pre-determined maturities and pre-determined present or future values, respectively. The maturities, present values, and future values are randomly generated and are individual to each student. On separate sheets, the students then see how different compounding frequencies, rates, and maturities affect the future and present value of investments.

The second project focuses on annuities with the example of a car loan. Since most students are familiar with car loans which are a main source of financial insecurities (Latham, 2021), this context increases the practical relevance of the project. To additionally increase the relevance of the example to students' personal lives, the students are encouraged to find the price of a car they are most interested in buying themselves. First, the loan length is fixed to common standard loan lengths. The current standard loan lengths are obtained by the students through a web search, as are current credit score brackets and corresponding interest rates. This ensures that the project remains timely and accurate. The interest rate of the car loan is compared to the best attainable interest rate at a given credit score, to ensure economic feasibility. Next, an amortization table is created, that lists the total payment, principal payment, percentage of the principal payment of the total payment, interest payment, percentage of the interest payment of the total payment, remaining

loan balance, and total cumulative interest payments for each period. This amortization table helps visualize how the portion of interest and principal payment change over the duration of the loan.

The third project focuses on bond valuation. Each student is assigned a bond with randomly generated yield to maturity, coupon rate, and maturity date. The students then set up the spreadsheets to calculate the remaining periods exact to the day, from the current date. Next, three different amortization tables are created that demonstrate the impact of changes in yield to maturity, coupon rate, and time to maturity, respectively, on the value of the bond.

Methodology

Data to assess the effectiveness of the Excel-based individualized projects was collected at the beginning and end of the Fall 2021 semester through an ex-ante and an ex-post survey, after approval from the Institutional Review Board for human subject research was granted in August 2021. The survey was administered in five sections of an introductory finance course at a large university in the Western United States. Two sections of the course completed the three Excel-based individualized projects over the course of the semester (i.e., the treatment group), while three sections did not (i.e., the control group). The five different courses were taught by four different instructors. While this led to some diversity in instructional methods besides the use of the Excel-based individualized projects, the core topics of the projects (i.e., time value of money, annuities, and bond valuation) have been central elements of each course. At the beginning of the semester, 177 usable questionnaires were returned. Since 208 questionnaires were administered, this led to an initial response rate of 85.10%. Of these 177 questionnaires, 106 were completed by students in the control group, and 71 were completed by students in the treatment group.

The ex-ante questionnaire contained ten questions to assess the content knowledge of the students, as well as ten questions to assess how sure students felt of their knowledge and its application. The content knowledge questions assess the effectiveness of the Excel-based individualized projects in terms of learning, transfer of learning, and generalization (Broad & Newsom, 1992; Gagne & Medsker, 1996; Noe, 2020). Testing maintenance of knowledge over the course of one semester is empirically difficult. However, as previous research has shown, self-efficacy is positively related to maintenance of knowledge. Self-efficacy describes one's belief to succeed in a task (Bandura, 1982, 1986; Noe, 2020). Hence, the ten questions assessing students' certainty of their knowledge and its application measure their self-efficacy related to the knowledge gained from the Excel-based individualized projects. Thus, self-efficacy serves as a proxy for maintenance of knowledge.

Additional questions asked for demographic information such as age, gender, ethnicity, race, major, degree progress, and professional experience. The complete ex-ante questionnaire can be found in Appendix 1. The ex-post questionnaire repeated the questions that assessed content knowledge as well as knowledge and application certainty of students. For the treatment group, additional questions asked students to rate the Excel-based individualized projects with regards to how engaging the projects were and whether the projects enhanced their learning in the course. Two open-ended questions provided students with an opportunity to comment on aspects they liked or did not like about the Excel-based individualized projects. The complete ex-post questionnaire for the treatment group can be found in Appendix 2.

Each ex-ante questionnaire assigned the surveyed student a random participant number, which students were asked to record until the ex-post survey at the end of the semester. Fluctuations in student enrollment over the semester, as well as difficulties to retain or locate the participant

number led to 124 completed ex-post questionnaires, 77 in the control group, and 47 in the treatment group. 94 ex-post questionnaires could be matched to the corresponding ex-ante questionnaires, 54 in the control group, and 40 in the treatment group. This led to an overall response rate of 45.19% for the matched sample with data on the ex-ante and ex-post questionnaire available.

Results

Descriptive Statistic and Reception of Projects

Table 1 shows the descriptive statistics of the sample. To measure content knowledge, each correct answer was coded as 1, and each incorrect answer was coded as 0. The variable *correctness* was calculated by adding the correct answers for each student in the ex-ante and ex-post survey, respectively. Application certainty was measured by assigning numerical values from 1 to 5 to each response. If students indicated that they were "very sure" of an answer, the assigned numerical value was 5. If students indicated that they were "very unsure" of an answer, the assigned numerical value was 1. The variable *certainty* was calculated by adding the numerical values for each student in the ex-ante and ex-post survey, respectively.

Table 1
Descriptive Statistics

	Treatment				**Control**			
Variable	**n**	**Mean**	**S.D.**	**Med.**	**n**	**Mean**	**S.D.**	**Med.**
correctness ex-ante	71	4.37	1.50	4	106	3.96	1.61	4
correctness ex-post	40	5.63	1.29	6	54	4.52	1.80	5
certainty ex-ante	71	27.70	6.47	28	106	26.62	7.33	27
certainty ex-post	40	37.78	4.59	38	54	32.46	7.22	33
engagement	40	4.28	0.64	4				
learning	40	4.08	0.73	4				
Note. n = number of participants, S.D. = standard deviation, Med. = median								

Similarly, if students did "strongly agree" that the projects were engaging or enhanced their learning, their respective response was coded as 5. If students did "strongly disagree" with the projects being engaging or enhancing their learning, their respective response was coded as 1. The coded answers resulted in the variables *engagement* and *learning*. These two variables reflected students' perspective on and opinion of the projects. As the results in Table 1 show, students perceived the Excel-based individualized projects as both engaging and enhancing their learning. This result is important, since student-centered education requires the use of learning activities that are perceived positively by the learner. Additionally, managing classroom morale is an important aspect of the work of instructors, and conveying knowledge with learning activities that are received positively is an important classroom morale management tool (Towler & Dipboye, 2001). The positive sentiment from the numerical analyses was mirrored in the comments. Students generally appreciated that the Excel-based individualized projects allowed them to gain a deeper understanding of the topics covered in class, and facilitated the transfer of theoretical concepts to practical knowledge and skills:

> *"[The projects] all connect to my career path. They're very straightforward and easy to understand."*

"The Excel projects used real-life situations which helped my understanding of the specific topic we covered."

"It gave a real example of how financing works. How bonds, interest, etc can increase or decrease. Made a better understanding of what was happening in class."

"The fact that I was able to do the calculations and see the different effects that price, APR, and payments have on the overal amount."

"I enjoyed playing with the spreadsheets after completing the project to see how the different inputs made the outputs change."

"[The projects] were easy to follow along. They helped me understand topics that I didn't fully understand in class."

"I felt that the Excel-based individualized projects gave me a foundation for skills that I can carry with me into the workplace."

Negative comments centered around difficulties with completing the projects on non-Windows computers. While the projects can be completed on any operating system, the instructional videos showed the formulas and keystrokes on a Windows computer. Thus, students that did not complete the projects on a Windows computer had to press different buttons in some instances or enter formulas slightly differently:

"It was a little difficult for mac users to follow along sometimes."

"I didn't like how the examples to follow were made with windows because it was a bit of extra work to do it on Mac. The translation of windows instructions to Mac was a little frustrating."

Overall, however, the responses to the question what students did not like about the projects further supported the generally positive feedback:

"There weren't enough projects."

"I have no negative comments on the Excel-based projects."

"I enjoyed the projects and have nothing negative to say about them."

"I don't have any negative comments about the excel projects."

"Nothing. I enjoyed it. I wish you had more."

Effectiveness of Projects

The results of *t*-tests comparing the responses of the ex-ante survey to the ex-post survey in terms of content knowledge and application certainty are shown in Table 2. In Panel A, the means of all responses from the ex-ante survey are compared to the means of all responses from the ex-post survey in means-difference *t*-tests. The *t*-tests are conducted separately for the control and the treatment group. The results show that over the course of the semester, students gained more content knowledge, and also significantly increased the certainty with which they applied this knowledge. Both results were confirmed for the control and the treatment group, but the significance level of content knowledge gained over the course of the semester in the control group was lower than the corresponding significance level in the treatment group. Thus, the Excel-based

individualized projects appear to increase content knowledge more than traditional instructional methods.

Table 2
Results of t-tests Comparing Ex-ante and Ex-post Scores

Panel A: Unpaired *t*-tests						
Variable	**n ex-ante**	**Mean ex-ante**	**n ex-post**	**Mean ex-post**	**Means difference**	***p*-value**
Control group						
correctness	106	3.96	54	4.52	0.56	0.05
certainty	106	26.62	54	32.46	5.84	<0.01
Treatment group						
correctness	71	4.37	40	5.63	1.26	<0.01
certainty	71	27.70	40	37.78	10.07	<0.01
Panel B: Paired *t*-tests						
Variable	**n ex-ante**	**Mean ex-ante**	**n ex-post**	**Mean ex-post**	**Means difference**	***p*-value**
Control group						
correctness	54	4.11	54	4.52	0.41	0.12
certainty	54	26.15	54	32.46	6.31	<0.01
Treatment group						
correctness	40	4.35	40	5.63	1.28	<0.01
certainty	40	27.95	40	37.78	9.83	<0.01
Note. n = number of participants; *p*-values are of non-directional *t*-tests to minimize Type II errors.						

Panel B shows the results of paired *t*-tests, which have greater statistical power than means-difference *t*-tests (e.g., Gravetter & Wallnau, 2013). Only observations from students that completed both the ex-ante and the ex-post survey, and who had retained their participant number at the end of the semester, entered the tests. The results more strongly confirm the results from Panel A. Application certainty of students in both the control group and the treatment group increased significantly over the course of the semester. However, content knowledge only significantly increased for students in the treatment group. Hence, the Excel-based individualized projects significantly increased content knowledge.

Comparing the results of the ex-ante survey to the results of the ex-post survey does not control for potential time-series or other confounding effects. This concern could be alleviated by using difference-in-difference regression models. However, the resulting coefficient estimates do not appropriately reflect the treatment effect. A Euclidian distance matching or a propensity score matching design show more accurate treatment effect estimates. Propensity score matching analyses are more accurate than Euclidian distance matching analyses in determining the correctly sized treatment effect, since they allow for a multi-dimensional matching (Wooldridge, 2009). Hence, Table 3 shows the results for propensity score matching analyses of ex-post values of *correctness* and *certainty* for students in the treatment and control group. The propensity score was estimated with logit regressions on various demographic dimensions, such as student age, professional experience, gender, race, ethnicity, and major. The data was collected in the ex-ante

survey and was coded into 14 dummy variables and five categorical variables. Since the demographic data was collected only in the ex-ante survey, only data from students for whom the ex-ante survey could be matched to the ex-post survey entered the analyses. Three observations generated almost identical propensity scores, which would distort the analyses (Wooldridge, 2009). Consequently, these observations were dropped. Due to the relatively low sample size, the average treatment effect of the treated was estimated based on between one and three matches.

Table 3
Results of Propensity Score Matching Analyses

Variable	**correctness ex-post**	**certainty ex-post**
intercept	-11.195 (-0.02)	-11.195 (-0.02)
age	-0.062 (-1.16)	-0.062 (-1.16)
degree year	-0.488 (-1.84)*	-0.488 (-1.84)*
professional experience dummy	0.655 (0.39)	0.655 (0.39)
professional experience in years	-0.236 (-0.48)	-0.236 (-0.48)
took course previously	1.329 (0.85)	1.329 (0.85)
format previous course	-0.486 (-0.54)	-0.486 (-0.54)
gender	0.504 (1.41)	0.504 (1.41)
Asian/Asian-American	0.420 (0.69)	0.420 (0.69)
Black/African-American	-0.172 (-0.17)	-0.172 (-0.17)
Native American	0.319 (0.19)	0.319 (0.19)
Hispanic	0.469 (0.79)	0.469 (0.79)
White/Caucasian	0.702 (1.31)	0.702 (1.31)
accounting/finance major	13.275 (0.02)	13.275 (0.02)
general business major	12.010 (0.02)	12.010 (0.02)
quantitative analysis major	14.406 (0.02)	14.406 (0.02)
marketing major	13.538 (0.02)	13.538 (0.02)
management major	12.852 (0.02)	12.852 (0.02)
other business major	14.091 (0.02)	14.091 (0.02)
other major	13.225 (0.02)	13.225 (0.02)
average treatment effect of the treated	1.757 (3.08)***	5.014 (3.09)***
number of observations	91	91

Note. Numbers in parentheses are *t*-values. Propensity scores are estimated with logit regressions. All variables are dummy variables except for *age*, *degree year*, *professional experience in years*, *gender*, and *format previous course*, which were categorical variables. Due to the relatively low sample size, the average treatment effect was determined based on between one and three matches. Three observations generated almost identical propensity scores and were thus dropped to avoid a distorted treatment effect.

The results show that the increase in content knowledge and application certainty observed in previous tests is, in fact, attributable to the Excel-based individualized projects. Students that completed the projects over the course of the semester answered correctly about two questions more than students that did not complete the projects. Given that there were ten knowledge questions in total, this translates to a gain in knowledge of 17.57%. With regards to application certainty, students that completed the Excel-based individualized projects scored 5.014 points

higher on the certainty scale. Since application certainty was based on ten questions, students felt on average half a category more certain about their knowledge and thus more secure in its application.

Taken together, the Excel-based individualized projects are positively received by students and offer an engaging way to support students in their learning. They convey more content and leave students feeling more certain about their knowledge and its application than traditional instructional methods.

Conclusion

This paper presents a novel way to integrate Excel into financial education. Teaching career-relevant Excel skills is important, as they are crucial skills demanded from professionals in the fields of finance and accounting. We develop and present three Excel-based individualized projects that allow large numbers of students to complete individualized assignments. These projects teach several functions of Excel as well as concepts of finance, and simultaneously serve as a learning activity to assess the progress of students in the course. We use a pretest-posttest study design with control group and compare collected data with a series of means-difference and paired *t*-tests, as well as propensity score matching analyses. The results show that the projects not only effectively convey knowledge to students and increase students' learning, but also increase students' self-efficacy. Additionally, students found the projects engaging and supportive in their learning and had overall a very positive opinion of the projects. Our study is relevant to scholars, as it advances the literature on financial education and shows a way to overcome identification problems of previous studies. Our results are also relevant to practitioners, as they present financial educators with a readily available effective and efficient instructional tool to give students a competitive edge in the job market.

References

Bandura, A. (1982). Self-efficacy mechanisms in human behavior. *American Psychologist*, *37*(2), 122-147. doi: 10.1037/0003-066X.37.2.122

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bauer Jr, R. J. (2006). Teaching Excel VBA to finance students. *Journal of Financial Education, 32*(Winter 2006), 43-63.

Broad, M. L. & Newstrom, J. W. (1992). *Transfer of training: Action-packed strategies to ensure high payoff from training investments*. New York, NY: Basic Books.

Campbell, D. T. & Stanley, J. C. (1963). *Experimental and quasi-experimental designs for research*. Boston, MA: Houghton Mifflin.

Coleman, P. D., & Blankenship, R. J. (2017). What spreadsheet and database skills do business students need?. *Journal of Instructional Pedagogies*, *19*, 1-8.

Formby, S. K., Medlin, D., & Ellington, V. B. (2017). Microsoft Excel®: Is it an important job skill for college graduates?. *Information Systems Education Journal*, *15*(3), 55-63.

Gagne, R. M., & Medsker, K. L. (1996). *The conditions of learning: Training applications*. Belmont, CA: Wadsworth Publishing.

Gravetter, F. J. & Wallnau, L. B. (2013). *Statistics for the behavioral sciences* (9th ed.). Boston, MA: Cengage Learning.

Latham, A. (2021, November 4). 2020 auto loan industry study. *SuperMoney*.

McNeil, C. R. (2015). Excel modeling assignments and automatic grading. *Journal of Financial Education*, *41*(3), 86-97.

Noe, R. A. (2020). *Employee training and development* (8th ed.). New York, NY: McGraw-Hill.

Tietz, W., Cainas, J. M., & Miller-Nobles, T. L. (2021, August 1). Excel: The common denominator. *Strategic Finance*.

Towler, A. J., & Dipboye, R. L. (2001). Effects of trainer expressiveness, organization, and trainee goal orientation on training outcomes. *Journal of Applied Psychology*, *86*(4), 664-673. doi: 10.1037//0021-9010.86.4.664

Willis, V. F. (2016). A model for teaching technology: Using Excel in an accounting information systems course. *Journal of Accounting Education*, *36*, 87-99. doi: 10.1016/j.jaccedu.2016.05.002

Wooldridge, J. M. (2009). *Introductory econometrics: A modern approach*. Boston, MA: Cengage Learning.

Zdravkovic, A. (2010). Forecasting the term structure if interest rates in government bonds. *Magistarski rad, Ekonomski fakultet Beograd*.

Zhang, C. (2014). Incorporating powerful Excel tools into finance teaching. *Journal of Financial Education*, *40*(3/4), 87-113.

Appendix 1
Ex-Ante Survey

1a. As interest rates increase, what happens to bond prices?
- a) Bond prices increase as well.
- b) Bond prices remain the same.
- c) Bond prices decrease.
- d) Bond prices become negative.
- e) Bond prices behave erratically.

1b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

2a. For the future value of a deposit to decrease, compounding frequency has to
- a) increase.
- b) remain constant.
- c) decrease.
- d) become negative.
- e) increase or decrease, depending on the circumstances.

2b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

3a. Bond prices _____ as time to maturity increases.
- a) increase
- b) remain constant
- c) decrease
- d) become negative
- e) approach infinity

3b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

4a. The present value of future cash flows
- a) increases with an increase in interest rates.
- b) decreases with an increase in interest rates.
- c) remains constant with an increase in interest rates.
- d) increases with a decrease in interest rates.
- e) decreases with a decrease in interest rates.

4b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

5a. The total interest paid will _____ with loan length.
- a) increase
- b) remain constant

c) decrease
d) become negative
e) disappear

5b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

6a. What is an annuity?
a) a finite number of equal payments that are equally distributed across time
b) an infinite number of equal payments across time
c) a portion of ownership of a company
d) the conflict between managers and owners of a company
e) the number of payments on a loan within one year

6b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

7a. Rank the following types of bonds from highest value to lowest value.
a) discount bond, par bond, premium bond
b) par bond, discount bond, premium bond
c) par bond, premium bond, discount bond
d) premium bond, par bond, discount bond
e) premium bond, discount bond, par bond

7b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

8a. As maturity approaches, the value of a premium bond will
a) increase.
b) remain constant.
c) decrease.
d) approach infinity.
e) increase or decrease, depending on interest rates.

8b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

9a. How does the bond price change with increasing coupon rates?
a) The bond price increases.
b) The bond price remains constant.
c) The bond price decreases.
d) The bond price becomes negative.
e) The bond price behaves erratically.

9b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

10a. Interest rates will be _____ for investments with longer investment horizons.

a) higher
b) equal
c) lower
d) negative
e) cubic

10b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

11. What is your current age?

12. Which gender do you most identify with?

13. Which ethnicity/ethnicities do you most identify with?

14. Which race(s) do you most identify with?

15. What is your current major?

16. In which year of your degree are you?

1st year	2nd year	3rd year	4th year	5th year	6th year

17a. Do you have any professional experience related to finance? (Yes or No)

17b. If yes, how many years of professional experience related to finance do you have?

18. How many times have you ever completed this course (or a similar course at another institution) before?

19. If you have ever completed this course or a similar course at another institution, which was the delivery format of the course?

online	hybrid	in-person

20. How proficient do you feel working with Microsoft Excel?

very proficient	proficient	neutral	not proficient	not proficient at all

Appendix 2
Ex-Post Survey Treatment Group

1a. As interest rates increase, what happens to bond prices?
a) Bond prices increase as well.
b) Bond prices remain the same.
c) Bond prices decrease.
d) Bond prices become negative.
e) Bond prices behave erratically.

1b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

2a. For the future value of a deposit to decrease, compounding frequency has to
a) increase.
b) remain constant.
c) decrease.
d) become negative.
e) increase or decrease, depending on the circumstances.

2b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

3a. Bond prices _____ as time to maturity increases.
a) increase
b) remain constant
c) decrease
d) become negative
e) approach infinity

3b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

4a. The present value of future cash flows
a) increases with an increase in interest rates.
b) decreases with an increase in interest rates.
c) remains constant with an increase in interest rates.
d) increases with a decrease in interest rates.
e) decreases with a decrease in interest rates.

4b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

5a. The total interest paid will _____ with loan length.
a) increase
b) remain constant

c) decrease
d) become negative
e) disappear

5b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

6a. What is an annuity?
a) a finite number of equal payments that are equally distributed across time
b) an infinite number of equal payments across time
c) a portion of ownership of a company
d) the conflict between managers and owners of a company
e) the number of payments on a loan within one year

6b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

7a. Rank the following types of bonds from highest value to lowest value.
a) discount bond, par bond, premium bond
b) par bond, discount bond, premium bond
c) par bond, premium bond, discount bond
d) premium bond, par bond, discount bond
e) premium bond, discount bond, par bond

7b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

8a. As maturity approaches, the value of a premium bond will
a) increase.
b) remain constant.
c) decrease.
d) approach infinity.
e) increase or decrease, depending on interest rates.

8b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

9a. How does the bond price change with increasing coupon rates?
a) The bond price increases.
b) The bond price remains constant.
c) The bond price decreases.
d) The bond price becomes negative.
e) The bond price behaves erratically.

9b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

10a. Interest rates will be _____ for investments with longer investment horizons.

a) higher
b) equal
c) lower
d) negative
e) cubic

10b. How sure are you about this answer?

very sure	sure	neutral	unsure	very unsure

20. How proficient do you feel working with Microsoft Excel?

very proficient	proficient	neutral	not proficient	not proficient at all

21. The Excel-based individualized projects that I completed during this semester were engaging.

strongly agree	agree	neutral	disagree	strongly disagree

22. The Excel-based individualized projects that I completed during this semester enhanced my learning in this course.

strongly agree	agree	neutral	disagree	strongly disagree

23. What did you like about the Excel-based individualized projects?

24. What did you not like about the Excel-based individualized projects?

Quantifying the Use of Bloomberg in Finance

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Universities and business leaders have long recognised the importance of integrating authentic work experiences into the curriculum to supplement students' subject knowledge. Where implemented, such experiences accrue benefits to the student, staff and university. Accordingly, many Australian universities have made a significant investment in Bloomberg terminals to increase the employability skills of graduates. We argue that both staff and students need to engage with the Bloomberg terminals to maximise the return on investment. We evaluate the effectiveness of Bloomberg integration into the Finance curriculum through surveys of staff and students. In summary, this project provides useful feedback on the integration of Bloomberg throughout the finance major and identifies areas for improvement, namely more in-depth and intellectual use of Bloomberg, more training opportunities for staff, and providing students with a variety of assessment items and tasks to develop key skills to enable work-readiness.

Keywords: Bloomberg, authentic learning, finance curriculum, work-readiness

Introduction

Growing competition between universities and employment markets focus attention on the need for the university and business sectors to cooperate to achieve better outcomes for students. The primary concern is that both employers and students feel that university learning experiences are not equipping graduates with the necessary range of skills workplaces require (Gardner and Liu, 1997; Kavanagh and Drennan, 2008). More specifically, students are seen to be lacking the generic skills to be effective in the workplace, being able to transfer technical knowledge to a practical setting and being generally aware of the realities of business (Hernandez-March, del Peso & Leguey, 2009; Jackling, 2009). This puts additional pressure on academics to deliver learning experiences beyond the traditional teaching of technical knowledge (Bates, 2011). In a highly competitive environment for funding and student retention, universities are compelled to better

satisfy the needs of employers and students by providing authentic work experiences and strategies to develop generic skills.

In order to meet the expectations of employers and students, universities and businesses recognise the need to work together to improve work-readiness. Research has demonstrated that exposure to authentic work experiences seem to motivate students in a number of ways, including undergoing a deeper assessment of their own skills and abilities in relation to the profession, seeking opportunities to get more experience in order to be better prepared, and to further engage with their technical study and career management (Crebert, Bates, Bell, Patrick & Cragnolini, 2004; Weisz & Smith, 2005). Thus, interest in work-integrated learning (WIL) has grown, to the extent that many Australian universities identify it as a key focus of their teaching and learning responsibilities.

WIL is referred to as the 'process whereby students come to learn from experiences in educational and practice settings and integrate the contributions of those experiences in developing the understandings, procedures and dispositions required for effective professional practice, including criticality' (Billet, 2009, p. 5). Alternatively, WIL programs can be described as 'educational programs which combine and integrate learning and its workplace application, regardless of whether this integration occurs in industry or whether it is real or simulated' (Atchison, Pollock, Reeders & Rizzetti, 2002, p. 3). Consequently, WIL activities can include off- and on-campus activities. Off-campus activities involve attending a real workplace and participating in a project, client meetings, conducting research or other support. On-campus activities can include simulations, like mock moot courts, airline simulations and simulated doctor-patient interactions (Smith & Worsfold, 2013).

This article focuses on activities that are delivered on-campus, in particular the use of Bloomberg Professional Service to simulate the working environment of the finance sector. As Bloomberg is used to source and analyse information by finance professionals worldwide, embedding the use of the Bloomberg terminals throughout finance courses is central to enhancing students' employability skills and enabling them to be work ready. This research is motivated by the proposition that student's engagement with Bloomberg during their Finance courses enhances their employment outcomes by equipping students with highly technical and specific skills required in their chosen field. Moreover, Finance staff benefit from access to Bloomberg through data for research, industry engagement (consultancy work, executive education workshops) and opportunities for recognition of good teaching practice (awards, citations, grants).

The rest of the paper consists of five sections. Section 2 presents the theoretical background behind integrating real-world and experiential activities and projects in the curriculum, while section 3 reviews the international literature on how academics have used Bloomberg in the classroom. Section 4 describes the methodology employed and results of mapping the Bloomberg platform in the curriculum and gathering the evidence of its benefit to the students. The paper concludes with a discussion in section 5.

Pedagogical Framework

The increasingly commercialised and highly competitive higher education sector has moved from offering a transformative learning experience to one that focusses on credentials for employment and smooth transitions into professional practice. Billett (2009) argues that a combination of specific pedagogy, curriculum and personal epistemologies is necessary to effectively integrate practice-based experiences into university programs. Integrating Bloomberg

specific activities into the curriculum addresses the procedural knowledge by allowing students to participate and develop skills for activities that are particular to a career in finance. Although Bloomberg terminals promote the practice of industry's 'know how', it also facilitates the application of conceptual knowledge (linking theory with real-world scenarios) as well as expanding students' dispositional knowledge via in increased interest and a sense of belonging as a finance professional.

Experiential learning has been found to be one of the preferred learning activities in finance and economics as it allows instructors to place more emphasis on student's integration of content knowledge with real life activities that require 'knowing' and 'doing'. The Experiential Learning Theory (ELT) model proposes that knowledge is built by combining the method of *grasping experience* – Concrete Experience (CE) and Abstract Conceptualisation (AC), with that of *transforming experience* – Reflective Observation (RO) and Active Experimentation (AE) (Kolb and Kolb, 2005). Thus, an experiential learning event is created where the student applies and adapts these four modes - experiencing, reflecting, thinking and acting - to the learning context and situation at hand. Practical problem-solving tasks using live Bloomberg data not only places the student at the centre of learning process but also increases engagement with the course content and stimulates curiosity to learn more about the Bloomberg interface which ultimately enhances overall finance knowledge (Coe, 2007). The next section provides a review of empirical studies investigating the adoption of Bloomberg terminals in higher education, highlighting the challenges and benefits faced by instructors and students alike.

Literature Review

Utilisation of Bloomberg terminals in commerce degrees develops students analytical and problem-solving abilities in classes and better prepares them for work as the platform is used by world leading banks, corporations and government agencies. The adoption of Bloomberg interface in finance courses has seen a significant growth in the late 2000's with 382 institutions reporting 868 Bloomberg terminals being used in various trading labs (Scott, 2010). By 2014, academic institutions employed more than 6,000 Bloomberg terminals (Athavale, Edwards & Kemper, 2016). According to Ottaviano (2014), about 700 academic institutions around the globe subscribe to Bloomberg. Griffith University has 24 terminals across two campuses, and is one of a handful of Australian universities to adopt the technology.

The ultimate goal of business education including finance is to prepare students to gain employment and be successful in their profession. While traditional teaching methodologies lay crucial foundation for this by stressing the importance of knowledge, the modern trend highlights the importance of practical skills in improving student outcomes. University trading rooms and Bloomberg terminals are instrumental in emphasising this practical component. Siam (2005) focuses on the role of the trading rooms in developing technical, personal, interpersonal, and broad industry competencies of students. Although admitting the challenge of fitting some of these activities in a crowded business curriculum, the author asserts that trading rooms have the capacity to enhance the curriculum, provide the linkage to business community and supply in-house training. Siam (2005) draws analogy between the role of trading rooms in developing practical competencies of students and air force cockpit flight simulators in the development of flying skills for pilots. More importantly trading room activities link curriculums together by allowing students to apply various theoretical concepts learned across several courses into overarching projects or themes core to a program. For example, at Griffith University, the Student Managed Investment

Fund builds on knowledge and technical skills acquired when students complete Investment Analysis and Portfolio Management courses by using Bloomberg terminals as a platform for integration.

Despite its importance as a source of business information, the use of Bloomberg terminals by students may not be widespread for various reasons including difficulty with navigation, lack of motivation as its use is not an assessable, or lack of educator knowledge or motivation. Therefore, it is imperative that academic institutions offer users the support they need to effectively use the resource (Ottaviano, 2014). A project by Payette and Libertella (2012) at Adelphi University aimed to quantify some of these issues. Students in the Adelphi University finance capstone course were required to select a publicly traded company and write a report about it using Bloomberg terminals. Students were given no formal training on how to use the Bloomberg system and were free to play around with the Bloomberg system to learn as much as they could about a company they selected. A survey conducted on how the students found Bloomberg after the project showed that 22% of students found Bloomberg "somewhat hard to use" and another 46% "reasonable to use," while less than a third found it easy or very easy to use (Payette & Libertella, 2012). In that same study, 42% of students said getting used to the software is the biggest problem (Payette & Libertella, 2012). Although the Bloomberg Market Concepts available on the terminals is a good resource for familiarisation with its functions and capabilities, perhaps a variety of support measures are needed to ensure more engagement for users.

While more support is needed for students, resources available to educators are growing as evidenced by the 'Syllabus Integrations' of 100 institutions on the Universities: Bloomberg for Education website[1], and the annual Bloomberg educators conference. Recent studies such as Lei and Li (2013), Athavale et al. (2016) and Sharma (2015) demonstrate the integration of Bloomberg into the classroom. Lei and Li (2013) illustrate the use of Bloomberg terminals in a 'Security Analysis and Portfolio Management' course and identify the key Bloomberg functions which could be used as a handout for students. In a similar vein, Athavale et al. (2016) show how Bloomberg terminals could be incorporated in two consecutive courses based on their experience of integrating Bloomberg resources into the curriculum at Ball State University. The authors followed a step-by-step approach by gradually introducing different facets of Bloomberg Professional Service (BPS) over 10 increasingly complex assignments starting with 'Basic Financial Analysis' and ending with 'Equity Screening'. Therefore, after completing the two courses the students learned not only the main theoretical investment concepts, but also become familiar with the application of those concepts through the investment related information available in the Bloomberg terminals.

Sharma (2015) focuses on the challenges of using trading rooms, to maintain effective and intensive use of such facilities, as well as ensure deployment of suitably trained and motivated academic staff. Appropriate staff training, take-up issues, technological aversion and skills mismatch amongst faculty can act as barriers to effective use of Bloomberg terminals. However, Sharma (2015) notes that with an appropriate staff recruitment and skills development strategy, universities should be able to facilitate more valuable use of such resources. Furthermore, academic management may consider motivating and incentivising faculty through adjustments to academic workloads when new material is being designed or new skills are being acquired. It is also noted that without an acknowledgement of the time and resource constraints involved, there is a tendency on the part of instructors to defer the use of these resources mainly on account of time limitations (Sharma, 2015).

[1] https://www.bloomberg.com/professional/expertise/universities/

This study builds on the work of Sharma (2015), Payette and Libertella (2012) and Athavale et al. (2016) to take stock of the extent of student and educator engagement with Bloomberg at Griffith University. Mapping the use of Bloomberg across the curriculum is performed at the course and program level followed by the development of more support resources for users. Student's awareness of the benefits of skills developed by Bloomberg use is evaluated, and recommendations on how to overcome the barriers to integration identified by staff and students are provided.

Methodology and Results

This project aims to quantify the use of Bloomberg across the Finance curriculum, develop a number of support resources for staff and students, and measure its perceived role in improving graduate outcomes. As Griffith University is one of few Australian universities with 24 Bloomberg terminals this project is highly aligned with the University's strategic objectives in learning and teaching. In particular, it supports strategic change to 'ensure that academic programs are attractive to students, have relevant content, are flexibly delivered, and aligned with workforce needs' (S1.1 of the *Academic Plan 2013-2017: Transforming the Student Experience*) and 'assessment will focus on "authentic" tasks that reflect those students will encounter in the workplace' (*Academic Plan 2017-2020: A Remarkable Student Experience*). The methods and findings are presented in the four areas of investigation below.

Mapping Bloomberg across the curriculum

Evaluating the integration of Bloomberg into finance courses three years after installation is important to detect barriers to use and consider corrective action. We hypothesise that deficient engagement may be because of a lack of staff familiarity with Bloomberg technology, a lack of understanding of how it can be integrated into coursework, or difficulties with access due to timetabling. In addition, for courses that are taught online, teaching staff may view it as impractical to reference Bloomberg technology when students can only use the terminals on campus. The availability on campus only is an issue of increasing importance, as an increasing number of courses are offered online as well. As Griffith University has purchased the 'University Package', this level of subscription does not offer remote access, but does allow unlimited logins to be created for the on-campus students, an important trade-off. 'Bloomberg Anywhere' is also not ideal as it only allows one person to access the Bloomberg terminal remotely. By mapping the current integration of Bloomberg technology into content materials and assessment items, we can identify courses where Bloomberg is under-utilised and focus corrective action if applicable.

Eleven educators were asked a number of questions regarding the use of Bloomberg within their courses, including rating the level of engagement, rating their own level of expertise, barriers to use and need for support. Table 1 provides an overview of the integration of Bloomberg into the undergraduate 'Bachelor of Commerce with a Major in Finance' degree and the postgraduate 'Master of Finance' degree, respectively.

Table 1

Educators rating of Bloomberg integration in undergraduate finance courses

Course Code	Course Name	Level of Inclusion
Bachelor of Commerce- Major in Finance		
1203AFE	Money, Banking and Finance	Medium
2201AFE	Corporate Finance	High
2204AFE	Financial Institutions Management	None
2206AFE	Investment Analysis and Management	High
2214AFE	Derivatives Securities	High
3208AFE	Portfolio Management	High
3210AFE	Advanced Corporate Finance	High
3213AFE	Credit and Lending	High
3217AFE	Student Investment Fund	High
Master of Finance		
7211AFE	Corporate Finance	None
7223AFE	Financial Markets	None
7232AFE	Investments	High
7251AFE	Applied Finance	High
7242AFE	Equity Markets	High
7243AFE	Fixed Income Investments	High
7244AFE	Derivatives and Risk Management	High
7245AFE	Portfolio Management	High
7246AFE	Behavioural Finance and Wealth Management	None
7247AFE	Ethics and Alternative Investments	High

Responses showed that there are four finance courses that do not reference the Bloomberg terminals, one in the undergraduate and three in the postgraduate program. For those that do, all but one integrates Bloomberg into an assessment item, and therefore have 'high' levels of inclusion. It seems appropriate that the first-year course in the undergraduate program has a 'low' level of inclusion whereby Bloomberg information is portrayed via screenshots in the lecture content materials. That Bloomberg is integrated so heavily into the postgraduate program is somewhat surprising given these courses are taught online as well as on campus, and students do not have access to it online, but these convenors advise that alternative information sources like Yahoo finance are also used.

The curriculum mapping demonstrates that students are provided with a range of activities to undertake using Bloomberg, with increasing levels of difficulty as they progress through the degree. For example, in the first year of the undergraduate degree, students are introduced to information panels on the cash rate, debt and equity securities and general market information. In the second year, there are assessment tasks that involve downloading data to compute beta and expected returns for CAPM, equity valuations, derivatives contracts, hedging decisions, portfolio optimisation and information on indices and economic indicators. In third year courses, tasks are extended to develop a 'buy/hold/sell' recommendation report for a particular company. The postgraduate program utilises Bloomberg data for the same tasks as the undergraduate program, but higher-level extensions include bond valuations, interest rate sensitivity, credit analysis, back-

testing portfolios, and risk/return analysis with alternative investments. There is potential to extend these activities to testing and developing theory and mastering seminal works by Tobin, Modigliani, Miller, Markowitz, Sharpe, Scholes, Merton, Fama, Hansen and Shiller (Johnson, 2014). For example, students could back-test concepts such as weak, semi-strong and strong efficient markets and well-known anomalies like the Monday and January Effect. Johnson (2014) also suggests that students achieve 'intellectual depth' when they are able to relate theory to the real world, such as exploring growth in indices and economies over time.

Where it was omitted, educators indicated a lower level of confidence with Bloomberg, and considered it an unnecessary addition in their course. They revealed that teaching online and the time needed to revise content and assessment, as well as accessibility to the trading room were some of the barriers to use. However, they did indicate that if more support were available they would be more likely to integrate Bloomberg in their course content. One person admitted not to have given it any thought before, but with reflection believed it would be useful for some parts of the course. Most staff were comfortable with their level of expertise on Bloomberg, but all indicated that more training and support resources would be beneficial.

Support resources

The second phase of the study was to provide training opportunities and to develop resources for staff and students. Two half-day training sessions were held during the year, one at each campus. The workshops were attended by three faculty staff and seven contract staff. The agenda ranged from general familiarisation to opportunities for participants to have one-on-one instruction by the three senior student trainers. The responses on the feedback form indicated that participants had varying levels of confidence with the terminals, and those that had higher levels of confidence had specific topic areas they wanted instruction on. Particular interest was shown for the portfolio management and optimisation tools, which the current subscription didn't allow access to. Some contract staff indicated wanting to learn more about sourcing data on Bloomberg for research. More needs to be done to understand the low workshop participation rate considering all staff indicated that more training and support would be beneficial.

Instructional videos were developed as additional support resources for both educators and students. A total of 16 three-minute videos with 'cheat sheets' were developed, stored in a central location and linked to each course site in the finance curriculum. The list of topics are provided in Table 2 below, along with the viewing statistics. Students sought information on Making an Account, using the Interface, Exporting Data and accessing Economic Data the most. The least utilised were specialist topics like Foreign Exchange and Charting and Reporting. While not directly comparable (as one person may view videos multiple times), some context is provided by the number of active users on the Bloomberg terminals (i.e. logged in over the past 90 days). As at the end of October 2018, 288 users were active across the two Trading Room sites. The viewing statistics suggest that a good proportion of users are accessing the videos to assist navigating through the terminals.

Table 2
Bloomberg Instructional Videos

No.	Name	No. of Views (Trimester 2, 2018)
1	Making an Account	164
2	Interface	92
3	Keyboard	62
4	Exporting Data	94
5	Economic Data	89
6	Economic Indicators	65
7	News and Research	39
8	Foreign Exchange	21
9	FX Charting	26
10	Fixed Income	29
11	Comparative Returns	41
12	Company Analysis	59
13	Charting and Reporting	19
14	Company Overview	26
15	Cost of Capital	48
16	Earnings and Estimates	37

The Bloomberg instructional videos were also evaluated by adding an additional question to student evaluation of course (SEC) surveys administered by the university at the end of each teaching term: 'The Bloomberg terminals and other Bloomberg components in this course assisted my learning'. Students responded on a 5-point Likert scale that ranges from Strongly Agree through to Strongly Disagree and awarded an overall score out of 5. Seven courses incorporated the question, with scores ranging from 3.1 for the first-year course with low level references to Bloomberg, to 4.8 for a postgraduate course with Bloomberg integrated into assessment and activities. This question elicited a few comments from first year finance students that they wished they had more contact with the Bloomberg terminals and thought it was a great resource. Second year students responded that the amount of access to Bloomberg and the amount of resources for Bloomberg was a particularly good feature of the course. There was some negative sentiment as to accessibility of the trading rooms and lack of educator support. A summary of responses for each course at the two Gold Coast (GC) and Nathan (NA) campuses is provided in Table 3.

Generic skill awareness

The final phase of the study was to evaluate student's awareness of the benefits of skills developed as a result of Bloomberg use. Prima facie, the application of Bloomberg technology that educators described in phase one are authentic to the finance industry and help develop skills that employers' value. However, educators may not convey this information well and students may not make this connection on their own. The study surveyed 101 finance students to determine their views on skill development, both their self-rating and their perceptions of the university's role. The survey used a 5-point Likert scale on a wide range of skills previously utilised in West, Johnson & Webb (2019).

Table 3
Responses to Additional SEC Question, end of Trimester 2, 2018

Course Code	Course Name	Response Score	Select Comments
1203AFE	Money, Banking and Finance (GC)	3.1	I didn't use the terminals however as an assessment for the future maybe consider the Bloomberg Market Concepts Quiz? - This is a great tool for students to learn the system.
1203AFE	Money, Banking and Finance (NA)	3.6	Access to Bloomberg Terminal was extremely helpful and enlightening. The ability to access Bloomberg was great, however, sadly given work and family commitments as a mature learner, I didn't have enough time to capitalise on this. That being said, even though I didn't fully utilise it, it was still fantastic to have. I wish maybe that the tutorial could be more engaging or that the Bloomberg terminals could provide with more relevance or integration throughout the course.
2206AFE	Investment Analysis and Management (GC)	3.7	The amount of access to resources (Bloomberg and the staff there providing help) Getting to use the Bloomberg terminals.
2206AFE	Investment Analysis and Management (NA)	4.3	Teach how to use Bloomberg, don't just make it a claim in the assessment to use it as a source.
3208AFE	Portfolio Management (GC)	4.4	The practical aspects such as the use of Bloomberg terminals was particularly useful in helping me learn and develop my skills.
3208AFE	Portfolio Management (NA)	4.0	Have the Bloomberg terminals open more as a lot of time I went to use it was closed.
7247AFE	Ethics and Alternative Investments (NA)	4.8	Bloomberg, Alternative Investment modules were interesting and we were engaged as a class to participate and contribute.

Table 4 provides descriptive statistics of the 57 respondents, a participation rate of 56%. The majority of respondents are aged 18 to 21 (52.6%), are male (57.9%), not of Aboriginal or Torres Strait Islander descent (96.5%) and speak English as a first language (75.4%). Regarding

education, most respondents are studying a degree (50%), have longer than 12 months to complete their program (41.1%), are in their second year (35.1%) and are employed part-time or on a casual basis (55.54%). There is a smaller cohort completing a graduate program (28.6% Graduate Diploma or certificate and 5.4% Masters) and are employed full-time (14.3%). The average GPA for all respondents is 5.28 (out of a scale of 7, with 7 being the highest and a passing grade of 4).

Table 4
Descriptive Statistics of Student Survey

Age		**Educational Attainment**	
<18	1.8%	Masters	5.4%
18-21	52.6%	Graduate Diploma or Graduate Certificate	28.6%
22-25	29.8%	Bachelor's degree	50.0%
26-35	10.5%	Other (please specify)	16.1%
36-45	5.3%	GPA	5.28
46-55	0.0%	Time until study completed	
56-65	0.0%	In the next 6 months	28.6%
over 65	0.0%	In the next 12 months	30.4%
Gender		Longer than 12 months	41.1%
Female	42.1%	Level of study	
Male	57.9%	First year student	17.5%
X Indeterminate/Intersex/ Unspecified	0.0%	Second year student	35.1%
Identification as Aboriginal or Torres Strait Islander		Third year student	29.8%
Yes, Aboriginal Australian	3.5%	Fourth year student	14.0%
Yes, Torres Strait Islander Australian	0.0%	Other (please specify)	3.5%
Yes, both Aboriginal and Torres Strait Islander Australian	0.0%	Employment Status	
No	96.5%	Employed full-time	14.3%
Language Other Than English		Employed part-time or casually	55.4%
Yes	24.6%	Not currently employed	30.4%
No	75.4%		

Table 5 shows that students rate their level of engagement with the Bloomberg terminals as 'medium' (42.1%), and primarily use Bloomberg to complete assessment tasks (66.7%) followed by course work (19.3%). Regarding resources, 63.2% of respondents say they felt supported and adequately trained, while 36.8% do not. Not surprisingly, students that were further along in their study program, i.e. third and fourth years, were more likely to respond positively to this question. More than half of respondents (54.4%) found the instructional videos useful, while students from differing year levels responded that they hadn't yet accessed the resources. Comments were much along the themes already presented, i.e. students would like more access and personalised

instruction earlier in their program. Topics that were flagged for future training included Foreign Exchange (46.4%), Economic Data (46.4%), Economic Indicators (44.6%) and Comparative Returns (37.5%).

Table 5
Student Engagement with Bloomberg Terminals

Level of Engagement with Bloomberg terminals		**Feeling supported and adequately trained on Bloomberg terminals**	
Very High	12.3%	Yes	63.2%
High	10.5%	No	36.8%
Medium	42.1%	Topics for further training	
Low	26.3%	None, I am satisfied with my current training.	8.9%
Very Low	8.8%	Making an account	12.5%
Other (please specify)	0.0%	Using the interface	33.9%
Primary use of Bloomberg terminals		Using the keyboard	35.7%
Course work	19.3%	Exporting data	33.9%
Assignments	66.7%	Economic data	46.4%
Extra-curricular	8.8%	Economic indicators	44.6%
None	5.3%	News and Research	33.9%
Other (please specify)	0.0%	Foreign Exchange	46.4%
Usefulness of instructional videos and 'cheat sheets'		FX Charting	32.1%
I haven't accessed the instructional videos or 'cheat sheets'	42.1%	Fixed Income	23.2%
Yes, the instructional videos and 'cheat sheets' were useful	54.4%	Comparative Returns	37.5%
No, I did not find these instructional videos and 'cheat sheets' useful	3.5%		

Finally, respondents provide a self-assessment of their level of skills and attributes, as well as an assessment of their perception of the role that University plays in skill development. Figure 1 provides the weighted average of each of these responses. On average, students rate themselves medium (3) to high (4) for all skills and attributes. They rate their skill level particularly high (above 4) for being able to use technology, being a team player, being a life-long learner, critical thinking, analysing information and problem solving. Respondents don't believe that the University plays an important role in developing the first three skills mentioned, but the gap is smaller for the others. They assign low ratings (below 3.7) to interpersonal, leadership and enterprising skills. Interestingly, presentation skills are the only attribute that respondents feel the

university has a role to develop that is above their current level of ability. Subsequently, these respondents identify a gap in skill development activities, and arguably taking initiative, leadership and entrepreneurship are skills highly valued in many industries including finance. In reference to Bloomberg, it is reassuring that the finance major respondents indicate they are confident with being able to use technology, analysing information and problem solving.

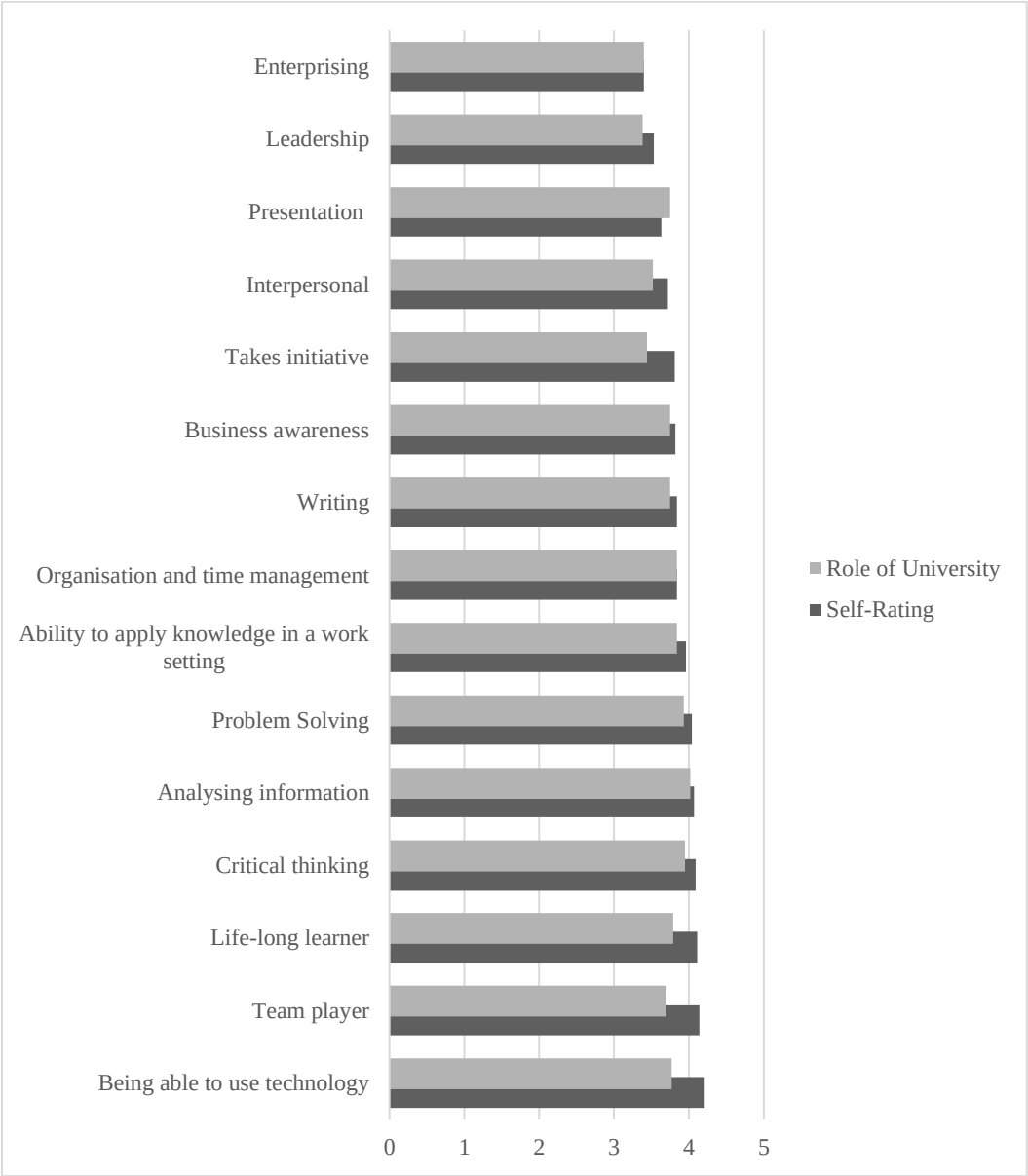

Figure 1. Self-Rating and the Role of the University in Level of Skills and Attributes.

Recommendations

In this paper we have presented evidence on the integration of Bloomberg as a work integrated learning on-campus activity. The findings are relevant to other institutions that are looking to maximise their return on investment for similar initiatives, albeit Bloomberg, specialist software

or WIL activity to assist students with work-readiness. We make the following observations and recommendations based on the three phases of our study:

Mapping Bloomberg across the curriculum

We find that, three years after installation, Bloomberg is widely used across the finance curriculum. Existing uses are notionally highly relevant to industry, and an opportunity for future research is to confirm this assertion via industry survey. Extensions to current utilisation could include testing finance theories and seminal works, including concepts such as weak, semi-strong and strong efficient markets and well-known anomalies like the Monday and January Effect. Gaps in Bloomberg integration are primarily due to educator confidence and knowledge. Thus, more professional development opportunities are needed.

Support resources

The group training sessions provided received positive feedback but relatively low attendance. One-on-one scheduled sessions may prove more beneficial to targeted educators than the group training sessions. Initial feedback from students on the instructional videos was positive. Students' feedback focused on issues with accessing the trading rooms, and scaffolding the assessment into activities that relate to relevant corresponding tasks in Bloomberg. This is both an issue for educators and for resource development that requires attention. A recommendation is to develop instructional Bloomberg videos tailored to provide key step by step guides for each assessment item or course. Providing online students with Bloomberg experience continues to be challenging.

Generic skill awareness

The student survey of generic skills showed that student's rate most of their skills in the moderate to high range but show more dispersed view of skills that the University does well to develop and those that it doesn't. Importantly, students identify that more should be done to develop taking initiative, enterprising and leadership skills. These are arguably key skills for finance professionals. It was reassuring to note that the respondents to this survey were confident with their skill levels in technology, analysing information and problem solving.

In summary, this project provides useful feedback on the integration of Bloomberg throughout the finance major and identifies areas for improvement, namely more in-depth and intellectual use of Bloomberg, more training opportunities for staff, and providing students with a variety of assessment items and tasks to develop key skills to enable work-readiness. The findings should be interpreted with the limitations of the study in mind, that is, that analysis of student engagement and usage with the Bloomberg terminals and the resources were evaluated at a point in time, instead of over multiple time periods. A detailed analysis of usage within teaching periods, particularly around assessment due dates would be beneficial for educators and is a topic for future research.

References

Atchison, M., Pollock, S., Reeders, E., & Rizzetti, J. (2002). *Work-integrated Learning Paper*. Melbourne: RMIT University.

Athavale, M., Edwards, J., & Kemper, K. J. (2016). Bloomberg 201: From Wall Street to University Avenue. *Advances in Financial Education*, 34-50.

Bates, M. (2011). Work-integrated Learning Workloads: The Realities and Responsibilities. *Asia-Pacific Journal of Cooperative Education*, 12(2), 111-124.

Billett, S. (2009). Realising the Educational Worth of Integrating Work Experiences in Higher Education. *Studies in Higher Education*, 34(7), 827-843. http://dx.doi.org/10.1080/03075070802706561

Coe, T. (2007). Using the Bloomberg Professional System for Finance Classes. *Journal of Financial Education* 33, 48-62.

Crebert, G., Bates, M., Bell, B., Patrick, C.J., & Cragnolini, V. (2004). Developing Generic Skills at University, during Work Placement and in Employment: Graduates' Perceptions. *Higher Education Research and Development*, 23(2), 147-165. http://dx.doi.org/10.1080/0729436042000206636

Gardner, P. D., & Liu, W.-Y. (1997). Prepared to Perform? Employers Rate Work Force Readiness of New Grads. *Journal of Career Planning and Employment*, 57(32-35), 52-56.

Hernandez-March, J., del Peso, M., & Leguey, S. (2009). Graduates' Skills and Higher Education: The Employers' Perspective. *Tertiary Education and Management*, 15(1), 1-16. http://dx.doi.org/10.1080/13583880802699978

Jackling, B., & De Lange, P. (2009). Do Accounting Graduates' Skills Meet the Expectations of Employers? A Matter of Convergence and Divergence. *Accounting Education*, 18(4/5), 369-385. http://dx.doi.org/10.1080/09639280902719341

Johnson, R.S. (2014). Equity Markets and Portfolio Analysis, Bloomberg Financial Series, John Wiley & Sons: New Jersey.

Kavanagh, M., & Drennan, L. (2008). What Skills and Attributes does an Accounting Graduate Need? Evidence from Student Perceptions and Employer Expectations. *Accounting and Finance*, 48, 279-300. http://dx.doi.org/10.1111/j.1467-629X.2007.00245.x

Kolb, A. & Kolb, D. (2005). Learning styles and learning spaces: enhancing experiential learning in higher education. *Academy of Management Learning & Education*, 4(2), 193-212. http://dx.doi.org/10.5465/amle.2005.17268566

Lei, A. Y., & Li, H. (2013). Using Bloomberg Terminals in a security analysis and portfolio management course. SSRN. http://dx.doi.org/10.2139/ssrn.1999066

Ottaviano, T. (2014). Bloomberg instruction in academic libraries: The boons and the challenges. *Public Services Quarterly, 10*(2), 169-175. http://dx.doi.org/10.1080/15228959.2014.904215

Payette, D. L., & Libertella, A. F. (2012). Capstone Course Innovation: Bloomberg Professional Service. *American Journal of Business Education, 5*(3), 311-318. http://dx.doi.org/10.19030/ajbe.v5i3.7002

Scott, R. H. (2010). Bloomberg 101. *Journal of Financial Education*, 80-88.

Sharma, A. (2015). Use of Bloomberg Professional in support of finance and economics teaching. *Cogent Economics & Finance, 3*(1), 1115618. http://dx.doi.org/10.1080/23322039.2015.1115618

Siam, J. J. (2005). University trading centres and their role in business education. *Journal of Financial Education*, 1-23.

Smith, C., & Worsfold, K. (2013). WIL Curriculum Design and Student Learning: A Structural Model of their Effects on Student Satisfaction. *Studies in Higher Education*, 39(6), 1070-1084. http://dx.doi.org/10.1080/03075079.2013.777407

Weisz, M., & Smith, S. (2005). Critical Changes for Successful Cooperative Education. Paper presented at the Paper presented at 'Higher Education in a Changing World', Proceedings of the 28th HERDSA Annual Conference, Sydney, Australia.

West, T., Johnson, D. and Webb, A. (2019). "Career Outcomes of Financial Planning Students", *Financial Planning Research Journal*, 2019, Vol. 5, No 1, pp 82-110.

Teaching Strategies for an Introductory Finance Course in the Current Business/COVID-19 Environment

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Teaching finance courses today offers a set of unique new challenges. While most finance concepts have almost remained unchanged, the business environment in which these concepts are applied has changed significantly. These changes include the growing impact of social media, higher customer preference for environmentally friendly products, rising shareholder activism, intensified firm-level political and social activism, different learning style of students, and the recent issues caused by the COVID-19 pandemic. In this paper, we provide an innovative pedagogical approach to teach an introductory undergraduate finance course that addresses the challenges posed by these changes, and we suggest several strategies to enhance student learning. Specifically, we discuss how to effectively educate students during and post COVID-19. Our recommendations in this paper can easily be adapted to teaching other business courses and can satisfy some of the requirements for the new Association to Advance Collegiate Schools of Business (AACSB) standards.

Keywords: Corporate Sustainability, Corporate Finance, New Business and Covid-19 Environment, Innovative Pedagogy

Introduction

The emerging dynamics of differences in learning styles coupled by a new business environment suggest multi-dimensional teaching strategies (Bhagat, Vyas, & Singh, 2015). Instructors teaching finance courses are increasingly facing a new set of teaching-related challenges. Even though most finance concepts have remained relatively unchanged, the current business environment has changed substantially. In addition, the current generation of students seems to learn differently given their reliance on social media news outlets and higher awareness of their social responsibilities (Digital Marketing Institute, 2019; eCampus News, 2017; Spaces4earning, 2020; Swain and Cao, 2019). In this paper, we present a set of teaching strategies for an introductory undergraduate finance course that accommodates changes in the current business environment. These changes include the dramatic advancements in technology and information availability, the growing impact of social media on student learning, a swelling customer base passionate about buying people/planet friendly products, increasing stakeholder activism, growing political/social activism by firms, and the new issues caused by the COVID-19

pandemic. Considering the global impact of the pandemic on universities worldwide, we also propose several viable approaches to implement our suggested strategies during and after COVID-19 disappears.

The paper is organized as follows. In the next section, we briefly present the business environmental changes that might influence teaching strategies in finance. We then use an introductory finance textbook to provide innovative teaching strategies necessitated by the changing business environment and the pandemic. In the subsequent section we emphasize how the pandemic has induced changes to the teaching methodology for an introductory finance course. The final section contains suggestions for further research and concluding remarks.

Changes in the Business Environment

The business environment in which a typical corporate firm operates has changed considerably over the past few decades (Padmanabhan & Swain, 2020). For example, social media furor over the forced removal of a passenger from a flight (Zdanowicz & Grinberg, 2018) and one Adidas ad related to the Boston Marathon massacre being broadcast over social media presumably cost the affected firms loss of future revenues. Several other similar examples are documented in the literature (Stabler & Fischer, 2020).

Stakeholder activism related to political, social, and environmental issues causes concern for firms, especially when forced to take sides. For instance, the Hallmark Channel found itself in a difficult situation (Vranica, 2019) when its broadcast same-sex ads received complaints from viewers with stances on both sides of the issue. In general, firm management in public entities must deal with shareholders who carry differing political/social views when investing in projects. Firms also take purposeful and visible stances on sensitive social/political issues that can affect its future revenues. Nike's ad using former San Francisco 49er Colin Kaepernick's kneeling protest when the US national anthem was played and Red Hen's stance protesting the visit by a member of the White House staff may have negatively affected firm revenues. Alternatively stated, are firm management teams maximizing common shareholder wealth by following such strategies when shareholders' views on what constitutes an optimal firm investment strategy differ?

Lately, consumers' demand for environmentally friendly products and their preference for companies that adhere to their social stances are on the rise (Darnall, Ponting, & Diego, 2012). In reaction, firms adopting green technologies face costs higher than conventional technologies, although these costs have been decreasing over time (Anthony, Majid, & Romli, 2017; Padmanabhan, Zhang, & Huang, 2018a, 2020; Wicky & Hansen, 2019). On the hiring front, firms face a labor force passionate about these issues. Goldberg (2020) suggests that recent college graduates have soured on tech jobs that they perceive as falling short on ethics. Firms must balance possible higher hiring costs and adoption of costly green technologies against a nontrivial loss of future revenues if they do not make these investments.

The emergence of COVID-19 has caused new problems for individuals, firms, and governments. Firms facing revenue losses under COVID-19 have been forced to revise their operational, marketing, and procurement strategies induced by truncated global supply chains (Zhang, Padmanabhan, & Huang, 2020). Yet, COVID-19 has not lessened the need to focus on other factors impacting revenues.

Additionally, firms have been urged by academics and the popular press to accommodate multiple goals (that consider the welfare of all stakeholders and the society) when making business decisions and not focus solely on maximizing common shareholder wealth (Portland Business

Journal, 2017). Academics assert that firms with better Environmental, Social, and Governance (ESG) performance enjoy higher operating performance, efficiency, and firm value (Gillan, Hartzel, Koch, & Starks, 2010). In contrast, opponents of the multiple goals approach rightfully inquire how firms should deal with conflicts generated by focusing on diverse objectives. A Harvard Business Review article suggests that the focus on profits emanates from Milton Friedman's work and is driven in part by the perception during the 1970s that low quality/high priced environmental products and socially responsible investing delivered low returns (Whelan & Fink, 2016). However, the article also argues that conventional wisdom has now been replaced by a focus that sustainability can generate cost reductions and deliver better firm performance. Thus, considering the needs of multiple stakeholders is in alignment with the traditional goal of maximizing common shareholder wealth (Smith, 2003).

Firms have changed their business models in reaction to the changing business environment created by environmental, social, technological, and social media pressures by offering new products. For example, General Motors and Ford are now also manufacturing ventilators (Root, 2020), changing their procurement, hiring, marketing, product delivery, and information flow strategies. While these changes attempt to preserve future revenues, they signal companies' status as good corporate citizens. To this end, firms present their performance along the Triple Bottom Line (TBL) of "planet, people, and profits" and their performance using the "balanced scorecard", and stakeholders use this information to judge the firm's *overall* performance. Extant academic research (Cowan, Padmanabhan, & Wang, 2015, 2016; Kaplan & Norton, 1996; Kim, Surroca, & Tribo, 2014; Lai, Wu, & Wong, 2013; Swain & Cao, 2014; Swain, 2018; Teng, Wu, & Chou, 2013) indicates that such strategies generally reward firms with future financial benefits.

Finally, colleges and universities have also not been immune to these forces. Indeed, while online education was already providing strong competition to in-person education, COVID-19 has hastened the transition to an online learning environment. In addition, universities are struggling to survive in the current COVID-19 context (Times Higher Education, 2020) and are seeking strategies to remain relevant in the future given business environment changes and a student body that learns differently from earlier generations. Using the introductory finance course, we provide some strategies on how to better train students to become future strategists and business leaders.

Teaching Strategies in an Introductory Finance Course

Typically, all business majors enroll in an introductory course in finance where they are first introduced to finance concepts. Since this course is taken early in a student's program, instructors must ensure that the core finance knowledge is retained throughout the student's college years and beyond.

In this paper, we provide a brief lesson plan to teach an introductory undergraduate finance course in the current business/covid-19 environment. We use a textbook to first outline the different elements covered in a traditional course and then discuss how changes to the business environment can be combined with different student learning styles to successfully enrich student-learning experiences. We first provide a brief outline of the areas covered in an introductory finance textbook and then present teaching strategies/lesson plans for areas that are critically impacted by changes in the business environment and differences in student learning styles. Briefly stated, an introductory finance textbook (e.g., Ross, Westerfield, & Jordan, 2020) covers the following topics (an asterisk "*" denotes the areas covered in this paper).

1. A short coverage of accounting concepts, business structures, balance sheet, income statement, statement of changes in cash flows, the progressive corporate taxation system, and agency theory.
2. The objective of the firm*
3. The time value of money concepts*
4. Valuation of bonds and stocks
5. Investment selection criteria and real options *
6. Risk and return in finance*
7. Capital budgeting *
8. Working capital management
9. International Corporate Finance

The Objective of the Firm

In our view, this is the most important section and therefore its proper treatment will define the extent to which we efficiently connect pedagogically with students throughout the course. For instance, understanding the objective of the firm is critical to understanding how to develop future expected cash flows and the project selection criteria. Indeed, operationalization of all finance functions within a firm relies on a clear definition of the objective of the firm. Hence, appropriate coverage of this section is critically important to link subsequent concepts together and to maintain high students' interest in course lessons.

In an introductory finance textbook, the first chapters usually deal with the accounting basics followed by a list of possible objectives of the firm. After briefly reviewing basic accounting concepts, we discuss business environmental related changes (documented earlier but restated here as shareholder activism, social media, customers preferring environmentally friendly products, and the COVID-19 virus) and introduce the relevance of the old objective of the corporate public firm (or any public or private firm, although sole proprietorships and partnerships arguably face different issues). These adjustments to teaching strategies and lesson plans can help students better understand the current business landscape and become well prepared for future finance and business careers.

We believe one of the first lessons that should be taught in an introductory finance course is the need by firm management to focus on one objective: maximizing the current price of common shares (Padmanabhan, 2019). We note that the multiple goals and aspects discussed in Section 2 align well with the main objective of the firm. Students will then invariably ask: should the other stakeholders be ignored at the expense of corporate profits? At this time, we emphasize that in today's world firms cannot maximize common shareholder wealth unless they devise strategies that consider the interests of all stakeholders. To emphasize our points, we introduce anecdotal evidence of firms that do (and do not) advertise their compliance related to issues that stakeholders care about as well as the reported ethical failures. Presentation of anecdotal evidence is important since students relate better to real world examples, and it certainly helps drive home the concepts. This discussion then concludes by restating that the firm's objective remains the same even in the new business environment – maximizing owners' current wealth is akin to maximizing the current market price of common stock.

Nonetheless, care must be taken to ensure that students absorb these lessons and use them later. From a pedagogical perspective, the challenge for the finance instructor is to effectively communicate this objective to the skeptical student who believes that social and environmental

issues, rather than monetary profits, should be of elevated concern to firm management. A logical question to ask then is, how can management maximize an objective that it cannot generally directly control? Once the textbook introduces the "investment selection criteria" in a later chapter, the discussion will focus on what this objective practically means to firm management. The operational impact of this objective is for management to select the best projects at the lowest possible cost. This strategy requires managers to predict future expected cash flows and compute the Net Present Value (Present Value of Cash Inflows – Present Value of Cash Outflows associated with the project) of each project. Clearly, owners expect management to use their expertise to predict project related cash flows and select the best projects. In fact, Stout (2012) argues that only firm managers (and not common shareholders) should have the sole right to make firm decisions. However, to refute this point we communicate to students that common shareholders oversight over management activities remains critically important.

Although well presented in finance textbooks, we note that students fail to embrace the fact that a firm's objective is tied to its future cash flow projections. The modern students, comprised mostly of millennials to Gen Z students, passionately worry more about social/environmental issues (Space4learning, 2020). Reviewing popular finance textbooks, there seems to be a disconnect between the examples cited in textbooks and on how the corporate firm is supposed to deal with these issues while remaining focused on maximizing shareholder wealth (a financial objective). Students erroneously conclude that if the firm is maximizing common shareholder wealth, they are not taking care of the people and/or the planet. We spend enough time in class to discuss and share examples to convince students that the multiple goals are not at odds with each other. In addition, we spend sufficient time to outline how markets have changed and how firms address these issues, making strategic changes and presenting performance results using the balanced scorecard/TBL. Our experience indicates that modern students are better able to absorb remaining finance concepts when they understand that a focus on financial profits is consistent with actions on social and environmental issues.

Time Value of Money Concepts

Usually there are at least two chapters in introductory finance textbooks covering the time value of money concepts. Non-finance majors' exposure to finance concepts generally occurs in this introductory class, and hence we must ensure that students retain these concepts well after the course has concluded.

We do not believe that the changed business environment has affected the process of coverage of these basic (yet very important) concepts in an introductory finance course. We start by emphasizing the practical importance of mastery over Excel functions on Time Value of Money (TVM) equations. More importantly, we stress that the changing business environment necessitates instantaneous computational ability to address "what if" scenarios. Classes in earlier decades stressed the importance of financial calculators in performing TVM calculations. However, today, calculators do not easily permit re-computation of results under "what if" scenarios. Ability to effectively recompute and communicate these results to aid decision making is key to success in the changing business environment.

As a teaching lesson plan, we present the idea of a timeline (a line with equal time intervals that transforms a financial word problem into a cash flow problems), the concepts of even cash flows (same value and sign) and uneven cash flows (differences in either amount or sign). We then develop the various present value and future value (for single amounts, annuities, and perpetuities)

concepts. We also simultaneously introduce Excel functions to aid TVM computations. Next, we assign several Excel-based exercises to students to enable them to acquire practical mastery over concepts and functions. Some questions require students to rework problems with changed inputs. We indicate that developed concepts and functions can be invaluable in the personal finance and investments fields. Students in non-finance majors perk up at this suggestion as they see the importance of these concepts in personal finance. We use many personal finance examples to help students relate these concepts to their own financial decisions such as buying a car or a house.

Investment Selection Criteria

In this chapter, the standard textbook discusses various investment selection criteria: accounting rates of return, payback period, adjusted payback, NPV, internal rate of return, and profitability index. Textbooks present each criterion, followed by a listing of the pros and cons of each method. Examples are provided to illustrate their pitfalls, concluding with a discussion of why the NPV is the most important criteria. Many textbooks also present method(s) that firms use practically in evaluating projects. Textbooks also discuss later the option to abandon -expand-curtail investments once undertaken. These are generally referred to as real options. Damodaran (2008) suggests that investment in risky assets involves learning from real world outcomes to adjust already undertaken projects (if needed). In today's changing business landscape, the ability to process real options (at least intuitively) becomes important to the finance professional. We present intuitive examples of real options using examples from the corporate world.

As a lesson plan, we first emphasize the links between investment criteria and the TVM concepts covered earlier. While the criterion can be used for already forecasted cash flow projections, the real value that finance managers can bring to a firm is the ability to accurately forecast future expected cash flows. We embed Excel files within our class content to provide computations as we discuss each criterion and to provide students with the experience of changing the forecasted cash flows while observing its impact on overall selection results. We now connect the objective of the firm to the practical implications of what this means. We teach students that in order to maximize the wealth of common shareholders, they must maximize the current share price of common stock. However, the current price is mostly determined by investors in the current business environment (we do not consider stock buyback by firm management as evidence that they can control stock price). At this point, we stress that the operational definition of the objective is for managers (hired by owners) to choose the best NPV projects based on their knowledge and experience. As stated previously, a key element of our treatment of an introductory course in finance is to connect different chapters to each other by continuously building on preceding content. Throughout the course, we point out that students should view course contents as "puzzles", where new concepts help to present an increasingly focused view of the overall picture. Students can then better perceive the importance (and the interconnectedness) of concepts covered in the course.

Next, discussions gravitate towards the importance of emotional intelligence when making decisions, especially in the current business environment (O'Connor, Hill, Kaya, & Martin, 2018), which intuitively translates into computations of the value of real options from projects. We present evidence of how firms deal with the current business environment and suggest that many of the outcomes may reflect examples of emotional intelligence used in practice. We then ask students to present their views on how they would react to such situations. For instance, we ask student opinions on the impact on current (and future) projects of the Hallmark Channel if some of their

offerings simultaneously alienate several groups with polar differences in ideas. These discussions become animated as students share their views. Finally, we bring in current real-life business examples (like the Hallmark Channel example mentioned earlier) and ask students to project cash flows under a variety of scenarios and urge them to decide on a certain course of action. We also provide several problems for students to solve using Excel functions. In a final step, students would need to recompute results under different data assumptions and make appropriate decisions.

Risk and Return in Finance and the Capital Asset Pricing Model

We believe that standard textbooks do an excellent job in covering the conceptually difficult topics of risk and return. Consequently, we do not suggest significant changes to conventional teaching methodologies to address them in the new business environment. For instance, instructors may introduce students to the historical evolution of risk measures in finance and then discuss risk measurement related issues. Eventually, conceptual explanations supplemented by examples of systematic and diversifiable risk, followed by a discussion of the mean-variance framework can serve as a precursor to the introduction of arguably the most important relationship in finance – the Capital Asset Pricing Model (CAPM). There is some emphasis placed on how CAPM assists in computing the theoretical expected return on common stocks and the weighted average cost of capital (WACC) of the firm.

In the current business context, we highlight the differences between business risk and financial risk in class. Business risk is a function of the competitive environment and the nature and demand for products offered by the firm. Financial risk is solely borne by the owners of the corporate firm (the common shareholders) who assume the bankruptcy risk in addition to firm specific business risks. If a firm is highly levered (indicated by a high long-term debt to total assets ratio), then the firm's owners bear additional risks of bankruptcy. While firm creditors assume business risk, the owners (the common shareholders) bear both business and financial risk. Based on our earlier coverage of the changing business environment, we state (with examples) that business risk has increased now and may increase in the future. In addition, we suggest that even with increased business risks, there may be risks associated with *not* taking a stand in society. Should firms take sides (as Nike did in the pro-Kaepernik ad.) or should they remain neutral in any political or social issue (Padmanabhan, 2018b). Clearly, firms must devise effective strategies to safely navigate these thorny waters. Students can then be asked to reevaluate the business risks of firms introduced when discussing the objective of the firm.

A possible lesson plan will include the basic development of the CAPM from fundamental principles (we trace through the historical development of how risk was measured in finance) and how the CAPM is used to compute the WACC. For students with passionate interest in investments, we also show the relevance of CAPM (and especially the risk measure, beta) to developing portfolios exhibiting specified risk-return characteristics. Several examples are developed in class, and students are asked to solve a variety of CAPM related conceptual and practical problems. For example, we provide several constructed vignettes that ask students to identify business vs. financial risks. For instance, we ask students to determine if the current business environment presents greater/lower business risk threats vis a vis earlier environments.

Capital Budgeting and Forecasting Future Expected Cash Flows

By this stage, students should be aware of the changing business environment and requirements for a firm's overall survival/growth/financial strategy. In this section, we present the most common approaches to developing forecasts of future expected cash flows (for example, the percentage of sales approach). We believe that traditional textbooks cover these aspects very well while providing numerous examples that students can easily relate to. While covering these basic concepts as well, we also highlight the importance (and the enhanced risks) of predicting future expected cash flows accurately. We reintroduce students to our earlier coverage related to the objective of the firm and the increased business risks associated with the current dynamic business environment. We also consider several events experienced by firms and ask students how they would forecast future expected cash flows if they, for instance, worked for Hallmark. Another important learning goal is to recognize that periodic dynamic revisions to strategies are necessary while the project is being implemented. In the current business environment, such conditional "what if" scenarios must be considered before the operationalization of a selected strategy.

It is also worth noting that our teaching experiences indicate that interesting discussions unrelated to finance ensue in class. An important aspect of this section (and really the entire course) is to teach students that the finance decision-making process is not made in isolation – rather it involves multiple areas, namely, marketing, management, etc. to develop a viable strategy to safely negotiate the firm through the current environment.

A typical lesson plan will provide the basic treatment of capital budgeting where information on cash flows is provided, and students can then decide whether to accept or reject the project based on the NPV criteria. At this point, we ask students for a list of other factors that might make them revise their decisions since changing environments/situations can change the dynamics of accept/reject decisions. We remind them that a project accepted earlier might need to be revisited considering new information (the idea of real options is again reinforced here). New information can be in the form of changing business risks and/or changing circumstances (for instance, a new tax subsidy now available and that was not available before). Again, the focus of these exercises is to constantly remind students of the changing business environment (and other circumstances related to the project) and how these forces play into the acceptance or rejection of a project. In addition, we remind students that decisions must be made with consequences extending well beyond the finance function.

In an advanced phase during this class, students learn how to develop pro-forma statements using the percentage-of-sales approach. An interesting discussion centers on the project horizon – how long should we consider the horizon to be? Clearly, with global competition, we suggest that the horizon in today's environment can arguably be much shorter than it was a decade ago, and projects must be profitable within a shorter horizon. We also provide students with revised estimates of growth in sales and ask them to recompute future expected cash flows – they quickly realize that inputting data in Excel with cell referencing can provide them with instant results to changing scenarios.

Impact of Covid-19 on Teaching an Introductory Finance Course

Clearly, the COVID-19 pandemic has significantly affected our teaching strategies and student learning methods. Here, we discuss how we have adapted our teaching approaches to deal with the COVID-19 environment to provide value to students in the course. This section also provides

evidence of available literature on this topic and suggestions to qualitatively implement the strategies discussed in earlier sections.

The pandemic necessitated the need for global universities to quickly adopt web-based meeting platforms such as Zoom or Teams and transition to online teaching, either asynchronously or synchronously. In the asynchronous environment, students learn at their own pace and choose their own times to complete class activities. In contrast, synchronous classes are conducted via live video/audio conferencing and provide immediate feedback (Hrastinski, 2008). Considering the critical importance of an introductory finance course especially to non-finance majors, we strongly recommend the synchronous delivery mode for this course during the pandemic. Benefits include the delivery of instant feedback to/from students that enable instructors to address potential issues and challenges faced by students (understanding, analyzing, and applying the material) in real time. We also believe that live interaction is critically important for delivery of all core courses.

Distance learning and online teaching platforms were popular (Peiris & Gallupe, 2018; Smith & Kellogg, 2015) even prior to the advent of the pandemic. Fadol, Aldamen, and Saadullah (2018) compare the performance of students in an introductory management course using three different delivery modes: traditional, online, and flipped. Their findings indicate that online and flipped methods outperformed the traditional method in terms of meeting learning objectives. In addition, the flipped method achieved the learning goal and class attendance objectives better than under the online format. Similarly, students performed better on exams, and missed fewer classes when accessing online material in the online and flipped modes vis a vis the traditional mode. Finally, 52% of students surveyed in their study believed that the flipped mode enhanced their learning experience better than the traditional mode. Others (Fedynich, 2014; Yilmaz, 2019) assert that online learning mediums help working students better absorb course concepts. Park and Kim (2020) investigate social presence in online learning and document that social presence driven by tool interactivity significantly affects student satisfaction in the online learning mode. They also show that gender differences play a key role in moderating the tool interactivity-social presence relationship in an online learning environment. Watts (2016), while acknowledging that both synchronous and asynchronous forms may work, suggests that time constraints, student motivation levels with the online setting, and technical knowledge (on the part of instructors and students) are important considerations in making the appropriate choice of medium. Based on these findings and our experiences, we believe that all introductory courses (including finance) should be delivered synchronously if the online format is chosen.

We now discuss the factors that can lead to a successful learning experience for students under the online synchronous format. First, we believe that instructors must offer an optimal balance between flexibility and structure. Students should be made aware of class format and structure prior to the first class – namely, key activities to be conducted before/during/end of each class, frequency of quizzes, and organization of articles for discussions with detailed evaluation rubrics for each student activity. However, instructors must consider the unusual COVID-19 related circumstances and provide well-structured plan B opportunities (communicated in the syllabus and during the first class meeting) for making up missed classes and assignments. Thus, students missing class may have to view class recordings and submit reflective assignments summarizing main takeaways from class content while sharing at least two challenging issues generated from class materials. Instructors should emphasize the importance of connectedness/communication between students themselves and the instructor, to receive maximum benefits from the course. They may also develop a set of learning objectives (and the organization, class format, materials available online for review) for each module. This information must be prominently displayed in

the syllabus. In addition, instructors may develop short videos explaining module-specific learning objectives for students to review prior to each class. Students can then focus exclusively on learning and absorbing the material. This clearly indicates that the instructor also serves as a coach/mentor to students under the online synchronous mode.

Cady (2020) suggests ten practices that instructors may adopt to enhance student learning experiences especially during the COVID-19 environment. Although we believe that all ten practices are important for teaching effectiveness, we only highlight a few for the introductory finance course. Cady recommends that instructors provide relevant and timely feedback to students. Prior to class, we share module-specific current news articles with students. For instance, in the "objectives" module, we provide news items that relate to shareholder activism, customer product preferences, social media reaction to firms' strategies, etc. We encourage students to post comments and questions related to these materials in shared discussion boards. We also require *all* students to post their replies to at least one question posed by classmates for credit. The meat of the discussion posts can then be used to organize in-class discussions perhaps centering on module content that was not properly understood by students. Cady refers to this practice as facilitating and engaging a collaborative learning community. Discussion boards and weekly quizzes may now be more oriented towards promoting student engagement and attendance - a more holistic understanding of the concepts covered in the module, rather than relying solely on multiple choice type questions. Zhao and Ye (2020) document the significant impact of metacognitive calibration on student performance in online learning. Furthermore, instructors can encourage students to participate actively in different virtual learning environments by stating that future employment opportunities involve requiring prospective employees to be competent in virtual environments, further motivating students to attend and participate in class discussions.

Next, assigning exercises to groups of students in Zoom breakout rooms encourages active participation and enhances the learning experience in our courses. Instructors should periodically visit each breakout room to address any understanding-related issues students may encounter. In turn, the availability of breakout rooms helps instructors to carefully customize their courses while strengthening student-instructor and student-student communication channels. This practice dovetails with Cady's suggestion to communicate regularly with students. Since students may be easily distracted in a virtual class, maintaining strong communication channels leads to better learning outcomes for students. We hope to maintain strong communication links with students by also periodically posting announcements (under the Announcement section of the online course page), allowing for preset office hours (preferably immediately following class) and flexible virtual office hours for students unable to meet during scheduled office hours. Efficient communication also requires instructors to promptly respond to queries posted or emailed by students. Cady summarizes all these points in one of his practices as "this promotes consistency and efficiency in the course, enables students to be proactive, increases confidence, reduces stress, and fosters learning safety". Cady also highlights the importance of coordinating all activities, events, and due dates though a central calendar. The transition from a paper calendar to an online one can be stressful for students. Consequently, we strive to make our course online home page user friendly (practice #6 in the article) and easy to navigate. We also use the first class to highlight the navigation tools available on the course home page.

Not surprisingly, efficient course delivery, especially during a pandemic, requires extensive preparation by instructors. A key question is whether these preparations will be wasted once we resume face-to-face classes (F2F) after the pandemic subsides. Kim (2020) asks if all classes will be taught online forever. He opines that both students and instructors prefer the F2F learning

method, but elements of online learning will remain even in a F2F environment. We also strongly believe that class content post-pandemic will be digitalized to higher levels when compared to pre-pandemic levels. Consistent with Kim (2020), flipped teaching may become the new norm for an introductory course in finance. In a post-pandemic world (and as we do now), we expect to develop and share lecture recordings well before actual classes commence. Class time may then primarily be utilized for clarifications, discussions, problem solving exercises, and active collaborations (Watts, 2016). Students may also choose their mediums of communication with instructors – some may prefer the online environment while others may opt for F2F contact. Certainly, future instructors may use the best elements of both worlds to design courses that offer greater flexibility for students to learn efficiently. We relegate more specific discussions related to the teaching environment in a post-pandemic world to future research.

In Appendix A, we present more concrete examples of processes that worked and those that need additional improvements.

Conclusions and Suggestions for Further Research

This study is motivated by a growing practitioner and academic literature that identifies a pressing need to incorporate changing business scenarios and key factors driving these changes into the core curriculum of a business degree program (Cronan, Douglas, Alnuaimi, & Schmidt, 2011). Over the last few decades, instructors in higher education have faced multiple unique challenges related to the changing business environment and their impact on preparing university graduates to become successful employees. These challenges comprise of evolving and varied student learning styles, as well as a pandemic that has significantly affected teaching platforms and delivery modes. In this paper, we explore how social media, changing consumer preferences, social activism by firms and stakeholders, and the current pandemic, have influenced teaching an introductory finance course.

Our suggested pedagogy offers potential to increase student engagement, enhance levels of understanding of financial concepts, increase creativity, offer flexibility in learning, reduce plagiarism, and provides a platform for linking acquired finance concepts to students' careers and personal lives. In addition, these enhancements may be easily adapted to other business courses while enabling schools to meet the new AACSB accreditation standards that mandate innovation in business school programs.

Although concepts discussed throughout this paper are covered in an introductory finance course, instructors in advanced finance courses should continue to build on this platform. Finance instructors can also coordinate with marketing and management course instructors (for instance) to ensure that these messages can be delivered to students seamlessly. While our recommended teaching strategies could remain relevant post-COVID-19, we present additional practices that can be implemented to ensure successful course delivery during and post-pandemic.

We provide several suggestions for future research. First, sample populations in this course can be segregated into several subgroups (i.e., finance and non-finance majors; in-class and online sections) to examine the impact of our suggested pedagogical approach on these groups. The results of this exercise may lead to course improvement opportunities. Second, as indicated by extant pedagogical literature, students may grasp course concepts immediately following the class but may not retain these concepts over the longer term. In this regard, longitudinal analyses of student learning outcomes could identify better teaching strategies that are effective over the longer term. Third, industry surveys conducted after implementation of these new approaches could

highlight how effective these changes were in preparing students for successful careers. These surveys can also be utilized to fulfill AACSB's indirect assessment requirements under the new standards and form the basis for continuous course improvement.

References

Anthony, J. B., Majid, M. A., & Romli, A. (2017). Green information technology system practice for sustainable collaborative enterprise: a structural literature review. *International Journal of Sustainable Society, 9*(3), 242–272.

Bhagat, A., Vyas, R., & Singh, T. (2015). Students' awareness of learning styles and their perceptions to a mixed method approach for learning. *International Journal of Applied and Basic Medical Research, 5*(1), 58–65.

Cady, S. (2020). Distance learning: The top ten practices. *BizEd AACSB International.* November 2.

Cowan, A., Padmanabhan, P., & Huang, C.-H. (2015). Do firms who give globally secure future financial performance? An investigation of US service firms. *International Journal of Business and Management, 10*(8), 29–38.

Cowan, A., Padmanabhan, P., & Huang, C.-H. (2016). Why do some US manufacturing and service firms with international operations choose to give internationally whereas others opt to give only in the US? *International Business Review, 25*, 408–418.

Cronan, T. P., Douglas, D. E., Alnuaimi, O., & Schmidt, P. J. (2011). Decision making in an integrated business process context: Learning using an ERP simulation game. *Decision Sciences Journal of Innovative Education*, *9*(2), 227-234.

Darnall, N., Ponting, C., & Diego, V-B. (2012). Why consumers buy green. In D. Vazquez-Brust, & J. Sarkis (Eds.), *Green-Growth: Managing the transition to sustainable capitalism.* New York: Springer, 287–308.

Damodaran, A. (2008). *Strategic risk taking: A framework for risk management*. Upper Saddle River, NJ: Pearson Education.

Digital Marketing Institute (2019). Students through the decades: How have they changed, accessed November 2020, available at https://digitalmarketinginstitute.com/blog/students-through-the-decades-how-have-they-changed-education.

eCampus News (2017). 3 big ways today's college students are different from just a decade ago, accessed December 2020, available at https://www.ecampusnews.com/2017/07/08/college-students-different/2/?all.

Fadol, Y., Aldamen, H., & Saadullah, S. (2018). A comparative analysis of flipped, online and traditional teaching: A case of female Middle Eastern management students. *International Journal of Management Education, 16*(2), 266–280.

Fedynich, L. V. (2014). Teaching beyond the classroom walls: The pros and cons of cyber learning. *Journal of Instructional Pedagogies, 13*, 1–7.

Gillan, S., Hartzell, J., Koch, A., & Starks, L. (2010). *Firms' Environmental, Social, and Governance (ESG) choices, performance and managerial motivation*. Working paper, University of Texas at Austin, TX.

Goldberg, E. (2020). Techlash' hits college campuses. *The New York Times*. Jan 11.

Hrastinski, S. (2008). Asynchronous and synchronous e-learning. *Educause Review*. November 17.

Kaplan, R. S., & Norton, D. P. (1996). *The balanced scorecard—translating strategy into action*. Boston, MA: Harvard Business School Press.

Kim, J. (2020). What if everything is online forever? *Inside Higher Ed.* September 15.

Kim, M., Surroca, J. & Tribó, J.A. (2014). Impact of ethical behavior on syndicated loan rates. *Journal of Banking & Finance, 38*, 122–144.

Lai, K.H., Wu, S. & Wong, C. (2013). Did logistics practices hit the triple bottom line of Chinese manufacturers? *International Journal of Production Economics, 146*(1), 106–117.

O'Connor P. J., Hill, A., Kaya, M, & Martin B. (2019). The measurement of emotional intelligence: A critical review of the literature and recommendations for researchers and practitioners. *Frontiers in Psychology, 10*(1116).

Padmanabhan, P., & Swain, A. (2020). Has the objective of the corporate firm changed over time? *Journal of International Business Research*, 19(2), 1–9.

Padmanabhan, P., Zhang, W., & Huang, C-H. (2020). *Why do firms invest in green technologies?* Working Paper, Greehey School of Business, San Antonio, TX.

Padmanabhan, P. (2019). For businesses, profits are built on more than money". *San Antonio Express News Op. Ed*. May 19.

Padmanabhan, P., Zhang, W. & Huang, C-H. (2018a). Firm level offshoring activities, pollution regulation, triple bottom line, and market structure: what do they have in common? *Journal of Cleaner Production, 195*, 618–624.

Padmanabhan, P. (2018b). Bottom line of business in politics. *San Antonio Express News Op. Ed.* Oct 14.

Park, C., & Kim, D. (2020). Exploring the roles of social presence and gender difference in online learning. *Decision Sciences Journal of Innovative Education, 18*(2), 291–312.

Peiris, K. D. A., & Gallupe, R. B. (2018). Evaluating a prototype of a recommender-driven online learning system. *Decision Sciences Journal of Innovative Education, 16*(4), 281–309.

Portland Business Journal, (2017). Why going green gives your business a competitive advantage, accessed December 2020, available at https://www.bizjournals.com/portland/news/2017/08/23/why-going-green-gives-your-business-a-competitive.html.

Root, A. (2020). Ford teams up with 3M and Thermo Fisher to make health equipment. *Barron's*. April 13.

Ross, S., Westerfield, R., & Jordan, B. (2020). *Essentials of corporate finance.* New York, NY: McGraw-Hill, 10th Ed.

Smith, H. J. (2003). The shareholders vs. stakeholders debate. *MIT Sloan Management Review.* July 15.

Smith, M. A., & Kellogg, D. L. (2015). Required collaborative work in online courses: A predictive modeling approach. *Decision Sciences Journal of Innovative Education, 13*(4), 563–581.

Spaces4earning, (2020). Design for post-millennials: How Gen Z is shaping higher ed spaces, accessed December 2020, available at https://spaces4learning.com/articles/2020/05/25/design-for-gen-z.aspx.

Stabler, S., & Fischer, M. (2020). When does corporate social irresponsibility become news? Evidence from more than 1,000 brand transgressions across five countries. *Journal of Marketing*, *84*(3), 46–67.

Stout, L. (2012). *The shareholder value myth*. San Francisco, CA: Berrett-Koehler Publishers.

Swain, A. (2018). Firm sustainability: Looking through the contingency theoretical lenses, *Proceedings of the 47th Western Decision Sciences Institute Annual Meeting*. Kawai, HI.

Swain, A. & Cao, Q. (2014). Strategic alignment and sustainability performance: An operations management perspective. *Proceedings of the Decision Sciences Institute Annual Meeting*. Tampa, FL,1695 –1715.

Swain, A.K., & Cao, R.Q. (2019). Using sentiment analysis to improve supply chain intelligence. *Information Systems Frontiers, 21*(2), 469–484.

Teng, M.J., Wu, S.Y., & Chou, S. (2013). Environmental commitment and economic performance – short-term pain for long-term gain, *Environmental Policy and Governance*, *24*(1), 16–27.

Times Higher Education, (2020). Universities must learn from banks to survive after Covid-19 shutdown, accessed December 2020, available at https://www.timeshighereducation.com/opinion/universities-must-learn-banks-survive-after-covid-19-shutdown.

Vranica, S. (2019). In three days, the Hallmark Channel managed to upset pretty much everyone. *The Wall Street Journal*. Dec 17.

Watts, L. (2016). Synchronous and asynchronous communication in distance learning: A review of the literature. *Quarterly Review of Distance Education*,*17*(1), 23–32.

Whelan, T. & Fink, C. (2016). The comprehensive business case for sustainability. *The Harvard Business Review*. October 21.

Wicky, S., & Hansen, E. (2019). Green technology innovation: Anatomy of exploration processes from a learning perspective. *Business Strategy and the Environment, 28*, 970–988.

Yilmaz, A. B. (2019). Distance and face-to-face students' perceptions towards distance education: A comparative metaphorical study. *Turkish Online Journal of Distance Education*-TOJDE, *20*(1), 1302–6488.

Zdanowicz, C., & Grinberg, E. (2018). Passenger dragged off overbooked United flight. *CNN Travel*. April 10.

Zhang, W., Padmanabhan, P., & Huang, C-H. (2020). *Global supply chain disruptions: Strategies under pandemics*. Working Paper, Greehey School of Business, San Antonio, TX.

Zhao, L., & Ye, C. (2020). Time and performance in online learning: Applying the theoretical perspective of metacognition. *Decision Sciences Journal of Innovative Education, 18*(3), 435–455.

Appendix A

This appendix provides several suggestions for improved pedagogy during the new business and Covid-19 environment. We also share concrete examples that illustrate successful approaches to enhance student learning. We classify our recommendations and examples into successful approaches and approaches that may require additional consideration.

Successful Approaches

We use recent news articles from the business press and social media posts to highlight concepts introduced in our Corporate Finance course. Other instructors may also find it useful to use recent finance (or strategy related) business news articles and social media posts that reflect business situations to improve student grasp of concepts and motivate them to speak up in class.

In the main body of the paper, we provide multiple references to business press articles that are related to the objective of the firm. We particularly use the Hallmark example since it helps students realize that the firm must decide between three uncomfortable options. Taking no stance is also not an option. The Hallmark example permits the discussion to be transferred from the objective's module to the issue of changing business risks and the estimation of future expected cash flows sections. We would recommend securing similar recent examples such as the furor over the new stances adopted by Major League Baseball with respect to the All-star game being moved from Atlanta, the stands of the National Basketball Association, and the athletes' stances arguably leading to revenue losses for NBC during the Olympics. These are all excellent examples to use in the modern classroom and a variety of similar, but more recent, examples can be extracted from the business press.

The aforementioned examples are also useful to illustrate the changing nature of business risks. Each example illustrated above can be used to ask students "Has the business risk changed for the firm? If so, in what direction?". These forums elicit intense discussions. Furthermore, we recommend that instructors solicit business press examples that can relate to multiple finance modules. We prefer these examples to news items that narrowly pertain to one module. This allows us to motivate students to refer to concepts taught earlier and understand them better. For instance, the Hallmark example was used to highlight three key finance modules outlined earlier. This format promotes a deeper understanding of key finance concepts by students while alerting them to the connections between the different finance modules, the relationships between finance and the other business functions, and the role of finance in overall corporate strategy. Examples that contain elements of all the business functions would be particularly useful.

We also suggest that instructors bring in guest speakers from industry to share their professional experiences. We find that students absorb the material better when practitioners explicitly reinforce concepts taught in class. We suggest that guest speakers be scheduled immediately following the completion of a particular module to maximize learning and retention of concepts by students.

With respect to coverage of the important time value of money (TVM) concepts, we observe that students generally find these sections relatively monotonous and uninteresting except when they are learning and applying the excel functions. We felt that it was important for us to punctuate this module with practical news items that relate to this module. Although contemporary TVM related examples are unfortunately not easy to locate in the business presses, we do find some historical ones. For instance, the classic example where Peter Minuit purchases Manhattan Island for $24 in 1626 provides an opportunity for students to compute the present value of this amount

and forces students to think about interest rates/discount rates over time. We find that students actively participate in class when such examples are used.

In addition, we make constant reference to the importance of TVM tools in personal finance and this link serves to keep students engaged. Students see the relevance of these principles in determining their mortgage and their loan payment amounts for car purchases (we find that financing the purchase of electric cars instead of a gasoline car resonates with students). Thus, maintaining TVM links to personal finance is key to teaching this module.

The risk/return module is another challenging pedagogy area. When we introduce students to the concepts of risk and return, we first graphically illustrate the growth patterns since 1900 of $ 1 invested separately in common stocks, bonds, and T-bills. Students immediately recognize the higher returns are associated with higher risks. Similarly, after completion of modern portfolio concepts, we ask students to choose between different portfolio options on a presented investment frontier. Once selected, we ask them to convince their peers of the superiority of their choices. We use this example to illustrate that portfolio choices from among efficient portfolios depend on the risk-aversion levels of each individual.

Finally, we have realized that forming student teams when discussing topics of interest works better than asking each student to pose questions in class. For instance, a recent news item suggested that Starbucks was able to legally avoid taxes in the UK. Eventually, Starbucks ended up paying these taxes. Student group discussions centered around the fact that not paying taxes within a legal framework helped Starbucks' income statement bottom line (and hence shareholder wealth). Another student group suggested that not paying taxes can result in bad publicity for Starbucks which then can reduce future revenues. These discussions were critical in helping students absorb material across many different finance and business modules. Instructors may want to organize student groups and permit them to review interesting news items similar to the Starbucks case.

Approaches Requiring Improvement

The current generation of undergraduate students are used to ESG related themes in their lives and therefore, examples that only illustrate these aspects are not met as enthusiastically as those that go beyond the ESG elements. Of course, we use a few ESG related examples, but students seem to ask, "tell us something that we don't know". Nevertheless, we were successful when we linked these concepts to finance and stressed that following ESG principles can enhance revenues and profits for the firm in the long run.

We suggest that instructors challenge students with questions to retain their interests. This is certainly a challenging task since we need to 'cover' material allocated for the class period while keeping the students engaged. Identifying different ways to motivate students to ask questions is important. We also encourage students to ask questions outside of class. However, some students choose not to ask questions, and this aspect poses a particular challenge for online classes.

When the last set of modules are taught, we have difficulty connecting these modules to the earlier ones. Students seem to forget what was taught in earlier modules and we have to constantly revisit earlier modules to remind students of the concepts covered there. This is certainly a challenging task and using the same set of news events across multiple modules is key to achieving success in terms of student retention of covered concepts.

In the Covid-19 environment, it is difficult for us to convince students to keep their videos on during an online synchronous class. We provide research evidence suggesting that students who keep their videos on during class tend to secure better grades in the course. This has shown to

motivate some students to switch their videos on. Nevertheless, a significant number of students do not consider this and continue keeping their videos off. Consequently, instructors may want to consider different options to keep students motivated and tuned in. Using breakout rooms to discuss exercises in small teams has proved valuable in keeping students focused on class material. In addition, many students feel motivated to keep their peers engaged during breakout sessions. Instructors may want to join breakout sessions periodically; doing so helps them detect concept areas that were not properly understood by the class and address them during main class sessions. Another efficient approach that has shown to work for us was to use the tail end of each class to allow students to ask each other questions pertaining to class content. We also interject and ask them questions about connections across modules already covered. While serving as an important review exercise, this tactic also promotes active discussions in class.

A Choice Algorithm for Teaching Capital Rationing

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This paper presents an adaptive linear programming model that utilizes Excel's 'Solver' function to optimize knapsack style problems related to capital rationing. Simple capital rationing problems are usually solved by ranking projects according to NPV, Profitability Index, and/or IRR and then selecting all available projects given budgetary constraints. Linear programming models to optimize these problems have been proposed to solve more complex versions of these problems, but the teaching of these models is not explained in most undergraduate and graduate corporate finance texts. The model explained in this paper is a simple, adaptable, and highly effective pedagogical tool that helps students understand constrained optimization. This paper advances the pedagogical literature by offering a detailed Excel walkthrough using 'Solver.'

Key Words: Pedagogy Capital Rationing, Capital Budgeting, Knapsack Problems, Excel, Solver, Financial Modeling Pedagogical Tools

Introduction

The capital budgeting decision involves the valuation and determination of viability for the firm's perspective investment in long-term assets. This concept is one of the fundamental decisions of financial managers and is covered in every introduction to Finance and Corporate Finance texts. Among the topics included in the teaching of capital budgeting is the ranking and choice of projects when the firm faces funding and/or cost of capital constraints, commonly called 'capital rationing.'

This paper presents a simple linear programming model (LPM) in Excel that can be used to solve single-period knapsack style problems related to capital rationing. Given information about cost, NPV, IRR, and Profitability Index, this model will determine the optimal projects to undertake, given the user-defined constraints. The model can be easily adapted to allow for constraints including but not limited to: investment ceiling/floor, profitability floor, number of projects, and/or any combination of the aforementioned variables.

Teaching capital rationing using this model as a pedagogical tool simulates complex decision making, encourages critical thinking, and provides a platform for cost/benefit analysis. The model presented herein can be used as a companion to capital rationing cases such as the 'Target Case' in *Case Studies in Finance* by Bruner et. al., or as a standalone model for constrained optimization capital rationing. The process presented in this paper would be appropriate for intermediate corporate finance, graduate-level finance, and financial modeling courses.

This paper is organized as follows. The literature review presents a brief summary of the benefits of active and problem-based learning and the application of related Excel tools. The problem of capital rationing and the traditional model is explained. A model for capital rationing using Excel's 'Solver' is presented as a pedagogical tool is presented. Next, the application, implementation and benefits of the model for Technology Enhanced Active Learning is discussed.

Finally, the learning outcomes for corporate finance and financial modeling are examined and the paper concludes.

Literature Review

Student engagement has long been shown to deepen learning as measured by the amount of retention and academic performance on assessment, as is shown by Carini, Kuh, and Klein (2006). Prince (2004) reviews a broad range of research and finds general support for the effectiveness of active and problem-based learning. Hassana, Saifullizam, and Buhari (2015) find that there is a correlation between the level of Technology Enabled Active Learning (TEAL) and student understanding, creativity, and innovation. The TEAL format was first implemented at the Massachusetts Institute of Technology (MIT) in 2003. Designed by John Belcher to introduce innovative teaching and learning into physics classes and to give rise to active learning. Morrison and Long (2011) describe TEAL as a novel learning environment that merges lectures, simulations and hands-on skills. Finally, Colby et. al. (2011) find that one of the desirable outcomes for business students in a liberal learning environment is to engage in 'multiple framing' as an aspect of analytic thinking. Problems that are difficult or ambiguous must be approached from different angles. Analytical thinking and scientific inquiry "involves the formulation and rigorous application of abstract concepts." Highlighting the importance of application.

Benninga (2008), and Holden (2015, 2015) are great examples of the power of Excel for bridging the gap between theory and practice in the teaching of Finance. Zhang (2014) goes beyond the aforementioned texts to show how Data Table, Charts, Scenario Manager, Goal Seek, and 'Solver' can be effectively implemented into the teaching of an introductory finance course with positive outcomes. Findley (2014) uses MS Excel to "solve and simulate a discrete-time specification of the *Life-Cycle/Permanent-Income Model of Consumption and Saving* (LCPI Model)." Multiple criteria decision making (MCDM) models, such as those presented in Jablonsky (2014) can be resolved using Excel's 'Solver' tool. Teaching with Excel in an active problem-based learning environment increases engagement, promotes critical thinking, bridges theory and practices in multiple disciplines, but especially in quantitative fields such as Finance, Computer Science, and Engineering.

A mathematical solution to capital rationing has been discussed amidst some controversy since Weingartner (1963). Baumol and Quandt (1965), Carleton (1969), Elton (1970), and Myers (1972) among others derive, debate, and ultimately confirm that the capital rationing model can be defined as follows:

$$\sum_{j=1}^{J}\sum_{t=0}^{T}\left[{}^{a_{jt}}/_{(1+k)^t}\right]x_j \tag{1}$$

Subject to

$$-\left[\sum_{j=0}^{J} a_{jt}x_j\right] \leq M_t \tag{2}$$

Where:

k = a fixed discount rate, "the cost of capital";

a_{jt} = the net cash flow, possibly negative, obtained from project j in period t;

x_j = the number of units of j constructed;

M_t= the fixed amount of cash available at time t.

If x_j is a constrained to a binary model and can take only values of zero or one, the model simplifies to what is commonly called a 'knapsack problem' in linear programming and optimization problems. A 'knapsack problem' is a zero–one integer chance-constrained model

where the objective is to maximize the sum value of inputs given user imposed constraints. In its original form the problem was described as an individual fleeing danger must decide what items that they would choose to take in their knapsack given there existed constraints on either weight or size.

Model

Practical examples that combine theory with concrete quantitative analysis enable student to make informed and effective decisions that are easily applicable to real-world scenarios. Through the use of spreadsheets, such as Microsoft Excel and Google Sheets, students can model more complex decisions than those found in introductory textbooks without losing the generalizability of the material. Pertaining to the material at hand, virtually all textbooks simplify the act of capital rationing to such a degree that the critical thinking element is lost.

Figure 1
Representative presentation of the Capital Rationing using spreadsheet software and ranked by Profitability Index (PI)

Project	Initial Outlay	NPV	PI	IRR
Project 1	$(200.00)	$40	1.20	20%
Project 2	$(600.00)	$60	1.10	15%
Project 3	$(800.00)	$80	1.10	10%
Project 4	$(1,000.00)	$90	1.09	8%
Project 5	$(400.00)	$30	1.08	5%

Examining Figure 1, when cash flows are simple and projects are ranked by *Profitability Index (PI),* the selection of projects becomes one straightforward 'Trial and Error.' This methodology has been the modus operandi for teaching capital rationing. The analysis becomes increasingly more complex when the number of viable projects increases, and cash flows are less amenable to trial and error such as that seen in Figure 2.

Figure 2
Capital rationing scenario using spreadsheet software and ranked by Profitability Index (PI) with multiple projects

Project	Initial Outlay	NPV	PI	IRR
Project 1	$(240.00)	40	1.167	20.0%
Project 2	$(235.00)	35	1.149	9.0%
Project 3	$(850.00)	95	1.112	15.0%
Project 4	$(1,025.00)	115	1.112	8.0%
Project 5	$(910.00)	95	1.104	11.0%
Project 6	$(470.00)	47	1.100	10.5%
Project 7	$(1,360.00)	125	1.092	10.0%
Project 8	$(825.00)	75	1.091	10.0%
Project 9	$(625.00)	55	1.088	6.0%
Project 10	$(750.00)	65	1.087	8.0%

To create a simple Linear Programming Model (LPM) it is necessary to modify the table exhibited in Figure 2 to simulate zero-one choice variables. As can be seen in *Figure 3*, two columns have been added titled 'Cost' and 'Benefit.' Initially the cells in the 'Cost' column can all be hard-coded as zero. The individual corresponding cells in the 'Benefit' column need to reference the corresponding rows in the 'Cost' column i.e. the formula in cell G2 should be "=F2" using the relative reference structure. Cells F14 and G14 in Figure 3 use the formula "=SUMPRODUCT()" to calculate the total 'Initial Outlay' and total 'NPV' respectively. The absolute value function =ABV() can be used to transform negative numbers to positive depending on formatting preferences.

Figure 3
Spreadsheet set-up for constrained capital rationing

	A	B	C	D	E	F	G
1	**Project**	**Initial Outlay ($)**	**NPV ($)**	**PI**	**IRR (%)**	**Cost**	**Benefit**
2	Project 1	(240.00)	40	1.167	20.0	0	=F2
3	Project 2	(235.00)	35	1.149	9.0	0	=F3
4	Project 3	(850.00)	95	1.112	15.0	0	=F4
5	Project 4	(1,025.00	115	1.112	8.0	0	=F5
6	Project 5	(910.00)	95	1.104	11.0	0	=F6
7	Project 6	(470.00)	47	1.100	10.5	0	=F7
8	Project 7	(1,360.00	125	1.092	10.0	0	=F8
9	Project 8	(825.00)	75	1.091	10.0	0	=F9
10	Project 9	(625.00)	55	1.088	6.0	0	=F10
11	Project	(750.00)	65	1.087	8.0	0	=F11
12							
13						Total Cost	Total NPV
14						=SUMPRODUCT (F2:F11, ABS(Table1 [Initial Outlay]))	=SUMPRODUCT (G2:G11, ABS(Table1 [NPV]))

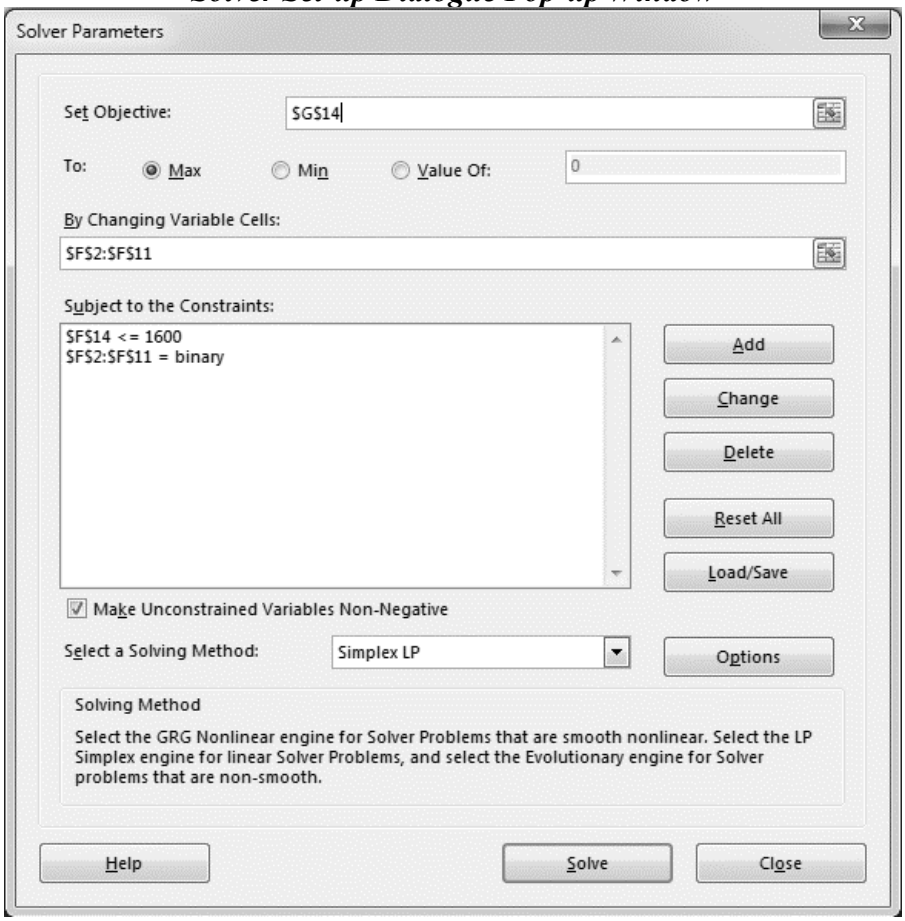
Solver Set-Up

Next, as described in Zhang (2014), the 'Solver' tool is employed to optimize the linear programming problem. 'Solver' can be found in the Analysis group on the Data tab. If 'Solver' is not a visible command under the Data/Analysis tab in Excel, you need to load Solver from the Excel Options. In Office 13, Click the 'File' tab, click 'Options' then 'Add-Ins', and then in the Excel Options box, then click 'Go. In the Add-Ins available box, select the Solver Add-in check box, and then click OK. To enable Solver in Mac Excel 2011 click 'Tools' then 'Add-Ins'. Within

the Add-Ins box, check 'Solver.xlam' then click the 'OK' button. Solver will be added to the Data tab.

Once 'Solver' has launched, a separate pop-up window will appear. It is necessary to define the objective function and constraints, as in the classic knapsack problem. In this case, our objective is to maximize the NPV, by selecting appropriate projects, subject to a constraint on the amount of available initial investment. There are some additional parameter constraints that need to be specified in a binary choice problem, which will be covered by the technical discussion of the 'Solver' parameters which follows. The first selection box 'Set Objective' needs to be the total NPV cell, in this case G14. Since our goal is to maximize the NPV the 'Max' radio button needs to be selected. It is necessary that the objective cell be a formula that depends on the cells selected in the 'By Changing Variables Cells:' reference area. Select the $F$2:$F$11 array as the cells to be changed. This will allow 'Solver' to progressively iterate the selected cells until the objective cell reaches the constrained limit.

Figure 4
Solver Set-up Dialogue Pop-up Window



The next step is to define the constraints which will appear under the 'Subject to the Constraints:' heading. Clicking the 'Add' button will open a dialogue box where the desired constraints can be defined, as seen in Figures 5a and 5b.

Figure 5a
Dialogue box and binary constraint parameters

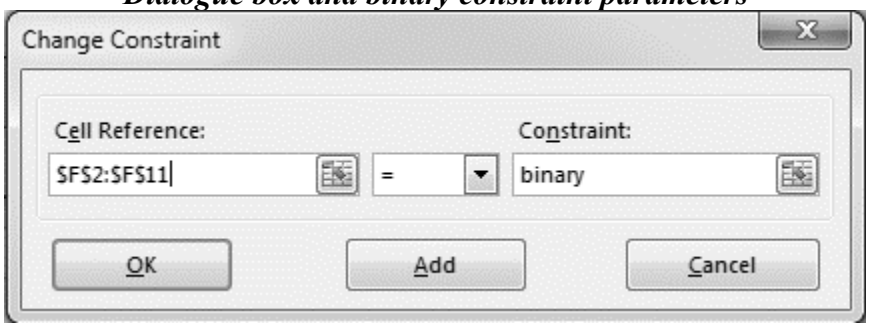
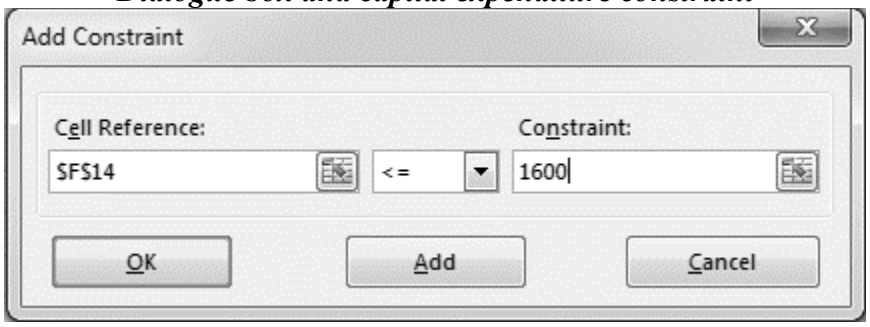


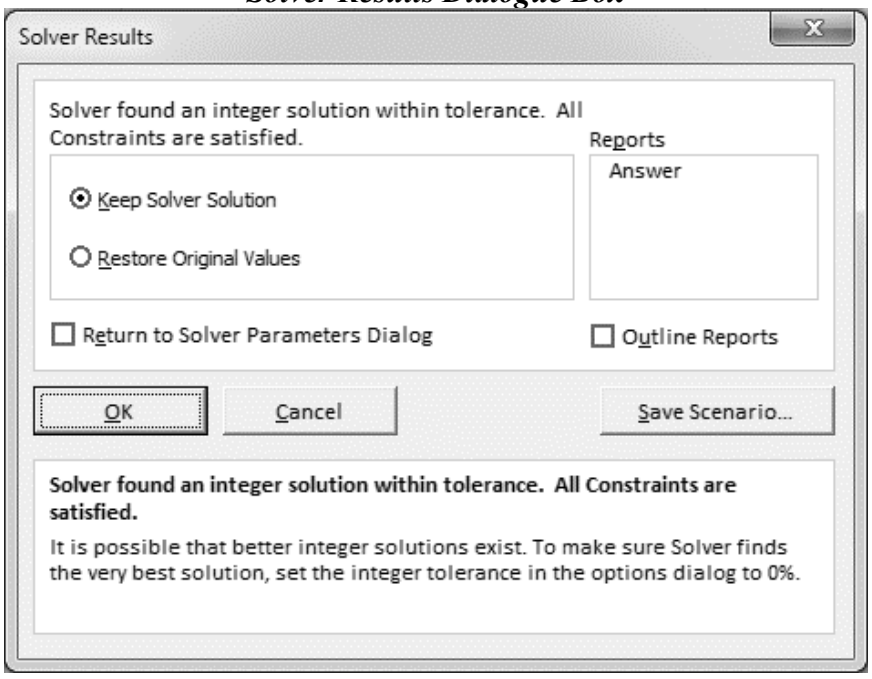
Figure 5b
Dialogue box and capital expenditure constraint



In the 'Add Constraint' dialogue box in 'Cell Reference:' area, select the array $F$2:$F$13 corresponding to the 'Cost' column and the cells selected under the 'By Changing Variables Cells:' reference area. By selecting the array, all cells included in the array will be subject to the same constraint(s). Next, in the middle option box (where the less than inequality is visible) select 'bin' to impose the zero-one binary constraint, and click the 'Add' button. For reference, see *Figure 5a*. This is tantamount to saying that x_j must be in the integer set of [0,1]. Project j can either be selected and fully funded, or can be rejected. Partial projects are not feasible. This constraint will sometimes lead to budgetary slack. Finally, a budgetary constraint must be imposed. Select the cell for total cost, F14, the less than inequality, and input the budget i.e. $1600, and click the 'OK' button.

Returning to the 'Solver' dialogue box, make sure that the 'Make Unconstrained Variables Non-Negative' radio box is checked and select the 'Simplex LP' option from the 'Select a Solving Method:' drop down box. To execute the optimization, click the 'Solve' button. 'Solver' will test iterations until a feasible solution is found or will return with a dialogue box that a feasible solution cannot be found.

Figure 3
Solver Results Dialogue Box



If a feasible solution has been found, the optimal combination of projects will be identified as those with a "1" under the 'Cost' column, as seen in *Figure 7*.

Figure 7
Selected projects determined by constrained optimization

	A	B	C	D	E	F	G
1	Project	Initial Outlay ($)	NPV ($)	PI	IRR	Cost	Benefit
2	Project 1	(240.00)	40	1.167	20.0%	1	1
3	Project 2	(235.00)	35	1.149	9.0%	1	1
4	Project 3	(850.00)	95	1.112	15.0%	0	0
5	Project 4	(1,025.00)	115	1.112	8.0%	1	1
6	Project 5	(910.00)	95	1.104	11.0%	0	0
7	Project 6	(470.00)	47	1.100	10.5%	0	0
8	Project 7	(1,360.00)	125	1.092	10.0%	0	0
9	Project 8	(825.00)	75	1.091	10.0%	0	0
10	Project 9	(625.00)	55	1.088	6.0%	0	0
11	Project 10	(750.00)	65	1.087	8.0%	0	0
12							
13						Total Cost	Total NPV
14						$1500	$190

Teaching Outcomes

Technology Enabled Active Learning (TEAL) necessitates that the learning outcomes using technology be more substantial, flexible, and ultimately more effective than the traditional theoretical practices. Teaching capital rationing under this framework exemplifies the aforementioned criteria. Not only does the model bridge the gap between theory and practice, it can be used to stimulate class discussion. To highlight the flexibility of the model presented in the previous section an instructor may ask: "What happens if we change the budgetary constraint from $1600 to $2000 or $2300?" Students can solve this problem easily and quickly buy editing the constraints in the 'Solver' window. It can be easily seen that the project selection set will change from [1,2,4] in the original model to [1,2,4,6] to [1,2,3,5].

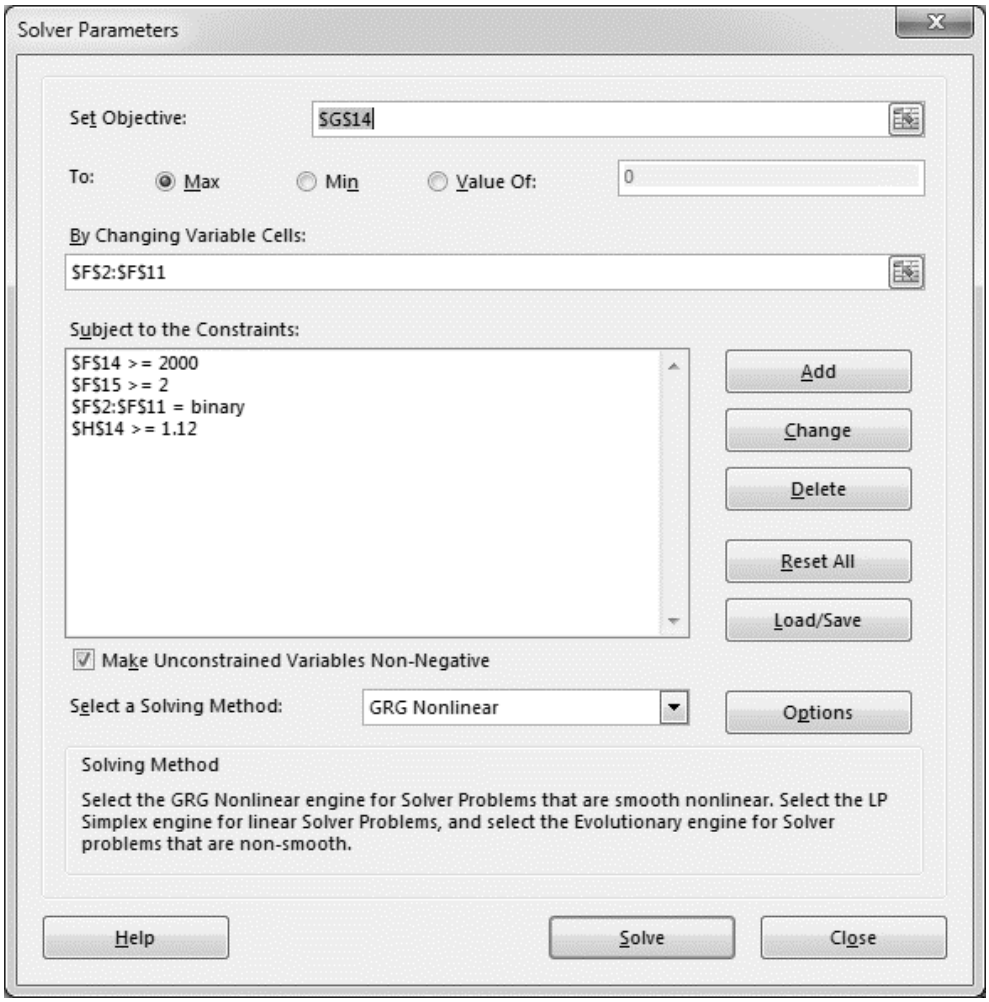
Additionally, the instructor could extend the model to consider questions regarding maximizing the NPV given constraints on the number of projects (maximum/minimum), and/or the minimum profitability index. Requiring the students approach the project from different angles, multiple-framing, has been shown to increase retention and analytical thinking. Adding an additional column, as seen in *Figure 8*, to calculate the weighted-average profitability index, and a single cell for the sum of the zero-one 'Cost' column will allow for these additional constraints. It is necessary that at least one "1" be left in the 'Cost' column when using the weighted-average profitability index as a constraint. This is to avoid the '#DIV/0!' error that occurs when dividing by 0.

Figure 8
Optimization model allowing for limits on number of projects and/or profitability index

	A	B	C	D	E	F	G	H
1	Project	Initial Outlay ($)	NPV	PI	IRR	Cost	Benefit	PI
2	Project 1	(240.00)	40	1.167	20.0%	1	1	1
3	Project 2	(235.00)	35	1.149	9.0%	0	0	0
4	Project 3	(850.00)	95	1.112	15.0%	0	0	0
5	Project 4	(1,025.00)	115	1.112	8.0%	0	0	0
6	Project 5	(910.00)	95	1.104	11.0%	0	0	0
7	Project 6	(470.00)	47	1.100	10.5%	0	0	0
8	Project 7	(1,360.00)	125	1.092	10.0%	0	0	0
9	Project 8	(825.00)	75	1.091	10.0%	0	0	0
10	Project 9	(625.00)	55	1.088	6.0%	0	0	0
11	Project 10	(750.00)	65	1.087	8.0%	0	0	0
12								
13						Total Cost	Total NPV	Total NPV
14						240	40	1.167
15					SUM	1		

Since the model is now optimizing over multiple dimensions, the solving method must be changed from Simplex LP to GRG Nonlinear or there will be an error in the model. The new constraints can be seen in *Figure 9.* The minimum invested amount is set to a floor of $2000, a minimum of 2 projects must be selected, and the weighted average profitability of projects selected must be at least 1.12. Selecting a weighted average profitability index greater than or equal to 1.12 is different than selecting all projects with a profitability index greater than 1.12. It allows for greater flexibility.

Figure 9
Solver dialogue box showing additional constraints on number of projects and profitability index minimum



As can be seen in *Figure 10*, the inclusion set [1,2,3,4] is one they may be counterintuitive to students. Imposing a global profitability index constraint allows for the selection of projects that fall below the desired imposed constraint of 1.12. This should trigger discussion about selecting projects that are close to the threshold of acceptability when the firm is trying to invest a minimum amount. Additional modifications to the model could be easily conceived but are beyond the scope of this paper.

Qualitative discussion with the students at the time of presenting this model revealed that they found the model intuitive, revealing, and easier to apply than the standard method. In addition,

students were exhibited a higher degree of excitement, asked probing and extending questions, and were able to, for the most part, replicate the model at the time of assessment.

Figure 10
Results of multi-dimensional constrained optimization

	A	B	C	D	E	F	G	H
1	Project	Initial Outlay ($)	NPV	PI	IRR	Cost	Benefit	PI
2	Project 1	(240.00)	40	1.167	20.0%	1	1	1
3	Project 2	(235.00)	35	1.149	9.0%	1	1	1
4	Project 3	(850.00)	95	1.112	15.0%	1	1	1
5	Project 4	(1,025.00)	115	1.112	8.0%	1	1	1
6	Project 5	(910.00)	95	1.104	11.0%	0	0	0
7	Project 6	(470.00)	47	1.100	10.5%	0	0	0
8	Project 7	(1,360.00)	125	1.092	10.0%	0	0	0
9	Project 8	(825.00)	75	1.091	10.0%	0	0	0
10	Project 9	(625.00)	55	1.088	6.0%	0	0	0
11	Project 10	(750.00)	65	1.087	8.0%	0	0	0
12								
13						Total Cost	Total NPV	Total NPV
14						2350	285	1.121
15					SUM	4		

Conclusion

This paper presents a spreadsheet model that employs Microsoft Excel's 'Solver' function to simulate capital rationing under budgetary and profitability constraints. The model presented herein is easily modified to answer many questions relating to capital rationing and could be used outside of finance for analysis of project selection. The model presented in this paper would be appropriate as a teaching aid in an introductory finance class or could be taught in a financial modeling class at either the undergraduate or graduate level. An interesting extension of this paper would be to test the effectiveness of teaching with this model compared to the standard method of teaching capital rationing.

References

Baumol, W., & Quandt, R. (1965). Investment and Discount Rates Under Capital Rationing-A Programming Approach. *Economic Journal*, 75, 317-329.

Benninga, S. (2008). *Financial Modeling.* Cambridge, MA: The MIT Press, 3rd edition.

Carini, R. M., Kuh, G.D, & Klein, S. P. (2006). Student Engagement and Student Learning: Testing the Linkages. *Research in Higher Education*. 47, 1-32.

Carleton, W. (1969). "Linear Programming and Capital Budgeting Models: A New Interpretation," *Journal of Finance*, 24, 822-833.

Colby, A., Ehrlich, T., Sullivan, W., & Dolle, J., (2011). *Rethinking Undergraduate Business Education: Liberal Learning for the Profession*. Hoboken, NJ: Wiley.

Elton, E. (1970). Capital Rationing and External Discount Rates. *Journal of Finance*, 25, 373-384.

Findley, T.S., (2014) Using MS Excel to Solve and Simulate the LC/PI Model of Consumption and Saving. *International Review of Economic Education, 16, 129-146.*

Hassana, N., Saifullizam, P., & Buhari, R., (2015). Student Understanding Through the Application of Technology Enabled Active Learning in Practical Training. *Procedia - Social and Behavioral Sciences*, 204, 318-325.

Holden, C. W., (2012). *Excel Modeling in Corporate Finance.* New York, NY: Pearson Education Inc. 5th edition.

Holden, C. W., (2015). *Excel Modeling in Investments.* New York, NY: Pearson Education Inc. 5th edition.

Jablonsky, J., (2014). MS Excel based Software Support Tools for Decision Problems with Multiple Criteria. Procedia Economics and Finance, 12, 251-258.

Morrison, J.L., & Long, P. (2011).Technology Enhanced Active Learning at MIT. *The International HETL Review*. Volume 1, Article 5, http://helt.org/2011/07/12/tealmit/

Myers, S. C. (1972). A Note On Linear Programming And Capital Budgeting. *Journal of Finance,* 27, 89-92.

Prince, M. (2004), Does Active Learning Work? A Review of the Research. *Journal of Engineering Education*, 93, 223–231.

Weingartner, H. (1963) *Mathematical Programming and the Analysis of Capital Budgeting Problems*. Englewood Cliffs, NJ: Prentice-Hall.

Zhang, C. (2014) Incorporating Powerful Excel Tools into Finance Teaching. *Journal of Financial Education*, 40(3/4), 87-113.

Preaching to the Converted – Enrolment Bias in Finance Ethics Subjects

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This paper analyses ethics electives in university business programs through the lens of the finance discipline. Using survey data, this study examines differences in ethical judgement between students with and without the intention to enrol in a finance ethics subject. Employing a case study involving an ethical dilemma related to insider trading, our results show that students who are newly enrolled, or who plan on enrolling into a finance ethics elective subject judge insider trading to be more unethical compared to respondents who do not intend to enrol into a finance ethics subject. This important finding enhances the understanding of teaching ethics in finance and suggests that individuals with poor moral judgement do not actively seek ethics training to improve their moral judgement. From a finance education perspective, our result suggests that ethics training should be a mandatory part of finance degree programs to avoid potentially severe negative outcomes in financial services, economies, and society as a whole.

Keywords: Ethics, ethics subjects, ethics teaching, curriculum design, material non-public information

Introduction

Market manipulation, fraud and other unethical conduct are significant threats to regional and global economic stability and can lead to severe negative outcomes for society. Unfortunately, unethical conduct appears to be as prevalent today as it was decades ago in the days of individuals such as insider traders Dennis Levine and Ivan Boesky and companies such as Enron and WorldCom. Indeed, the need for an increased emphasis on ethics in finance has been widely discussed in academia (Asaad, 2016; Emerson, 2003; Hauser et al., 2017; Hess at al, 2004 and Locke, 2006). An example of a response to ongoing unethical business culture, practice and greed was the establishment of a Royal Commission into Misconduct in the Banking Superannuation and Financial Services Industry in 2017 by the Australian Government, which delivered its final report in February 2019 after receiving a total of 10,323 conduct inquiry submissions. The Ethics Centre (2019), in commenting on the findings of this report, stated that "The fact that a loophole was available to be exploited does not mean that it should have been. The capacity to exercise ethical restraint (not to do everything that is possible) was always latent within the ranks of the boards and senior management."

Given the importance of ethical behaviour in financial markets, the finance education sector must accept responsibility for delivering ethics education for future finance leaders. This has been recognized by scholars over a decade ago when Dobson (2008) and Mele (2008) stated that there ensued a crisis of confidence in corporations, highlighting a need for improved education in ethical behaviour for business students. Cagle (2005), Cagle and Baucus (2006) and Hauser et al. (2017) found that studying corporate scandals assists in improving students' understanding of unethical conduct. This is extremely important, as Hauser et al. (2017) report that approximately 70% of all white-collar crimes involve individuals with post-high school qualifications.

The purpose of university ethics training is to equip finance students to better identify, understand and manage ethical dilemmas, enabling them to engage in moral reasoning about (more) ethical courses of action. However, how effective are finance ethics subjects at improving moral judgement if the students that are most in need of ethical training do not actually enrol in them?

In this paper, we shed light on this question, by analysing the results of a case study-based survey that was created by an experienced financial services professional to investigate finance students' judgement of an ethical dilemma frequently encountered in financial markets. The survey comprised of a case study scenario, inspired by the vignettes of Hess et al. (2004), in which an individual makes an unethical decision to act on material non-public information (MNPI), also known as insider trading.

Survey respondents were instructed to rate the ethical behaviour of the individual, who by objective standards (i.e., verified by an industry control group), engages in unethical behaviour. It was administered in an AACSB accredited Australian university business school to undergraduate and postgraduate finance students.

Our research is different from existing ethics studies that focus on university students who are already enrolled in ethics subjects. This study offers novel analyses and perspectives not considered by the existing literature by investigating how the ethical judgement of students who have never enrolled in a finance ethics subject compares to the judgement of those who are newly enrolled or plan to enrol in a finance ethics subject. The survey was administered in the first week of the Autumn (Fall) 2019 semester, prior to the start of formal lectures. Therefore, those enrolled in a finance ethics subject had not yet attended a class. The survey was completed by 362 undergraduate and postgraduate finance students with diverse backgrounds and stages of study. Our survey results show that finance students who were enrolled or expressed intention to enrol in a finance ethics class were significantly more likely to identify, and be more critical of unethical behaviour, when compared to finance students who had no intention on enrolling in a finance ethics elective.

Importantly, and as pointed out by Borkowski and Ugras (1998), there exists a potential country bias in the literature as the majority of studies on ethical conduct of university students has been conducted in the USA. By contrast, our study uses a sample consisting of both local Australian and international students.

Literature Review

Although ethical behaviour is key to assuring the functioning and efficiency of financial markets, market participants frequently suffer from a general lack of trust when engaging in transactions with other parties. Judgement also differs between current and future business leaders. D'Aquila et al. (2004) reported that while 97% of business leaders perceive businesses in the USA

as ethical, only 24.5% of finance students agreed. Undoubtedly, the financial sector plays a special role as it serves as an enabler for goods and services transactions in the economy. Because of the intangible nature of financial services, and in some cases very long periods of service delivery (e.g., in retirement planning), customers often lack transparency and understanding of conflicts of interests, fees and service quality. According to a global study by CFA Institute (2018) surveying 3,127 retail customers, only 44% of Australian retail customers expressed that their financial service provider *always* put their interest first. In other markets, only 7% (Hong Kong), 10% (Singapore) and 16% (France) of consumers believe that their financial service provider *always* put their interests first.

The global lack of trust in financial markets has put pressure on business schools to place a significantly greater emphasis on ethics training as part of their broader curriculum when educating future finance leaders. While Alan and Au (1997) report no difference in ethical values of business and non-business students, business schools have determined a need for ethics training. This has not only been encouraged by, e.g., academics from a range of U.S. business schools (Dobson, 2008 and Evans et al., 2006), but has been mandated by accrediting bodies. For example, and in 2004, the AACSB's Ethics Education Task Force published a report "to urge and encourage administrators and faculty in business education to contemplate their current approaches to ethics education and to explore methods to strengthen this vital part of the curriculum." (AACSB, 2004, p7) The reality however is that finance ethics remain of secondary importance in most university programs. For example, in a study of postgraduate finance programs at Australian universities, Imam (2018) found that only three out of 11 programs in the study had subjects devoted to the study of business ethics.

Seto-Pamies and Papaoikonomou (2016) investigate the curricular level, i.e., concentration or dispersion of these concepts throughout the curriculum. They note that there may be several reasons for students choosing not to enrol in a stand-alone elective ethics subject, including lack of interest or lack of opportunity. Giacalone and Promislo (2013) contend that the assumption that all students wish to engage in ethical discussions and behaviour is neither necessarily correct nor a priority for many. Dobson (2008) and Jonson et al. (2015) investigate if stand-alone ethics subjects, or subjects where ethics is integrated into the curriculum are more effective in enabling students to understand the complexities of ethical issues. Jonson et al. (2015) find that when tested, those that have undertaken a stand-alone ethics class have responses that "are more pragmatic and realistic because of their deeper exposure to the complexities of cases from the real business world in general …" (p488).

Although it is conceded that ethics training will not deter the truly criminally inclined individuals, several studies have concluded that formal ethics training can indeed enhance the moral development of individuals. Studies by Cagle (2005), Cagle and Baucus (2006), Davis and Welton (1991), Dellaportas (2006), Jones (2009), Kovacevic et al. (2016), May et al. (2014), Wang and Calvano (2015) and Warren, Gaspar and Laufer (2014) report statistically significant and, in most cases, a permanent improvement in the ethical and moral reasoning of university students after they have undertaken some form of ethics training.

However, these studies do not account for *self-selection bias* through enrolment, i.e., the likelihood that students enrolling in ethics subjects as finance electives exhibit either an already higher cognitive ability to engage in moral reasoning when compared to those who do not self-select themselves into an ethics subject, or they have an expressed interest in ethics which perhaps makes them more susceptible to a continued and positive change in their moral development. This notion is confirmed in a study by Ting and Lee (2012) who found that one of the key factors driving

the selection of electives among university students is their perceived interest in the subject matter. Adkins and Radtke (2004) refer to this response bias in their study of university faculty members and admit that those interested in ethics education could potentially be overrepresented in their sample.

A substantial number of studies have explored the role of gender in the context of ethical judgement, hypothesising the social theory that females tend to be more empathetic (Wang and Calvano, 2015). In two separate meta-analyses, Borkowski and Ugras (1998) and Franke et al. (1997) report significantly higher ethical attributes for females than males in the majority of the 56 and 66 studies respectively in their samples. The results have also been supported by Alan and Au (1997), Eweje and Brunton (2010), Kohut and Corriher (1994), Perryer and Jordan (2002) and Tse and Au (1997). No conclusive relationship was found by the Jonson et al. (2015) study.

Although females appear to exhibit a higher level of moral development when compared to males, an interesting finding has emerged from studies related to ethics training. Kovacevic et al. (2016) conclude in a study of undergraduate university ethics students that, although both male and female survey respondents benefit from ethical training, male participants benefit relatively more in light of the higher level of moral cognitive development of female students prior to ethics training. This finding is also supported by the study of Wang and Calvano (2015) who conclude that, although females exhibit higher levels of ethical decision making prior to ethics education, males tend to respond more favourably to ethics training.

The meta-analysis of Borkowski and Ugras (1998) reports significantly stronger ethical attitudes for individuals as they age. The results have also been supported by Eweje and Brunton (2010) and Perryer and Jordan (2002). Verschoor (2017) found millennials (those born 1981 or after) were more likely to observe misconduct at work but were also the least likely to report it. The author suggests that this is in part due to the findings that those in senior management roles were less likely to fear retaliation (i.e. older generations) and that the millennials feel that they don't have any influence on ethical matters in the company.

The studies of Alan and Au (1997) and Davis and Welton (1991) report higher ethical values for senior compared to junior students. Although it is conceded that this relationship is most likely impacted by age and experience rather than level of study. This is evident from the Eweje and Brunton (2010) study, where the authors report a strong positive relationship between ethical awareness and work experience. Persons (2009) finds that working both full-time or part-time provide a significantly positive impact on student's ethicality it is stronger for those undertaking full time work.

Survey, Methodology and Data

Survey

To assure finance industry relevance, a case study (Appendix 1) focusing on unethical behaviour regarding one of the most critical threats to the integrity of capital markets was developed. The case was written by a senior partner in a Chicago based funds management firm with over three decades of international experience in funds management and professional credentialing development and assessment. The case is similar in length and style to the ethics vignettes proposed by Hess et al. (2004) and describes how a buy-side security analyst that is employed by an investment firm conducts a site visit to a company for investment analysis purposes. During the visit, the analyst receives MNPI related to failure of clinical trials that has the potential to negatively affect the company's near-term stock price if made public. Upon

returning to the office, the analyst decides to change her current outlook on the stock from positive to negative, thereby causing her firm to sell all the shares in the company from their investment portfolios.

A survey using this case study was distributed to both undergraduate and postgraduate finance students at the beginning of 2019 Autumn (Fall) Semester. Data collected also include demographic information (Appendix 3). Based on the case information, which avoids legal bias in respondents' answers by explicitly stating the minimalistic nature of existing laws in the case, respondents were asked to rate the ethical nature of the analyst's action. To assess respondents' evaluation of the ethical dilemma presented to them in the case study, we employ a bipolar Likert scale with seven balanced responses ranging from "very unethical" (response score 1) to "very ethical" (response score 7). The case study was also sent as a separate survey to a sample of industry professionals to rate the analyst's actions and thereby provide an independent benchmark to validate the use of the case study.

Methodology

Our study employs Likert scale questions and rating response scales as a tool to obtain a respondent's quantitative judgement (i.e., a category scale rating) to measure the respondent's attitude towards the ethical dilemma presented in a finance case study (see Appendices 1 and 2 for the case study and additional information on Likert scale questions and rating response scales).

In our study, each respondent is required to pick one of seven answer category choices that range from "very unethical" to "very ethical". While the nature of Likert scale data (in the following referred to as "Likert data") and the robustness of statistical testing methods has been controversially debated (e.g., Carifio and Perla, 2008; Jamieson, 2004 and Norman, 2010), if the data is characterised as being ordinal (ordered categories), non-parametric statistical tests can be employed to test hypotheses. By comparison, parametric tests have been described as "incredibly versatile, powerful and comprehensive", however, they technically require normally distributed, interval-level input data (Norman, 2010). This leaves the question whether parametric tests can be used to analyse Likert data.

There has been much debate in the literature across several disciplines on the statistical suitability of parametric tests for the analysis of Likert data. To resolve the "50-year debate" several studies examine the statistical character of Likert data (ordinal versus interval) and empirically investigate the robustness of parametric tests to violations of their assumptions (Carifio and Perla, 2007; Carifio and Perla, 2008; Derrick and White, 2017; DeWees et al., 2020; Grech and Calleja, 2018; Harpe, 2015; Hopkins et. al., 2018 and Wigley, 2013). These studies conclude that parametric tests (1) are suitable for Likert data, (2) are extremely robust to violations of their statistical assumptions and (3) have a higher statistical power than non-parametric tests when applied to Likert data.

Additional support is provided in the seminal study by Norman (2010) who provides evidence that parametric testing is in fact the optimal method to use for rating scale data. The author uses empirical and simulated data and shows that parametric tests are generally more robust, sensitive, and powerful than nonparametric tests when used for the analysis of Likert data. For our study this implies that using parametric tests is not only increasing accuracy of results, but it is also more likely to yield the detection of means differences in ratings between sample sub-groups if they actually exist.

Expanding on Norman (2010) and other studies, Harpe (2015) develops a set of criteria that support the use of parametric testing. These include requirements that the response scale consists of at least five categories and that the samples that are being compared are of a similar size and are independent with homogenous variances. The data used in this study meets these requirements. For example, unreported results of F-tests confirm that the standard deviations of sub-samples analysed in this study are not statistically significantly different.

Given the evidence of the suitability of parametric testing, and to conduct comprehensive, accurate and robust analyses of Likert type data pertaining to the ethical judgement of several student groups, our analysis approach follows that of recent studies by using a two-step investigation. For example, Padilla et al. (2020) first employ "[p]arametric analyses with Likert-type data [because these analyses] are more sensitive and powerful than the non-parametric alternative" (p. 1241). As a second step, the authors employ non-parametric tests "to be conservative". This approach has three advantages. First, employing both parametric and non-parametric tests serves as a robustness check. Second, one-sided *t*-tests complement non-parametric results to not only assess general differences in ethical judgement, but also the direction of differences. Third, the interpretation of "mean differences" in parametric tests is intuitive and easier than that of "mean rank differences" in non-parametric tests. Therefore, parametric testing facilitates the use, application, and adoption of our results to real world educational applications.

As an additional step, we conduct a multivariate regression analysis to study if and how students' characteristics (e.g., educational level, age, work experience) drive ethical judgement (Liu et al., 2020 and Lovelock and Hayes, 2020).

Data

A total of 362 valid student responses to the survey were received in March 2019. Appendix 3 presents a summary of key demographic statistics of survey respondents. It is important to note that the survey was conducted in the first week of the business school's semester and before the first lecture of the relevant finance ethics subjects. Consequently, students who were enrolled in a finance ethics subject (35.1%) had no ethics training prior to taking the survey. This is to ensure that respondents were on par in their ethical education related to the finance ethics subjects when compared to students that planned on enrolling in a finance ethics subject in the future (30.7%). The university at which the survey was conducted offers separate finance ethics electives for all finance students in both undergraduate and postgraduate programs.

The undergraduate and postgraduate students in the sample were undertaking finance degrees or majors either in finance or accounting or were taking finance focused MBA degree programs. Table 1 presents the frequency distribution of Likert values for sub-groups and for the full sample. Of 362 students, 208 (57.5%) were undergraduate students and 154 (42.5% were postgraduate students).

Table 1
Frequency Distribution of Likert Values
This table presents the distribution of Likert values by sub-groups "No intention", "Enrolled", "Plan to Enroll" and for the full sample (N = 362).

Likert Value	Group "No Intention"	Group "Enrolled"	Group "Plan to Enrol"	Full Sample
1 (very unethical)	5	14	10	29
2	17	14	23	54
3	25	35	25	85
4	34	22	20	76
5	14	23	19	56
6	13	14	8	35
7 (very ethical)	16	5	6	27
Total	124	127	111	362

Hypothesis Development

Our research question aims at analysing the level of moral judgement of finance students who have enrolled or plan to enrol in an ethics elective versus students who have no intention of ever enrolling in an ethics elective subject as part of their finance degree. We aim to determine if those students that have no intention of enrolling in a finance ethics subject are likely to judge the action of the analyst in the case study as more ethical (or conversely as less unethical) than those who are currently enrolled or do plan to enrol in a finance ethics subject. We derive the following hypothesis to assess the potential difference in judgement. Note that higher respondents' scores represent a judgement of "more ethical" compared to lower scores. For each hypothesis presented, the associated null hypothesis is that the mean score μ of the first respective group is less than or equal to the mean score μ of the second respective group as stated in *H1*, *H2*, *H3* and *H4*. In addition, Tables 4 and 5 present two-tailed *t*-tests for *H3* and *H4* (i.e., means are different) in which case the associated null hypothesis is that the two respective means are equal.

H1. Respondents who have enrolled or intend to enrol in a finance ethics subject view trading on MNPI to be more unethical (i.e., lower score) when compared to respondents who have no intention of enrolling in a finance ethics subject (i.e., *H1*: $\mu_{No\_intention\_to\_enrol} > \mu_{Enrolled/Plan\_to\_enrol}$).

Based on existing studies we expect female students to recognize the trading on MNPI to be more unethical than male students. This is summarised in our second hypothesis.

H2. Female respondents view trading on MNPI to be more unethical (i.e., lower score) when compared to male respondents (i.e., *H2*: $\mu_{Males} > \mu_{Females}$).

Based on prior research our third hypothesis reflects our expectation that moral judgement is affected by age:

H3. Respondents who are older view trading on MNPI to be more unethical (i.e., lower score) than younger respondents (i.e., *H3*: $\mu_{Age\_19\_or\_less} > \mu_{Age\_20\text{-}25/Age\_25\_and\_older}$).

Our final hypothesis relates to our expectation that increased work experience provides respondents with an improved ability to evaluate unethical behaviour. Therefore, we expect students who work, either part-time or fulltime, to exhibit an increased level of awareness of the unethical nature of trading on MNPI:

> *H4*. Respondents who work part-time or full-time view trading on MNPI to be more unethical (i.e., lower score) than respondents who are not employed (i.e., *H4*: $\mu_{No\_work} > \mu_{Part\text{-}time\_work/Full\text{-}time\_work}$).

Results

Our analysis focusses on investigating differences in judgement of the ethical dilemma presented in the survey's case study. First, we analyse sample subgroups using parametric and non-parametric statistical tests with the goal of identifying potential differences and therefore drivers of ethical judgement. Second, we use a multivariate regression analysis to both complement and check for robustness of results obtained from the mean difference analysis. We test hypothesis *H1* by conducting *t*-tests to compare the mean scores from respondents in Group 1 ("no intention to enrol") and Group 2 ("plan to enrol" or "currently enrolled" or both) as presented in Table 2, Panel A.

Recall that, the lower the score, the more unethical the respondent believes the actions by the individual in the case to be. As a result, we expect overall low mean score levels. This would indicate that, on average, respondents are able to recognise and be critical of unethical behaviour presented in the survey's case study.

The mean score for respondents with no intention to enrol in a finance ethics subject is 4.113 (N = 124), suggesting a judgement on the scale towards "ethical" above the midpoint. Respondents that are either currently enrolled or plan to enrol provided the mean score of 3.634.). We reject the null hypothesis at a 1% significance level and conclude that those respondents in our sample who self-select (plan to enrol or already enrolled) into a finance ethics subject are better able to recognise, and be critical of, unethical behaviour prior to taking a finance ethics subject than their "no intention" counterparts. To validate our case study's ability to effectively distinguish between respondents' levels of cognitive development related to moral reasoning we employ a control group consisting of financial professionals, financial industry experts and finance academics. The mean score for the industry control group at a level of 2.85 is lower than mean scores for either Group 1 or 2, thereby providing validation that our case study design is effectively permitting trained financial professionals and experts to identify the behaviour presented in the case as unethical behaviour.

Given this important result we extend our analysis of hypothesis *H1* by considering subsamples for the mean difference test of Group 2, including "CURRENT" (i.e., currently enrolled) and "PLAN" (i.e., plan to enrol) separately. As reported in Panel A of Table 2, we reject the null hypothesis in both cases, at the 5% significance level for "CURRENT" and at the 1% significance level for "PLAN". We conclude that both groups independently are better able to recognise the unethical behaviour in the case when compared to Group 1.

Table 2

Mean Difference Test Results (Survey Response Scores) for SCORE

Groups 1 and 2 represent subgroup pairs as indicated in the table with three pairs of results shown for three alternative Group 2 definitions. Differences in means are tested using *t*-test, Mann Whitney U test and Kruskal-Wallis H test methods. Statistical significance at the 1, 5 and 10 percent level is denoted by ***, ** and *, respectively. *t, z* and chi-squared statistics are reported, *p*-values in parentheses.

	SCORE	**SCORE of Group 2 = CURRENT**	**SCORE of Group 2 = PLAN**	**SCORE of Group 2 = CURRENT + PLAN**
Group 1 = NO INTENTION	**4.113** (N = 124)			
Group 2		**3.693** (N = 127)	**3.568** (N = 111)	**3.634** (N = 238)
Panel A: *t*-test				
One-tailed test		2.019**	2.522***	2.635***
H_0: $\mu_1 \leq \mu_2$; H_a: $\mu_1 > \mu_2$		(0.022)	(0.006)	(0.004)
Two-tailed test		2.019**	2.522**	2.635***
H_0: $\mu_1 = \mu_2$; H_a: $\mu_1 \neq \mu_2$		(0.044)	(0.012)	(0.008)
Panel B: Mann Whitney U test (MWU)				
H_0: SCORE mean ranks of Group 1 and Group 2 are equal		1.784*	2.390**	2.401**
H_A SCORE mean ranks of Group 1 and Group 2 are not equal		(0.074)	(0.016)	(0.016)
Panel C: Kruskal-Wallis H test (KWH)				
H_0: SCORE mean ranks of groups NOINT, CURR, PLAN are equal	6.266** (0.043)			
H_A: SCORE mean ranks of groups NOINT, CURR, PLAN are not equal				

As a robustness check we use parametric test to determine whether statistically significant differences between two or more groups in our sample exists. Both, the (two-sided) pairwise comparison using Mann Whitney U (MWU) tests and the combined analysis of all three sub-groups in our sample by means of a Kruskal-Wallis H (KWH) test are based on "mean ranks", which are arithmetic averages of positions of ranked data within a sub-group. Panel C in Table 2 shows a statistically significant difference between the sub-groups at the 5% level. Expanding this result by using MWU tests shows similar results (Panel B) compared to *t*-test results in Panel A: The statistical differences for "PLAN" is at the 5% level and "CURRENT" at the 10% level. In sum, non-parametric test results are similar to those of the two-sided t test, albeit at a lower significance level for "CURRENT".

Assuming that postgraduate finance students have a better understanding of business and are committed to a career in finance and are also more likely to be appointed in more senior levels of

employment, we extend the analysis of hypothesis *H1* through specific investigation of the ethical judgement of postgraduate finance students.

Table 3 presents mean difference test results for postgraduate finance students with the same structure as previously followed. The mean score of postgraduate finance students without intention to enrol is higher at a level of 4.397 compared to the mean for the combined group of 3.698 of those who are enrolled and those who plan to enrol. This is statistically different at the 1% significance level for the one-tailed *t*-test (Panel A).

Table 3
Mean Difference Test Results (Survey Response Scores) for SCORE: Postgraduate Finance Students

Groups 1 and 2 represent subgroup pairs of postgraduate students as indicated in the table with three pairs of results shown for three alternative Group 2 definitions. Differences in means are tested using *t*-test, Mann Whitney U test and Kruskal-Wallis H test methods. Statistical significance at the 1, 5 and 10 percent level is denoted by ***, ** and *, respectively. *t, z* and chi-squared statistics are reported, *p*-values in parentheses.

	SCORE	SCORE of Group 2 = CURRENT	SCORE of Group 2 = PLAN	SCORE of Group 2 = CURRENT + PLAN
Group 1 = NO INTENTION	**4.397** (N = 58)			
Group 2		**3.671** (N = 73)	**3.783** (N = 23)	**3.698** (N = 96)
Panel A: *t*-test				
One-tailed test		2.383***	1.390*	2.398***
H_0: $\mu_1 \leq \mu_2$; H_a: $\mu_1 > \mu_2$		(0.009)	(0.084)	(0.008)
Two-tailed test		2.383**	1.390	2.398**
H_0: $\mu_1 = \mu_2$; H_a: $\mu_1 \neq \mu_2$		(0.018)	(0.168)	(0.017)
Panel B: Mann Whitney U test (MWU)				
H_0: SCORE mean ranks of Group 1 and Group 2 are equal		2.224**	1.315	2.257**
H_A SCORE mean ranks of Group 1 and Group 2 are not equal		(0.026)	(0.188)	(0.024)
Panel C: Kruskal-Wallis H test (KWH)				
H_0: SCORE mean ranks of groups NOINT, CURR, PLAN are equal	5.148*			
H_A: SCORE mean ranks of groups NOINT, CURR, PLAN are not equal	(0.076)			

Finance postgraduate respondents in Group 2 "PLAN" have a mean score of 3.783 which is a difference in average judgement to the lower scored Group 1 at a 10% statistical significance level

in Panel A. Results in Panel B from the non-parametric MWU tests are identical regarding the significance levels when compared to the two-sided t test in Panel A. In addition, the general difference between the subgroups in the combined KWH test is confirmed at a significance level of 10%. Overall, the postgraduate results support our hypothesis *H1*.

Contrary to our expectations, the mean score for female respondents of 3.890 is higher than the mean score of male respondents of 3.755, indicating more lenient ethical judgement by females on average in our sample. Accordingly, the one-tailed *t*-test results in Panel A fail to yield a rejection of the null hypothesis that female students' scores are less or equal than male students' scores. To further explore the unexpected results, we undertake a two-tailed *t*-test (Panel A) which also fails to reject the null of equal means. The non-parametric MWU test in Panel B yields the same result. Therefore, contrary to prior research, we find no impact of gender on a respondent's ability to identify the use of MNPI for trading purposes to be unethical.

Next, we analyse hypothesis *H2* to test whether female students in our sample have a stronger level of ethical judgement than their male peers. The results for this are presented in Table 4.

Table 4

Mean Difference Test Results (Survey Response Scores) for SCORE Based on Gender

Groups 1 and 2 represent female and male respondents, respectively. Differences in means are tested using *t*-test and Mann Whitney U test methods. *t* and *z* statistics are reported, *p*-values in parentheses.

	SCORE	SCORE of Group 2 = MALE
Group 1 = FEMALE	**3.890** (N = 163)	
Group 2		**3.693** (N = 127)
Panel A: *t*-test		
One-tailed test		0.769
H_0: $\mu_1 \leq \mu_2$; H_a: $\mu_1 > \mu_2$		(0.778)
Two-tailed test		0.769
H_0: $\mu_1 = \mu_2$; H_a: $\mu_1 \neq \mu_2$		(0.442)
Panel B: Mann Whitney U test (MWU)		
H_0: SCORE mean ranks of Group 1 and Group 2 are equal		0.872
H_A SCORE mean ranks of Group 1 and Group 2 are not equal		(0.383)

To assess hypothesis *H3* we conduct mean difference tests related to age. We test for differences in mean scores of respondents aged 19 or younger and of respondents aged 20 to 25, as well as 25 and older. Results are presented in Table 5.

Results from the one-tailed *t*-test in Panel A of Table 5 indicate that the null hypothesis, which expresses that students of age up to 19 assign lower or equal scores when compared to older students, cannot be rejected. To assess whether mean scores between students aged up to 19 on the one side and a group of older students on the other side who are either 20 to 25, over 25 or a

combination of the two on the other side are generally different, we employ a two-tailed *t*-test. Results in Panel A show that the ethical judgement of the youngest respondents in our sample, which are those of age 19 or younger, are statistically significantly different at the 10% and at the 5% level from respondents who are 20 to 25 and older than 25, respectively. The combined group, representing 275 respondents of age 20 and older, shows a difference in the mean score that is statistically significantly different at the 5% level. However, the mean scores for the older groups are higher, not lower. This indicates that older survey respondents in our sample are less able to judge the unethical use of MNPI. The combined KWH test (Panel C) supports these findings by detecting mean rank differences in sub-groups at a significance level of 10%. Panel B shows MWU results that indicate the same 5% significance level result for the group "AGE25 and older".

Table 5

Mean Difference Test Results (Survey Response Scores) for SCORE Based on Age

Groups 1 and 2 represent sub-group pairs by age as indicated in the table with three pairs of results shown for three alternative Group 2 definitions. Differences in means are tested using *t*-test, Mann Whitney U test and Kruskal-Wallis H test methods. Statistical significance at the 5 and 10 percent level is denoted by ** and *, respectively. *t, z* and chi-squared statistics are reported, *p*-values in parentheses.

	SCORE	SCORE of Group 2 = AGE20-25	SCORE of Group 2 = AGE25 and older	SCORE of Group 2 = AGE20-25 + AGE25 and older
Group 1 = AGESUB20	**3.494** (N = 87)			
Group 2		**3.842** (N = 240)	**4.257** (N = 35)	**3.895** (N = 275)
Panel A: *t*-test				
One-tailed test		-1.741	-2.354	-1.976
H_0: $\mu_1 \leq \mu_2$; H_a: $\mu_1 > \mu_2$		(0.958)	(0.989)	(0.975)
Two-tailed test		-1.741*	-2.354**	-1.976**
H_0: $\mu_1 = \mu_2$; H_a: $\mu_1 \neq \mu_2$		(0.082)	(0.020)	(0.048)
Panel B: Mann Whitney U test (MWU)				
H_0: SCORE mean ranks of Group 1 and Group 2 are equal		1.576	1.981**	1.808*
H_A SCORE mean ranks of Group 1 and Group 2 are not equal		(0.115)	(0.047)	(0.070)
Panel C: Kruskal-Wallis H test (KWH)				
H_0: SCORE mean ranks of the three age groups are equal	4.697*			
H_A: SCORE mean ranks of the three age groups are not equal	(0.095)			

It should be noted that these results pertaining to age groups may be indicative of the small difference in the age bands used for the first two age groups i.e., under 20 and from 20 to 25. While the top age group of over 25 only consists of 35 students.

Our analysis of the employment status (*H4*) of students presented in Table 6 found insignificant results indicating no difference between those working, either full time or part time and those not working at all.

Table 6:
Mean Difference Test Results (Survey Response scores) for SCORE Based on Employment Status

Groups 1 and 2 represent sub-group pairs by employment status as indicated in the table with three pairs of results shown for three alternative Group 2 definitions. Differences in means are tested using *t*-test, Mann Whitney U test and Kruskal-Wallis H test methods. *t, z* and chi-squared statistics are reported, *p*-values in parentheses.

	SCORE	SCORE of Group 2 = WORKING FULL-TIME	SCORE of Group 2 = WORKING PART-TIME	SCORE of Group 2 = WORKING FULL-TIME + PART-TIME
Group 1 = NOT WORKING	**3.752** (N = 157)			
Group 2		**4.000** (N = 21)	**3.815** (N = 184)	**3.834** (N = 205)
Panel A: *t*-test				
One-tailed test		-0.645	-0.359	-0.470
H_0: $\mu_1 \leq \mu_2$; H_a: $\mu_1 > \mu_2$		(0.740)	(0.640)	(0.680)
Two-tailed test		-0.6451	-0. 3592	-0.4704
H_0: $\mu_1 = \mu_2$; H_a: $\mu_1 \neq \mu_2$		(0.519)	(0.719)	(0.638)
Panel B: Mann Whitney U test (MWU)				
H_0: SCORE mean ranks of Group 1 and Group 2 are equal		0.535	0.210	0.313
H_A SCORE mean ranks of Group 1 and Group 2 are not equal		(0.596)	(0.834)	(0.754)
Panel C: Kruskal-Wallis H test (KWH)				
H_0: SCORE mean ranks of the three age groups are equal	0.274			
H_A: SCORE mean ranks of the three age groups are not equal	(0.871)			

While the parametric (Panel A) and non-parametric (Panels B and C) result do not support hypothesis *H4*, it may not come as a surprise. Many students frequently have part-time / casual employment that is unrelated to the financial services industry. Also, as noted for H3, the majority

(92.3%) of students in this study are under 25 and are therefore likely to have had very little work experience if any and so unlikely to have different views from those with no work experience.

As a robustness check, and to complement results from the means difference analysis (Tables 1 to 5) we estimate the following regression model:

$$SCORE = \alpha + \beta_1 NOINT + \beta_2 FEMALE + \beta_3 AGESUB20 + \beta_4 UGRAD + \beta_5 NOWORK + \varepsilon \quad (1)$$

where SCORE is the respondent's assigned score; NOINT is a dummy variable and is 1 if the respondent has no intention to enrol in an ethics subject; FEMALES is a dummy variable and is 1 if the respondent is female; AGESUB20 is a dummy variable and is 1 if the respondent is less than 20 years old; UGRAD is a dummy variable and is 1 if the respondent is an undergraduate finance student; NOWORK is a dummy variable and is 1 if the respondent is working neither part-time nor full-time; and ε is a stochastic error term.

We estimate the relation between the regressors in Equation (1) and the ethical judgement score assigned by an individual in response to the case study employed. To be consistent, and similar to our analysis of differences in means, we follow Norman (2010) who shows that parametric tests for Likert-type data are generally more robust than nonparametric tests.

The regression results in Table 6 are in line with the previous results of the means difference analyses and provides support for our key result for the regressor NOINT. The coefficient for the dummy variable NOINT is positive and highly significant at the 1% level. Having no intention to enrol in a finance ethics subject increases the score assigned by the respondent on average by 0.496. This result validates the finding that finance students who choose an ethics elective subject have a higher level of understanding of, as well as ability to identify and judge ethical issues when compared to their peers who have no intention to enrol in an ethics subject.

Table 7:
Regression Results from the Multivariate Regression Model for the Full Sample (N = 362)
Significance levels are ***0.01, **0.05, and *0.10 with coefficient standard errors in parentheses.

Constant	3.8766*** (0.1985)
NOINT	0.4961*** (0.1833)
FEMALE	0.1572 (0.1736)
AGESUB20	-0.4267* (0.2321)
UGRAD	-0.1773 (0.2085)
NOWORK	-0.2640 (0.1869)
R-squared	0.0399
F-Statistic	2.9593
Observations	362

Further, and reinforcing the results discussed for Table 4, the coefficient for the gender dummy FEMALE is positive, suggesting that females in our sample provide a judgement that indicates "more ethical" compared to their male and other colleagues. However, the FEMALE coefficient lacks statistical significance. Regarding respondents' experience related to age, we see that the younger finance students judge the individual's action in the case to be less ethical than those in older age groups with a 10% level of significance corroborating our difference tests. This result supports our previous findings discussed for Table 5. The UGRAD coefficient is negative at a level of -0.177 and lacks statistical significance. Finally, having no work experience (NOWORK) appears to be indicate a better ethical judgement of the case, but lacks statistical significance.

Conclusion

In this paper we examine whether finance students who are currently enrolled, or plan to enrol in an ethics elective exhibit a higher level of moral development compared to students who have no intention to enrol in such a subject.

Our study employs data obtained from a survey based on an insider trading case study among 362 Australian and international undergraduate and postgraduate students. The case, developed by a financial industry subject matter expert, details how an analyst makes the decision to use material non-public information for the benefit of an investment firm's clients. This topic is extremely important as insider trading represents unethical behaviour that is among the most severe threats to the integrity of and trust in capital markets.

The case study was validated using a control group of industry practitioners and finance experts. The control group's results serve as a benchmark consensus view and confirms that the behaviour outlined in the survey's case study is identified as unethical by finance professionals and experts. Our main result indicates that students who are currently enrolled, or plan to enrol in a stand-alone ethics subject, are better capable of identifying unethical behaviour in finance (insider trading) compared to students who have no intention to enrol into a finance ethics elective subject.

In addition, our results indicate that ongoing transformations of education and labour markets and resulting improvements towards gender equality have decreased gender-based differences of ethical judgement compared to prior gender bias studies. Our results related to finance students' experience based on age and work suggest that students' ethical judgement does not appear to be different for the age groups considered. Also, work experience among the young adults who participated in this study may perhaps not be strictly related to financial subject matter experience and therefore lacks to serve as a driver for observed ethical judgement.

Our findings are important because they can make the economy and society as a whole better off by informing educational policy design in business schools. Our results encourage business schools' administrators and faculty to strengthen finance curriculum and competency development in all university business programs by making ethics a compulsory subject, teaching real world case studies as proposed by authors such as Asaad (2016), Cagle (2005), Hauser et. al. (2017) and Hess et al. (2004). Importantly, our results allow students who may have had no intention to study finance ethics to better understand the connections between the virtues of ethics and the enhancing of their professional careers (e.g., in finance) and personal lives (Giacalone and Promislo, 2013). As a consequence, higher education policies should consider adopting mandatory ethics education in business and finance programs to, not only foster employability of students in response to

growing demand for ethical leadership in businesses, but, more importantly, to protect society as a whole from an implicitly accepted culture of unethical behaviour in the financial industry.

References

AACSB International. (2004). Ethics Education in Business Schools. Available online: https://www.aacsb.edu/~/media/AACSB/Publications/research-reports/ethics-education.ashx [accessed 17 January 2020].

Adkins, N., & Radtke, R.R. (2004). Students' and Faculty Members' Perceptions of the Importance of Business Ethics and Accounting Ethics Education: Is There an Expectations Gap? *Journal of Business Ethics*, 51, 279-300.

Alan, C.B., & Au, A.K. (1997). Are New Zealand Business Students More Unethical Than Non-business Students? *Journal of Business Ethics*, 16(4), 445-450.

Asaad, C. (2016). Educational Entertainment: Integrating Business Ethics with Out-of-the-Classroom Financial Documentaries. *Journal of Financial Education*, 42(1-2), 56-80.

Borkowski, S.C., & Ugras, Y.J. (1998). Business Students and Ethics: A Meta-Analysis. *Journal of Business Ethics*, 17, 1117-1127.

Cagle, J. (2005). Case Studies of Ethical Companies to Emulate: Effects on Ethical Perceptions of Finance Students. *Journal of Financial Education*, 31, 41-56.

Cagle, J.A.B., & Baucus, M.S. (2006). Case Studies of Ethics Scandals: Effects on Ethical Perceptions of Finance Students. *Journal of Business Ethics*, 64(3), 213-229.

Carifio, J. & Perla, R. (2007). Ten common misunderstandings, misconceptions, persistent myths and urban legends about Likert scales and Likert response formats and their antidotes. *Journal of social sciences*, 3(3), 106-116.

Carifio, J. & Perla, R. (2008). Resolving the 50-year debate around using and misusing Liker scales. *Medical Education*, 42, 1150-1152.

CFA Institute. (2018). The Next Generation of Trust. Available online: https://nextgentrust.cfainstitute.org/wp-content/uploads/2018/04/CFAITrust-Global-Report.pdf [accessed 12 Dec. 2019].

Colman, A. M., Norris, C. E., & Preston, C. C. (1997). Comparing rating scales of different lengths: Equivalence of scores from 5-point and 7-point scales. *Psychological Reports*, 80(2), 355-362.

D'Aquila, J. M., Bean, D. F., & Procario-Foley, E. G. (2004). Students' Perceptions of the Ethical Business Climate: A Comparison with Leaders in the Community. *Journal of Business Ethics*, 51(2), 155-166.

Davis, J.R., & Welton, R.E. (1991). Professional Ethics: Business Students' Perceptions. *Journal of Business Ethics*, 10, 451-463.

Dellaportas, S. (2006). Making a Difference with a Discrete Course on Accounting Ethics. *Journal of Business Ethics*, 65(4), 391-404.

Derrick, B. & White, P. (2017). Comparing two samples from an individual Likert question. *International Journal of Mathematics and Statistics*, 18(3), 1-13.

DeWees, T.A., Mazza, G.L., Golafshar, M.A. & Dueck, A.C. (2020). Investigation into the Effects of Using Normal Distribution Theory Methodology for Likert Scale Patient-Reported Outcome Data From Varying Underlying Distributions Including Floor/Ceiling Effects. *Value Health*, 23(5), 625-631.

Dobson, J. (2008). Introducing Ethics into the Finance Curriculum: A Simple Three-Level Guide. *Journal of Financial Education*, 34, 1-17.

Emerson, J. (2003). The Blended Value Proposition: Integrating Social and Financial Returns. *California Management Review*, 45(4), 35-51.

Evans, J.M., Trevino, L.K. & Weaver, G.R. (2006). Who's in the Ethics Driver's Seat? Factors Influencing Ethics in the MBA Curriculum. *Academy of Management Learning and Education*, 5(3), 278-293.

Eweje, G., & Brunton, M. (2010). Ethical Perceptions of Business Students in a New Zealand University: do Gender, Age and Work Experience Matter? *Business Ethics: A European Review*, 19(1), 95-111.

Finstad, Kraig. (2010). Response interpolation and scale sensitivity: Evidence against 5-point scales. *Journal of Usability Studies*, 5(3), 104-110.

Franke, G.R., Crown, D.F., & Spake, D.F. (1997). Gender Differences in Ethical Perceptions of Business Practices: a Social Role Theory Perspective. *Journal of Applied Psychology*, 82(6), 920-934.

Giacalone, R.A. & Promislo, M.D. (2013). Broken When Entering: The Stigmatization of Goodness and Business Ethics Education. *Academy of Management Learning and Education*, 12(1), 86-100.

Grech, V. & Calleja, N. (2018). WASP (Write a Scientific Paper) Parametric vs. Non-Parametric Tests. *Early Human Development*, 123, 48-19.

Harpe, S.C. (2015). How to analyse Likert and other rating scale data. *Currents in Pharmacy Teaching and Learning,* 7, 836-850.

Hauser, R., Asaad, C.T. & Bartholow, J. (2017). You Decide: The Company You Keep. *Journal of Financial Education*, 43(1), 161-183.

Hess, D., Norman, C., & Strand, C. (2004). Teaching Ethics in Investment Classes: A Series of Vignettes. *Journal of Financial Education*, 30, 41-60.

Hopkins, S., Dettori, J.R. & Chapman, J.R. (2018). Parametric and Nonparametric Tests in Spine Research: Why do They Matter? *Global Spine Journal*, 8(6), 652-654.

Imam, T. (2018). Curriculum Coherence when Subject-specific Standards are Absent: a Case Study Using Coursework-based Master of Finance Programs at Australian Universities. *Studies in Higher Education*, 43(7), 1135-1147.

Jamieson, S. (2004). Likert scales: How to (ab) use them? *Medical education*, 38(12), 1217-1218.

Jones, D.A. (2009). A Novel Approach to Business Ethics Training: Improving Moral Reasoning in Just a few Weeks. *Journal of Business Ethics*, 88(2), 367-379.

Jonson, E.P., McGuire, L.M. & O'Neill, D. (2015). Teaching Ethics to Undergraduate Business Students in Australia: Comparison of Integrated and Stand-alone Approaches. *Journal of Business Ethics*, 132(2), 477-491.

Kohut, G.F. & Corriher, S.E. (1994). The Relationship of Age, Gender, Experience and Awareness of Written Ethics Policies to Business Decision Making. *SAM Advanced Management Journal*, 9(1), 32-39.

Kovacevic, A., Hambusch, G., Michayluk, D. & G. Van de Venter. (2016). The Effectiveness of Ethics Training on the Development of Moral Judgement in Finance Students. *Australasian Journal of Economics Education*, 13(2), 1-31.

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, 22(140), 5-55.

Liu, J., Yi, Y. & Wang, X. (2020). Exploring factors influencing construction waste reduction: A structural equation modelling approach. *Journal of Cleaner Production*, 276, 123185.

Locke, E.A. (2006). Business Ethics: A Way Out of the Morass. *Academy of Management Learning and Education*, 5(3), 324-332.

Lovelock, B. & Hayes, S. (2020). Challenges associated with implementing discriminatory pricing: the case of international tourist anglers in New Zealand, *Tourism Recreation Research,* 45(3), 351-363.

May, D.R., Luth, M.T., & Schwoerer, C.E. (2014). The Influence of Business Ethics Education on Moral Efficacy, Moral Meaningfulness, and Moral Courage: A Quasi-experimental Study. *Journal of Business Ethics*, 124(1), 67-80.

Mele, D. (2008). Integrating Ethics into Management. *Journal of Business Ethics*, 89(3), 291-297.

Norman, G. (2010). Likert Scales, Levels of Measurement and the 'Laws' of Statistics. *Advances in Health Sciences Education*, 15(5), 625-632.

Padilla, M.E., Frietze, G.A., Hartman, J. & Mendez, I.A. (2020). Assessing the impact of faculty research profile videos on student's learning perceptions towards research at a school of pharmacy. *Currents in Pharmacy Teaching and Learning*, 12(10), 1239-1244.

Perryer, C., & Jordan, C. (2002). The Influence of Gender, Age, Culture and Other Factors on Ethical Beliefs: A Comparative Study in Australia and Singapore. *Public Administration and Management: An Interactive Journal*, 7(4), 367-382.

Persons, O. (2009). Using a Corporate Code of Ethics to Assess Student's Ethicality: Implications for Business Education. *Journal of Education for Business*, 84(6), 357-366.

Seto-Pamies, D., & Papaoikonomou, E. (2016). A Multi-level Perspective for the Integration of Ethics, Corporate Social Responsibility and Sustainability (ECSRS) in Management Education. *Journal of Business Ethics*, 136(3), 523-538.

The Ethics Centre. (2019). Banking Royal Commission: The World of Loopholes has Ended. Available online: https://ethics.org.au/banking-royal-commission-the-world-of-loopholes-has-ended [accessed 12 Dec. 2019].

Ting, D.H., & Lee, C.K.C. (2012). Understanding Students' Choice of Electives and its Implications. *Studies in Higher Education*, 37(3), 309-325.

Tse, A.C.B. & Au, A. K.M. (1997) Are New Zealand Business Students More Unethical Thank Non-Business Students? *Journal of Business Ethics*, 16, 445-450.

Verschoor, C.C. (2017). Ethics Attitudes Differ Among Generations: Understanding Generational Differences can Provide Insights About how to Approach Ethical Standards and Culture Within an Organization. *Strategic Finance*, 98(8), 19-21.

Wang, L.C., & Calvano, L. (2015). Is Business Ethics Education Effective? An Analysis of Gender, Personal Ethical Perspectives, and Moral Judgment. *Journal of Business Ethics*, 126, 591-602.

Warren, D.E., Gaspar, J.P., & Laufer, W.S. (2014). Is Formal Ethics Training Merely Cosmetic? A Study of Ethics Training and Ethical Organizational Culture. *Business Ethics Quarterly*, 24(1), 85-117.

Wigley III, C. J. (2013). Dispelling Three Myths about Likert Scales in Communication Trait Research, *Communication Research Reports*, 13(4), 366-372.

APPENDIX 1

This appendix presents the case study of the survey and answer choice scores offered to survey participants.

Case Study

Susan Myer is an analyst at the investment firm AlphaCo that manages an equity fund in which clients invest. The country in which AlphaCo and Myer are situated does not have strict securities laws and regulations. Myer analyses a pharmaceutical company, DeveloPharm, which is developing a new medication to treat cancer. AlphaCo holds a large number of DeveloPharm shares in its fund. A large trial of the medication was undertaken with test patients, but results have not yet been disclosed publicly.

As part of her analysis, Myer meets with several of DeveloPharm's senior executives. The visit includes a tour of the production facilities with one of DeveloPharm's managers. During the tour and without intent, Myer notices a document on a desk. The front page reveals to Myer that the medication's trial was a failure, i.e. the medication has not proven to be effective in treating cancer.

After returning to her office that afternoon, Myer informs AlphaCo's fund managers that she has changed her outlook on DeveloPharm from positive to negative. As a result, AlphaCo immediately sells all of the fund's DeveloPharm shares. Although Myer holds a large number of DeveloPharm shares in her personal portfolio, she does not sell any of her own shares. Two weeks later, DeveloPharm publicly announces that the medication trial was a failure and DeveloPharm's shares lose half of their value in that day's trading.

On a scale from 1 (very unethical) to 7 (very ethical), how do you rate the ethical nature of Myer's action to inform AlphaCo's fund managers that she has changed her outlook on DeveloPharm from positive to negative and to not sell the shares of DeveloPharm from her personal portfolio? (Circle your answer)

APPENDIX 2

This appendix presents information related to background and optimal design of the Likert question and rating scales employed in this study.

A2.1 Likert Statements / Questions

Likert statements and corresponding response scales are standard research tools in the natural sciences, e.g., in medical and health science research. Social sciences have also adopted the use of Likert scales, e.g., in sociology research. First proposed by American psychologist Rensis Likert (1932), a "Likert scale" is a bipolar psychometric scale that is frequently used in survey response-based research to assess respondents' level of, e.g., attitude, satisfaction, value or opinion.

To measure the attitude of university students towards a type of unethical behaviour in finance (i.e., insider trading), we use a Likert scale question to ask students to rate the behaviour exhibited by a character in a case study using a bipolar rating scale with extreme points that range from "very unethical" to "very ethical" with intermediate scale points as answer options (see Appendix 1 for the case and survey question). This approach not only provides respondents' direction of the attitude (ethical versus unethical) but it also provides a measure of attitude via several scale points located between the extremes.

Following Johns (2010), and to increase the accuracy of results obtained, our survey question avoids three key problems that can introduce ambiguity, which are (1) using two attitudes in a single statement (e.g., "How much do you agree or disagree with …"), (2) using quantitative terms (e.g., "better", "worse", or "always") and (3) using persuasive assertations ("Something is better than something else." – "Do you agree?") that can cause acquiescence or agreement bias.

A2.2 Likert Response Scales

As a second step, the survey question is complemented by a Likert response scale, which is also sometimes referred to as a rating scale. In general, and despite its discrete step or category character, a response scale is intended to represent a continuum of attitude choices. Therefore, a larger number of rating choices appears to best approximate the attitude continuum, but it can lead to respondents' dissatisfaction, which can result into reduced response rates and accuracy.

Likert's original work employed a five-point scale in an effort to strike a balance between extracting directional response content (for which two or three scale points suffice) and the desire to extract the strength of a respondent's attitude through using a large number of scale points between the two extremes.

In general, most researchers choose five- or seven-point scales. The literature has pointed out several advantages of using a seven-point scale, which include (1) a slightly improved approximation of the attitude continuum, (2) taking advantage of humans' ability to distinguish up to seven categories in terms of immediate memory ability and (3) improved accuracy over five-point scales in electronic survey distributions (Finstad 2010; Johns, 2010; Colman Norris and Preston 1997). Provided that our study relies on a single focused question to assess the ethical judgement of survey respondents, we employ a seven-point scale to increase result accuracy and to best accommodate the electronic distribution of our survey.

APPENDIX 3

This appendix presents demographic information obtained from survey respondents and sub sample results for respondents' SCORE.

	N	Percent of sample	Mean	Std. Dev	Score 1-3	Score 4	Score 5-7
Full Sample	362	100%	3.80	1.63	46.4%	21.0%	32.6%
1. Gender							
Female	163	45.0	3.90	1.58	42.9%	22.7%	34.4%
Male	196	54.1	3.76	1.70	48.2%	20.3%	31.5%
Other	3	0.8	1.67	0.58	100%	0%	0%
2. Age							
Under 20	87	24.0	3.50	1.41	50.6%	29.9%	19.5%
20-25	240	66.3	3.84	1.65	46.3%	17.9%	20.0%
older than 25	35	9.7	4.26	2.06	37.1%	20.0%	42.9%
3. Graduate level							
Undergraduate	218	60.2	3.67	1.55	42.9%	18.8%	38.3%
Postgraduate	144	39.8	3.99	1.78	49.0%	22.6%	28.4%
4. Mode of study							
Part-time	28	7.7	4.14	2.63	39.3%	17.9%	42.9%
Full-time	334	92.3	3.77	1.62	47.0%	21.3%	31.7%
5. Intention of taking subject							
Currently enrolled	127	35.1	3.69	1.62	49.6%	17.3%	33.1%
Plan to enrol	111	30.7	3.57	1.63	52.3%	18.0%	29.7%
No intention to enrol	124	34.3	4.11	1.68	37.9%	27.4%	34.7%
6. Work							
Not working	157	43.4	3.75	1.60	45.9%	21.7%	32.4%
Working part-time	184	50.8	3.82	1.66	47.3%	21.2%	31.5%
Working full-time	21	5.8	4.00	2.04	42.9%	14.3%	42.9%

Financial Literacy – Evidence of Lack of Knowledge with Policy Suggestions

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Financial literacy is of ever-increasing importance. Using FINRA data of bi-annual surveys of U.S. residents in all 50 states, we test knowledge of basic financial literacy concepts such as inflation, compound interest, diversification, retirement savings for those that self-identify with high financial knowledge. Separately, we examine those required to take a course in financial education. We find gaps in basic financial knowledge when measuring the population with some financial education. With more retirees and fewer workers to fund government programs, the large increase in national debt with the global pandemic, it is crucial that individuals have a solid understanding of their finances; else, there is a concern for substantial loss of wealth and less government support in investor's later years. We present data and arguments for a national standard in financial education, essentially a national curriculum recommended for basic financial education.

Keywords: financial literacy, personal investing, savings, retirement, financial education reform

As a country, we have seen millions of Americans, with a general lack of financial planning, struggle every day with their money, only to wind up deep in debt.

https://www.cnbc.com/2021/04/05/state-of-personal-finance-education-in-the-us.html

Introduction

Financial education requirements are increasing in the United States, as indicated by the 2020 Survey of the States, conducted bi-annually by the *Council of Economic Education*. In the most recent survey, 21 states required a high school course in personal finance, and 25 states required a similar course in economics. The continual urging of increased needs for financial education begs the question, "Are we preparing residents adequately?" Prior studies, including Lusardi (2019), Lusardi and Mitchell (2014), and Lusardi and Tufano (2015), predicate concerns with the level of financial literacy in the general population. We examine the data from the National Financial Capability Study (NCFS), a project of FINRA to measure how well basic financial skills are transferred and, more importantly, understood. With the increased advent of financial education, it is important to determine if people understand the basics of inflation, diversification, mortgage interest, retirement savings, and compound interest and suggest potential reforms.

With the Covid-19 pandemic and impending stay-at-home orders, consider the type of activity that impacted the equity markets. In the first half of 2021, much attention was given to the Reddit subgroup #WallStreetBets, which, dissatisfied with the heavily short position held by hedge funds, worked to manipulate the price of GameStop and A.M.C. Posters rallied purchases of the stock, driving the stock price of GameStop from $20 on January 13 to a high of to $413 on January 29, two weeks later. The price plunged to $74 in just two trading days and has since rallied to around $240 in June 2021. Did the intrinsic value of GameStop change? Arguably not; rather, the social media and gaming rally to buy in using acronyms such as YOLO, 'you only live once,' gamers and individual investors following Reddit's posts purchased thousands of call options driving the price beyond any realistic valuation. Hedge funds with a short position lost millions. Some small investors won, but had the intrinsic value of GameStop, the retail gaming company known for brick and mortar stores, changed? In the end, it is unlikely that knowledge of valuation impacted these investors' decisions. Instead, the GameStop stock prices were arguably little about the firm's intrinsic value but rather a behavioral phenomenon caused when a large subset of younger adults had extra leisure time due to the pandemic and support from the stimulus and unemployment funding. The price wins by some otherwise uninformed investors will likely result in the sense of overconfidence and hubris, often acting and overreacting to news and drives in the markets. Most investors do not have the sophistication to value a firm. They should think about investing in mutual funds or diversified portfolio management by a professional portfolio manager. Most investors gain wealth through diversified portfolios rather than individual securities. This recent example illustrates the importance of financial education in teaching about diversification as well as fundamental risk and return metrics.

While an interesting anecdote, this points to a larger concern in the markets. If investors can rally and drive stock prices, how well do these same investors understand basic finance fundamentals? There is a genuine concern that continued experiences like GameStop will alleviate individuals' concerns about the key driving forces in the marketplace. Goyal and Kumar (2020) find a consistent deficiency of financial literacy across all populations, specifically across demographic strata. Thus, we argue that these trading environments may harm the financial markets if the investors do not, in general, have a basic financial understanding of key issues, including inflation, interest, retirement planning, and mortgages.

Over the past fifty years, The Federal Reserve reports an average personal savings rate of 9%. From March 2020-April 2021, the average savings rate was 18.8%, with a spike as high as 33% in April 2020. It is believed this spike was largely holding onto funds due to the uncertainty of the pandemic and potential stimulus funding. This large savings in 2020 led to pent-up demand for spending in 2021, which may have been a partial driver in the GameStop and related firms' upswings in value. Americans, in general, save about 9% of personal income, and with increased inflation to catch up for low inflation at the start of the pandemic, real savings will likely diminish with a spending surge. Federal Reserve Chair Jerome Powell presents the Fed's position clearly—maintain an average core inflation rate at 2%, allowing higher than 2% for a sustained time to make up for lower inflation in 2020. Notably, this core inflation excludes food and energy, two crucial sectors that tend to hold higher inflation rates. Thus, while Americans are saving, are they understanding the impact of inflation on purchasing power? Because of Federal debt during the pandemic, understanding inflation is important to increase their future savings to account for inflation risk.

Another form of spending comes with home mortgages. For most taxpayers since 2017, mortgage interest has no longer been deductible due to a much larger personal exemption.

Mortgage lenders tend to promote thirty-year mortgages with the argument that homeowners can always prepay additional principal if desired and, as such, not be tied to higher payments of a 15-year mortgage. Some behavioral studies such as Foltice and Langer (2018) have uncovered what they and others in the literature describe as exponential bias. It is a scenario where debtholders do not understand the exponential increase in loan balances due to compounding and instead believe that the increase is linear. This results in individuals choosing to prefer long-term loans and short-term savings instruments. The fifteen-year mortgage will save on total interest payments in a manner only emulated with the strictest of willpower to maintain incremental principal payments on a thirty-year mortgage.

There has been a consistent theme toward increasing financial education as a necessary, functional tool for adults in the United States. Monticone (2010) determined that higher levels of financial knowledge were predictive of more wealth accumulation. In the 21st century, where independent wealth accumulation is crucial to long-term financial security, it is of increased importance, as highlighted in this particular issue. Skagerlund, Lind, Strömbäck, Tinghög and Västfjäll (2018) denote a positive relationship between literacy and confidence with numeracy, and Remund (2010), as well as Skagerlund et al. (2018), call for increased financial literacy due to the increasingly complex economy. In the most recent Survey of the States (2020), twenty-one states required a course in financial education in the high school curriculum. In some instances, employers offer financial education as well as independent entities. The question at this juncture is to examine the efficacy of the total financial education system in the United States to determine if the current model is working. Using data from the FINRA Foundation, we focus on respondents that believe they have good financial knowledge or have had a required course in financial education to understand how well they understand the basic concepts of compound interest, inflation, mortgage terms, retirement savings, and credit. The results indicate that those that claim to have strong financial education or have had a required course in financial education are ill-equipped to understand basic financial concepts. While this may be partially explained by hubris or not remembering some concepts, it calls for a national standard for financial education to ensure that upcoming generations better understand basic finance.

Given incomplete knowledge and other lures, people can get into trouble by not understanding the basic concept of diversification. Like those hurt most financially by the pandemic, these are people who can ill afford the loss (Federal Reserve Chair Jerome Powell, April 28, 2021, FOMC press conference). This may result in financial ruin placing an unaffordable burden on society and future generations that could far exceed our current pandemic and $28 trillion in national debt. We are close to moving past the crucial point of correction if people do not understand the need to save, plan, and understand how inflation impacts purchasing power.

Literature Review

Investing is challenging to most Americans. Financial knowledge determines different investment strategies and therefore implies differential wealth accumulation. Amager, Groot, van der Brink and Wilschut (2018) distinguish between skills, knowledge, attitude, and confidence. Current programs aimed at minors and adults do not meet all three criteria and argue for strengthening the financial literacy education programs. Hibbert, Lawrence and Prakash (2012, 2013, 2018) completed an extensive survey of U.S. finance professors who are well equipped to understand the risk characteristics of their investments. They examine whether finance professors

invested differently than the rest of the population. Comparing finance professors to the Federal Reserve's Survey of Consumer Finances, the authors find women, in general, are significantly more risk-averse than men. Interestingly, when both men and women have attained strong financial education, they are equally likely to invest a significant portion of their portfolio in risky assets, suggesting that financial education mitigates the gender difference in financial risk aversion. This study is important because it reflects how the gender gap is reduced with financial education.

The decrease in risk aversion may hold for those with solid financial education, i.e., those with advanced finance degrees such as finance professors and investment management professionals, but not the general population, even if there is solid financial education. Klapper and Lusardi (2020) measured financial literacy with four questions on interest rates, interest compounding, inflation, and risk diversification to 150,000 adults in 140 countries, finding the strongest performance in Canada, Germany, the United Kingdom, and the United States. Performance was lower in the over 65 age group as well as with female respondents. Specifically, economic success was determined by the ability to forecast and thus, understand the impacts of inflation by DeBruine, Vanderklaauw, Downs, Fishoff, Topa and Armantier (2010), which suggests the understanding of inflation is important in basic financial education.

Hastings, Madrain and Skimmyhorn (2013) suggest that how financial education is structured could matter whether it has meaningful effects or outcomes. Behrman, Mitchell, Soo and Bravo (2012) used data from the nationally stratified Social Protection Survey to argue that the investment in financial literacy determines that investing in financial literacy, individuals, firms, and governments can enhance household wealth and well-being. Das (2019) presents the advent of fintech and the changing financial markets. We argue it is crucial for users with access to these tools to have a strong base in financial knowledge.

Grimes, Rogers and Smith (2010) note that those that do not take a high school course in business or economics are less likely to hold a bank account. Bi-annually, the Council for Economic Education conducts a comprehensive survey to review the United States K-12 economic and financial education to measure progress over time. The most recent survey, in 2019, reflected that most high school students had at least some access to personal finance, with almost 70% provided the option to take at least a one-semester elective. Unfortunately, a semester-long course was only required for 17% of the respondents. Investing is challenging to most, and financial literacy is of utmost importance as baby boomers retire and younger generations earn to support their retirement.

An experimental study of college students at a U.S. university by Foltice and Langer (2018) finds that a significant part of their sample of students does not understand compound interest very well. It had poor outcomes on their selection of debt and savings decisions. Specifically, they find that more than a quarter of the students who have taken on debt believed that their debt level was rising linearly and not exponentially. They also invested in short-term debt securities when choosing savings instruments. Interestingly, they find the same exponential growth bias in first-year and upper-level students, many of whom have learned about compound growth rates. Lusardi, Michaud and Mitchell (2017) show that financial knowledge is a key determinate in wealth inequality, and as such, it is crucial to promote more financial literacy. In light of the incremental $12 trillion in additional U.S. government debt taken on, at this writing, due to the Coronavirus pandemic and the increasing likelihood of decreased funding in retirement from

Social Security, Americans must have a strong sense of financial literacy in their early twenties to plan appropriately for a lifetime of financial security.

Research Hypotheses

We develop three hypotheses using FINRA data of bi-annual surveys of U.S. residents in all 50 states. The first is related to self-identified financial knowledge; the second two are related to whether or not the individual indicated they had required financial education. After regressing test results against financial knowledge and financial education, we aim to develop a recommendation for future financial education. Those with high financial knowledge and required financial education were expected to perform better. If this is not the case, reform will be suggested.

H1: Individuals with *perceived higher levels of financial knowledge* are predicted to be positively related to perceived quality of financial education, understanding of savings, inflation, bonds, mortgages, diversification as well have basic retirement planning.

We test this hypothesis by regressing the dependent variable of high perceived level of financial knowledge against each independent variable individually and collectively. A priori, we would expect a positive relationship between a perceived high level of financial knowledge and the independent variables.

H2: Individuals that were *required to take financial education* coursework are predicted to have an understanding of savings, inflation, bonds, mortgages, diversification, and some retirement savings knowledge.

We test this hypothesis using the respondents that indicate they were required to take financial education coursework and measure the impact of the independent variables for these individuals. Signs and significance would be expected to be positive if the financial education that was required is teaching concepts that are remembered.

H3: Individuals that were *not required to take financial education* coursework are predicted not to have as strong an understanding of savings, inflation, bonds, mortgages, diversification, and some retirement savings knowledge.

We test this hypothesis using the respondents that indicate they were not required to take financial education coursework and measure the impact of the independent variables for these individuals. Signs and significance are less predictable than the first two hypotheses. If financial education is working well, the impact would be less than those required to have a financial education. A priori, we expected to see that those with self-identified high levels of financial knowledge (at least a five on a seven-point Likert scale) would have stronger financial skills. Those required to take financial education coursework are expected to have stronger financial skills vis-à-vis the understanding of basic financial concepts.

Methodology and Data Analysis

We use a subset of the 2018 National Financial Capability Study data. The FINRA Investor Education Foundation sponsors this study. The study asks a set of survey questions to investors in all 50 states. The questions are broadly classified into four categories: 1) Making ends meet, 2) Planning ahead, 3) Managing financial products, and 4) Financial knowledge and decision making. We merged the FINRA dataset with the Council for Economic Education's Survey of the States

data. The survey gives information on whether financial education was a required component of high school education. Table 1 presents the variable definitions used in the regressions.

Table 1
Variable Definitions

Variable	Response	Question
Dependent Variables		
H.F.K.	High Financial Knowledge, self-scored (5-7)	How would you assess your overall financial knowledge on a scale from 1 to 7, where one means very low and seven means very high?
Y_FE	Yes, required financial education	Were you ever required to take financial education?
NO_FE	No required financial education	Were you ever required to take financial education?
Independent variables – knowledge-based questions		
H.Q.--F.E.	High-quality financial education, self-scored (5-7)	Overall, how would you rate the quality of the financial education you received?
SAV	More than $100	Suppose you had $100 in a savings account, and the interest rate was 2% per year. After five years, how much do you think you would have in the account if you left the money to grow?
INFL	Less than today	Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After one year, how much would you be able to buy with the money in this account?
BOND	They will fall	If interest rates rise, what will typically happen to bond prices?
DBLE	At least five years but less than ten years	Suppose you owe $1,000 on a loan and the interest rate you are charged is 20% per year compounded annually. If you did not pay anything off, at this interest rate, how many years would it take for the amount you owe to double?
MORT	True	A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less.
DIVERS	False	Buying a single company's stock usually provides a safer return than a stock mutual fund.
Independent variables – retirement, savings, and credit usage questions		
RET_THINK	Yes	Have you ever tried to figure out how much you need to save for retirement?
401K	Yes	Do you [or your spouse/partner] have any retirement plans through a current or previous employer, like a pension plan or a 401(k)?
OTHR_RET	Yes	Any retirement accounts, employer-based or independent (C1 or C4) [2009 base]
RET_CONTRIB	Yes	Do you [or your spouse/partner] regularly contribute to a retirement account like a 401(k) or I.R.A.? [2009 base]
CREDIT	Yes	In the past 12 months, which of the following describes your experience with credit cards? - I always paid my credit cards in full

We examine several qualifier variables, the first being if the individual believes they had a high degree of financial knowledge. The question asked was, 'On a scale from one to seven, where one means very low, and seven means very high, how would you assess your overall financial knowledge?' Those who self-rated in between five and seven inclusive were expected to have a higher degree of financial knowledge by FINRA. In individual regressions, the perception of having received a high-quality financial education is significant and positively related to the perception of having good financial knowledge. This implies that respondents believe they have good financial knowledge have received good financial education.

From this point, the results are much more concerning. Individual regressions of basic understanding of savings, inflation, bond valuation, mortgage terms, and diversification are insignificant for those with perceived high financial knowledge, leading to concerns about the right level of financial knowledge among respondents. Four questions on retirement planning were asked as follows.

1. Have you ever tried to figure out how much you will need to save for retirement?
2. Do you [or your spouse/partner] have any retirement plans through a current or previous employer, like a pension plan or a 401(k)?
3. Any retirement accounts, employer-based or independent (C1 or C4) [2009 base]
4. Do you [or your spouse/partner] regularly contribute to a retirement account like a 401(k) or I.R.A.? [2009 base]

All received significant positive signs, as expected. This indicates that Americans that believe they have good financial knowledge believe they have had a good financial education. They have considered the total amount needed for retirement, and they do have some retirement plans. Additionally, they contribute to their plan; we do not know how much or if the general trend on retirement savings is likely adequate. More concerning, would the person know if it was inadequate?

In aggregate, Table 2 indicates that those who self-indicate have a high degree of financial knowledge do not understand basic finance. High financial knowledge is significant with perceived high-quality financial education, and high financial knowledge respondents answered the question on the relationship between interest rates and bond prices incorrectly. This is a more challenging question for general financial literacy, but the concern lies in its significance in the wrong direction. These results partially support H1 in that people who have thought about retirement contributed to a plan but did not understand basic financial concepts such as inflation, diversification, or mortgage terms. In Table 2, Regression 14, measuring retirement planning and investment, we see generally correct responses for retirement, but Regression 13, measuring tools, does not reflect any significantly correct values.

In Table 3, we measure the impact of those required to take financial education. This group is likely to have thought about retirement, but again, that is all that leans toward basic financial literacy. No other variable is significant, which is very concerning and leads to significant financial education structure and policy concerns. In Table 4, we measure the impact of those not required to take financial education, and there are no significant signs of the correct direction. Retirement is negative; other variables are insignificant. Thus, those that were not required to take financial education were less likely to have thought about retirement. Other than that, there are no economic differences in the respondents. The seemingly full lack of comprehension in the years post-education is most concerning here.

Table 2
Regressions measuring responses for those that indicate they have relatively high financial knowledge

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
VARIABLES	HFK	HFK	HFK	HFK	HFK	HFK	HFK	HFK	HFK	HFK	HFK	HFK	HFK	HFK
HQ-FE	0.173**													
	(0.068)													
SAV		0.035											0.027	
		(0.113)											(0.208)	
INFL			0.049										-0.045	
			(0.085)										(0.228)	
BOND				0.227*									0.288*	
				(0.118)									(0.150)	
DBLE					0.119								0.121	
					(0.147)								(0.157)	
MORT						0.041							0.077	
						(0.088)							(0.152)	
DIVERS							0.045						-0.097	
							(0.084)						(0.196)	
RET_THINK								0.123						0.028
								(0.083)						(0.121)
401K									0.091					-0.436*
									(0.065)					(0.258)
OTHR_RET										0.111*				0.488*
										(0.064)				(0.276)
RET_CONTRIB											0.213**			0.253**
											(0.102)			(0.112)
CREDIT												0.073		-0.044
												(0.101)		(0.111)
Constant	0.582***	0.683***	0.681***	0.650***	0.674***	0.679***	0.689***	0.659***	0.660***	0.644***	0.539***	0.670***	0.590***	0.468***
	(0.051)	(0.083)	(0.048)	(0.031)	(0.043)	(0.066)	(0.037)	(0.034)	(0.035)	(0.038)	(0.081)	(0.055)	(0.107)	(0.096)
Observations	31	51	51	51	51	51	51	51	51	51	51	51	51	51
R-squared	0.184	0.002	0.007	0.071	0.013	0.004	0.006	0.042	0.038	0.058	0.082	0.011	0.094	0.169

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3

Regressions measuring responses for those that indicate they have been required to take financial education coursework

VARIABLES	(1) Y_FE	(2) Y_FE	(3) Y_FE	(4) Y_FE	(5) Y_FE	(6) Y_FE	(7) Y_FE	(8) Y_FE	(9) Y_FE	(10) Y_FE	(11) Y_FE	(12) Y_FE	(13) Y_FE	(14) Y_FE
HQ-FE	0.003												0.026	
	(0.098)												(0.103)	
SAV		0.106											0.029	
		(0.146)											(0.336)	
INFL			0.007										0.039	
			(0.111)										(0.407)	
BOND				-0.257									-0.669**	
				(0.154)									(0.251)	
DBLE					-0.099								-0.372	
					(0.192)								(0.237)	
MORT						0.046							-0.140	
						(0.114)							(0.221)	
DIVERS							0.0821						0.429	
							(0.109)						(0.293)	
RET-THINK								0.330***						0.510***
								(0.100)						(0.147)
401K									0.090					-0.108
									(0.085)					(0.313)
OTHR_RET										0.094				-0.071
										(0.085)				(0.335)
RET_CONTRIB											0.143			0.165
											(0.137)			(0.136)
CREDIT												-0.099		-0.160
												(0.131)		(0.135)
Constant	0.169**	0.079	0.153**	0.224***	0.186***	0.123	0.120**	0.022	0.108**	0.101**	0.043	0.210***	0.305	0.004
	(0.072)	(0.108)	(0.063)	(0.041)	(0.056)	(0.085)	(0.045)	(0.041)	(0.047)	(0.051)	(0.109)	(0.071)	(0.195)	(0.117)
Observations	31	51	51	51	51	51	51	51	51	51	51	51	31	51
R-squared	0.000	0.011	0.000	0.053	0.005	0.003	0.012	0.182	0.022	0.025	0.022	0.011	0.355	0.279

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4

Regressions measuring responses for those that indicate they have not been required to take financial education coursework

VARIABLES	(1) NO_FE	(2) NO_FE	(3) NO_FE	(4) NO_FE	(5) NO_FE	(6) NO_FE	(7) NO_FE	(8) NO_FE	(9) NO_FE	(10) NO_FE	(11) NO_FE	(12) NO_FE	(13) NO_FE	(14) NO_FE
HQ-FE	-0.042												-0.081	
	(0.099)												(0.103)	
SAV		-0.046											-0.136	
		(0.158)											(0.334)	
INFL			0.010										-0.022	
			(0.120)										(0.404)	
BOND				0.163									0.648**	
				(0.169)									(0.250)	
DBLE					0.105								0.409*	
					(0.207)								(0.235)	
MORT						0.005							0.255	
						(0.123)							(0.219)	
DIVERS							-0.076						-0.497	
							(0.117)						(0.290)	
RET_THINK								-0.350***						-0.532***
								(0.108)						(0.161)
401K									-0.093					0.197
									(0.092)					(0.342)
OTHR_RET										-0.105				0.003
										(0.091)				(0.366)
RET_CONTRIB											-0.148			-0.180
											(0.148)			(0.149)
CREDIT												0.052		0.117
												(0.142)		(0.147)
Constant	0.820***	0.839***	0.799***	0.762***	0.774***	0.801***	0.838***	0.948***	0.855***	0.867***	0.923***	0.777***	0.705***	0.995***
	(0.074)	(0.116)	(0.068)	(0.045)	(0.061)	(0.092)	(0.052)	(0.045)	(0.050)	(0.054)	(0.118)	(0.077)	(0.194)	(0.128)
Observations	31	51	51	51	51	51	51	51	51	51	51	51	31	51
R-squared	0.006	0.002	0.000	0.019	0.005	0.000	0.009	0.177	0.021	0.026	0.020	0.003	0.388	0.255

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

These results are concerning, and given the large sampling distribution, it calls for a national financial education curriculum required for all students. Based on this simple yet previously tested set of questions, Americans with financial education appear to know they need to save but do not know how to do so. If there is not a good understanding of inflation, interest, and mortgages, we see that current financial education, both formal and informal, have solved part of the issue but not most of it. Americans know they need to save for retirement, but we do not have data on average savings or age from this sample. So, in the end, they all think about it but do not have the knowledge to do anything. They must have better financial education, more directed measures, or hire financial advisors. In the end, we are called to expand our financial literacy programs with a curriculum of common body knowledge and use of technology in all education forums to gain more interest and understanding of the target audience. Likely, one may not care a lot as a teenager, but the concerns are rallied as the level of competence does not reflect maturing ages.

Conclusion and Policy Recommendation

As of now, our financial education only goes partway. Participants in this large, cross-sectional study understand where they should, at least regarding recognition and saving for retirement. However, education does not complete the pathway of how to get there. Despite having had a financial education course, most do not understand mortgages, compound interest, diversification. Those with higher perceived financial knowledge do markedly better, so they do know, essentially, that they do not know what they should. It is a concern that while people are saving for retirement, they may not save nearly enough. All it takes is one or two groups not understanding, and it can take the system down via contagion. There is a need for all to understand the financial system. Policymakers need to know what is working and what is not to see where to focus efforts. We recommend developing a national standard for financial education with a suggested curriculum to march the standards to improve financial knowledge in the nation with key deliverables in retirement planning, credit usage, inflation knowledge, and understanding of compound interest and portfolio asset diversification. In short, a run-up on GameStop has made a few affluent investors, but we fear it may have created a young investor group of gamblers, much akin to Kenny Rogers' famous recording of *The Gambler*. In a comprehensive financial education program, we recommend using standardized simulation software and a correlating smartphone app that students can keep and test the various outcomes with different inputs. Gaining interest early in life is crucial; thus, a standard platform should be considered as a base from which schools and educators may use as a base tool for financial education. As with many online retirement programs, if people can determine their level of understanding through various tools, it will improve Americans' financial health throughout their lives. We need to gain interest early in life and teach skills that will translate into future financial understanding regardless of career path to have a financially stable and appropriately financially confident future population.

References

Amager, A., Groot, W. van der Brink, H., and Wilschut, A. (2018). A review of financial-literacy education programs for children and adolescents. Citizenship Social and Economics Education, 17(1), 56-80. https://doi.org/10.1177/2047173417719555

Behrman, J.R., Mitchell, O.S., Soo, C.K., and Bravo, D. (2012). How financial literacy affects household wealth accumulation. The American Economic Review, 102(3), 300-304. https://doi.org/10.1257/aer.102.3.300

Bruine de Bruin, W., VanderKlaauw, W., Downs, J.S., Fischhoff, B., Topa, G, Armantier, O. (2010). Expectations of inflation: The role of demographic variables, expectation formation, and financial literacy. Journal of Consumer Affairs, 44(2), 381–402. https://doi.org/10.1111/j.1745-6606.2010.01174.x

Das, S. (2019). The future of fintech. Financial Management, 48(4), 981-1007. https://doi.org/10.1111/fima.12297

Council for Economic Education. (2020). Survey of the States: A Report Card. New York: National Council on Economic Education. https://www.councilforeconed.org/survey-of-the-states-2020/

Foltice, B. and Langer, T. (2018). Exponential growth bias matters: Evidence and implication for financial decision making of college students in the U.S.A. Journal of Behavioral and Experimental Finance, 19 (September), 56-63. https://doi.org/10.1016/j.jbef.2018.04.002

Goyal, K. and Kumar, S. (2020). Financial literacy: A systematic review and bibliometric analysis. International Journal of Consumer Studies, 45(1), 80-105. https://doi.org/10.1111/ijcs.12605

Grimes, P.W., Rogers, K.E., Smith, R.C., (2010). High school economic education and access to financial services. Journal of Consumer Affairs, 44 (2), 317– 335. https://doi.org/10.1111/j.1745-6606.2010.01171.x

Hastings, J. S., Madrian, B. C., and Skimmyhorn, W.L. (2013). Financial literacy, financial education, and economics. Annual Review of Economics, 5, 347-373.

Hibbert, A.M, Lawrence, E.R. and Prakash, A. (2012). Do finance professors invest like everyone else? Financial Analysts Journal, 68(5), 95-105. https://doi.org/10.2469/faj.v68.n5.1

Hibbert, A.M., Lawrence, E. R., and Prakash, A. J. (2013). Does knowledge of finance mitigate the gender difference in financial risk-aversion? Global Finance Journal, 24(2), 140-152. https://doi.org/10.1016/j.gfj.2013.07.002

Hibbert, A.M., Lawrence, E.R., and Prakash, A.J. (2018). The effect of prior investment outcomes on future investment decisions: Is there a gender difference? Review of Finance, 22(3), 1195-1212. https://doi.org/10.1093/rof/rfw060

Klapper, L. and Lusardi, A. (2020). Financial literacy and financial resilience: Evidence from around the world. Financial Management, 49(3), 589-614. https://doi.org/10.1111/fima.12283

Lusardi, A. (2019). Financial literacy and the need for financial education: Evidence and implications. Swiss Journal of Economics and Statistics, 155(1). https://doi.org/10.1186/s41937-019-0027-5

Lusardi, A., Michaud, P. C., & Mitchell, O. S. (2017). Optimal financial knowledge and wealth inequality. Journal of Political Economy, 125(2), 431–477. https://doi.org/10.1086/690950

Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: theory and evidence. Journal of Economic Literature, 52(1), 5–44. https://doi.org/10.1257/jel.52.1.5

Lusardi, A., & Tufano, P. (2015). Debt literacy, financial experiences, and overindebtedness. Journal of Pension Economics & Finance. 14(4), 332–368. https://doi.org/10.1017/s1474747215000232

Monticone, C. (2010). How much does wealth matter in the acquisition of financial literacy? Journal of Consumer Affairs, 44(2), 403– 422. https://doi.org/10.1111/j.1745-6606.2010.01175.x

Remund, D.L. (2010). Financial literacy explicated: The case for a clearer definition in an increasingly complex economy. Journal of Consumer Affairs, 44(2), 276–295. https://doi.org/10.1111/j.1745-6606.2010.01169.x

Skagerlund, K., Lind, T., Strömbäck, C. Tinghög, G., and Västfjäll, D. (2018). Financial literacy and the role of numeracy - How individuals' attitude and affinity with numbers influence finance literacy. Journal of Behavioral and Experimental Economics, 74(1), 18-25. https://doi.org/10.1016/j.socec.2018.03.004

The FAB Merger: Developing Competitive, Sustainable Strategies for a Multinational Bank that Integrates Technology and Innovation as Driving Forces

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The oil-rich region of Middle East gulf states is one of the fastest growing markets in the financial sector industry. This paper addresses the changing economic landscape of the banking industry and the response of banks in the United Arab Emirates (UAE). The most powerful global driving forces that are altering competitive dynamics include technological change, younger and better educated populations and the resultant shift in buyer preferences and lifestyles for innovative, better products. The performance of the UAE banking industry in general and the megamerger between First Gulf Bank (FGB) and National Bank of Abu Dhabi (NBAD) that created First Abu Dhabi Bank (FAB), in particular, is discussed with an eye to how the banks are adapting to maintain a strong banking sector best positioned to serve the growing demands of the region. Bank strategies are analyzed with a focus on the management practices and key success factors that are required to succeed in international banking. A major premise of this case is that technology combined with innovation and risk management functions are essential in the financial services industry. This study adds to the growing body of knowledge about effective management practices in the region.

Keywords: Banking industry, merger, technology, innovation, and performance management

Introduction

Mergers, especially of large organizations, have been studied extensively in the banking industry in the US, and Europe and Asia (Weiß, Neumann, & Bostandzic, 2014) as they have the potential to significantly restructure the competition and economic performance of industry incumbents. In developed countries, mega banks dominate banking markets (Fraisse, Hombert, & Lè, 2018). The motives behind large bank consolidations include stability through economies of scale, risk diversification, managerial efficiency, and synergy and growth through diversification of the bank's assets and product portfolio. For example, mergers that result in broader loan diversification, e.g., loans for commercial real estate, construction/industry, residential, consumer, and agriculture, have been found to improve financial stability in concentrated markets (Shim, 2019). Devos, Krishnamurthy, and Narayanan (2016) examined megamergers over a three-decade period and concluded that some mergers resulted in gains from cost efficiencies while mergers that

resulted in geographic overlap led to increased market power. Moreover, reshuffling assets by exchanging stock can result in easier access to credit, lower financing costs and risk diversification. In general, mergers are thought to create value for shareholders as evidenced by increased stock purchases and prices after the announcement of a new merger.

Formed in 1981 in Abu Dhabi, the Gulf Cooperation Council (GCC) is comprised of six nations--Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates--that are strategically located on the largest proven oil reserves in the world. The GCC has one of the world's fastest growing banking and capital markets (PwC Middle East, 2019). These countries have pursued major economic initiatives with the goal of diversifying from an economy dependent on natural resources to one that is fueled by innovation and knowledge (World Bank, 2010). Capital markets play a critical role in the efficient allocation of savings into productive investments and the financial sector is expected to provide the investments needed to accelerate major transformations in economic growth and development.

Oil is a commodity export from the region. In brief, the reliance on hydrocarbon resources leads to economic growth and credit booms when oil prices are increasing but contributes to systemic risk and financial shocks when prices fall. The International Monetary Fund (2013) reported that the impact of the 2003-2008 oil price boom initially led to Gross Domestic Product (GDP) growth, followed by a corresponding increase in the demand for credit from the private sector primarily for real estate and construction, which in turn fueled credit growth, inflation and ultimately an increase in asset prices. When this period of prosperity ended abruptly in late 2008, stock and real estate markets fell, asset prices fell, and credit defaults loomed. The subsequent financial crisis was further exacerbated by changes in exchange rates.

Even though GCC countries are diversifying into sectors other than oil, banks face concentration risks in their credit portfolios for which they must hold sufficient buffer capital (International Monetary Fund, 2014). Concentration risk stems from several sources that generally relate to the dependence of these economies on oil. Credit portfolios are linked with government expenditures because the sectors to which the banks lend are dependent on government spending which in turn is influenced by oil revenues. Therefore, the benefits that ordinarily accrue from diversification in lending do not materialize in these economies because of the interconnectedness between the oil and nonoil sectors.

Nonetheless, the GCC weathered the global financial crisis well and continued to become more integrated into the global economy due to the importance of oil and gas to world trade as well as the region's ambitious economic objectives (World Bank, 2010). In 2014, banks in the GCC were liquid, well capitalized, and more profitable. Net profit grew in 2013 and the majority of the banks maintained strong levels of liquidity and improved loan asset quality due to a decrease in nonperforming loans. Economies in the region were expected to continue to expand.

Since 2015, however, the GDP of GCC countries has been declining. Coupled with an uncertain political environment, profitability and growth can be affected, e.g., with a rise in nonperforming loans. Historically, when economies contract, bank mergers may occur to take advantage of economies of scale or growth opportunities. In 2017, the largest mega-deal of all time in the Middle East (ME) region occurred between NBAD and FGB creating FAB (Gencoglu, 2016) valued at over $175 billion in assets.

The next three sections examine trends in the banking industry at three levels: global, regional (GCC), and local (UAE). On a global scale, technological change and internet growth are aligned with research on bank channels and customer satisfaction to address how banking strategies can respond to create a competitive advantage. The next section examines the demographics in the

GCC region and the important impact fluctuations in the oil and gas sector have on bank ratings and competitiveness. This is followed by a review of industry trends in the UAE. The fourth, final section addresses the megamerger that created FAB and provides an overview of the strategies, merger and detailed financial performance of NBAD, FGB and the newly formed FAB.

Global Banking Trends

The world economy is undergoing significant shifts that affect the banking industry. The global financial crisis and the ensuing developments heightened the role of transparency and regulation in the banking markets. In the post crisis period, many banks focused on recovering outstanding loans, acquiring new customers to build financial assets, reducing risk, meeting regulatory requirements and diversifying revenues. A decade after the crisis, industry analysis shows that despite regulation that increased capital requirements and strengthened asset-to-equity ratios, the global banking sector was still weaker than it was before the crisis (World Economic Forum, 2017). Financial stability and a strong banking sector are essential for economic growth, and investments in infrastructure and technology are vital for innovation. Important driving forces discussed in this section include technological changes and internet growth and the ensuing impact on an increasingly sophisticated consumer demand for digital banking services.

Technologies are challenging traditional banking business models and how banks interact with customers. A driving force in the external environment is the pace of technological change which comprises new technologies that change how and what products and services are in demand. New competitors are emerging from internet companies, e.g., Google, Amazon and Facebook, hardware companies such as Apple's iCloud, along with other web-based financial service providers. Digital banking is an important trend but modern branches with the latest technologies and innovations are also important brand ambassadors for private and wealth banking. Enormous untapped opportunities exist in banking to identify and integrate data across channels that will transform the status quo, improve productivity and risk management and increase customer satisfaction and revenues (Giridhar, Notestein, Ramamurthy & Wagle, 2011, McKinsey, 2011). Most financial institutions are using information to develop new offerings or strengthen relationships with employees, partners, customers and suppliers. To illustrate the importance of leveraging technology innovations with products, consider the challenge from "robo-advisors" who are new entrants to the industry competing for customers' traditional savings at banks by automating and improving accessibility to sophisticated financial advisory functions, i.e., investment management.

The banking habits of consumers are changing. In financial services, the accelerating pace of change due to new technologies provides significant opportunities for differentiation for those banks who are first to implement successfully. New technologies can result in new business models. Reengineered and improved services that are more responsive, agile and efficient can lead to a competitive advantage that is sustainable to the extent that it is difficult, costly, or time consuming for competitors to copy. Successful new products and services that mirror the changing requirements of customers go hand in hand with a growing demand for innovation and complementary IT applications. Consider NetApp in Australia, the world's leading direct saving bank, ranked 51 out of 100 companies by Forbes (2012) on a list of the world's most innovative companies. NetApp, via an integrated "Bank in a Box" project, was able to bring new banking products and services to the market quickly so that innovative ideas result in a competitive edge.

Technologies can be very disruptive for banks that do not or cannot adapt quickly. Nonetheless, while the payoffs may be high for first movers, the risk and costs of pioneering new technologies may indicate that a fast follower strategy is advantageous. Notwithstanding numerous success stories, there are notorious failures that cause consumer confidence to fall. After implementing a software *update* to its IT system, a system outage at Ulster Bank in Ireland affected over 600,000 customers (Magee, 2012). Customers could not access funds or view balances for over a month.

The growth in internet usage, online banking, smartphones and social networking are redefining the channels that reach consumers and signal a decline in the popularity of branch banking in most countries. As shown in Table 1, the growth rate in internet users each year exceeds the world's population growth rate from 2000 to 2016 (Internet Live Stats, 2016). While the growth in internet users has slowed, it is nonetheless substantially greater than the world population change that remained relatively stable during this period. This led to an increasing penetration rate and based on International Telecommunications Union statistics, at the close of 2018, an estimated 51.2% of the world's population is using the internet (Emerging Trends, 2018). According to Smith (2014) at the Pew Research Center, internet usage is less among the older generation and positively related to education and household income. Moreover, wealthy countries with high per capita income have both higher internet and social media use as well as smartphone ownership.

The GCC countries are enthusiastic users of the internet and social media. Table 2 shows that among the GCC countries, Kuwait, the UAE, Qatar and Bahrain, have penetration rates over 93%. Not only are there more internet users in these countries, these countries are more likely to use social networks compared to the rest of the world (Poushter, 2015). Rising internet users and penetration, smartphone owners and e-commerce will increase the demand for innovative financial services and products tailored to these channels.

The growth in the internet has led to the subsequent popularity in online banking. Consumers can use the internet, ATMs and mobile services around the clock, i.e., 24 hours a day. Figure 1 shows that the growth in the use of online banking has increased at a higher rate than other banking channels, i.e., online banking, ATMs and branch banking. In-branch transactions and branch visits have declined significantly in mature markets and in the US, an estimated 40% of branches are not profitable (Carter, 2012). While branch banking is being replaced in popularity by digital channels, more complex bank transactions will still require a local office. Customer satisfaction varies across channels: call centers tend to have below average satisfaction, the internet and mobile phones slightly higher, with ATMs and branches receiving the highest satisfaction ratings (Giridhar, Notestein, Ramamurtby, & Wagle, 2011). Tomorrow's banks must be successful at using technology and infrastructure to focus insights on improving customer satisfaction which includes streamlining internal operations to be more efficient and effective.

The Changing Landscape of the GCC Banking Industry

Countries in the GCC, such as Bahrain, Saudi Arabia and the UAE are investing in the financial sector as a source of competitive advantage by seeking to establish themselves as regional financial centers (World Bank, 2010). On the one hand, buoyed by an ongoing wave of growth opportunities, the GCC economies enjoy prosperity when oil revenues increase. As hydrocarbon revenues are channeled into economic growth, domestic credit growth increases powered by rising consumer and investor confidence, i.e., demand for credit increases in the private sector which

creates opportunities for the financial sector to lend. Inflation and asset prices increase and in the case of speculative investments such as real estate, these trends set the stage for future risk and problems. For years, high oil revenues served as a catalyst for infrastructure development, economic growth and the accumulation of financial reserves in local banks.

On the other hand, lower oil revenues lead governments to cut spending, e.g., postpone infrastructure projects and borrowers become at risk for default which increases bad debts. Higher nonperforming loans and impairment charges result in tightened liquidity. Falling property prices result in developers struggling to repay loans and a decrease in the value of assets. High risk loans cause future loan growth to slow and constrain profitability in the short term. In the aftermath of the wave of loan restructuring, e.g., reductions in interest rates and maturity extensions, that occurred in Dubai, bank credit ratings were downgraded and as credit became tighter, there was slower growth in local economies. In 2016, the GCC banking sector posted an overall 2.4% decline in combined net profits of over $30 billion. Previously, GCC oil financed government spending focused on economic development and diversification through the private sector. However, to finance deficits from declining oil revenue and to build infrastructure, governments drew down savings and borrowed more locally which translated into less capital available to private sector borrowers.

These cyclical ups and downs, combined with political complexities, create challenges for the banking industry. More recently, the relationships among the GCC countries have become strained. Politically, the standoff in the Middle East has Saudi Arabia, Bahrain, Egypt and the UAE in alignment but in confrontation with Qatar (with Kuwait and Oman straddling the middle). These countries have stopped all travel to and from Qatar and cut diplomatic and economic ties. As a result, the financial markets in Qatar have been affected, e.g., nonresident deposits have fallen significantly, but the government has intervened by drawing heavily from a $350 billion sovereign wealth fund to support the banking system (World Bank, 2018). Despite the tensions with Qatar, developments in the financial sector have been positive. Inflation averaged less than 3 percent and in 2017, liquidity in the banking system eased as higher oil prices resulted in higher government deposits (World Bank, 2018).

The dynamics of the oil and gas sector affect the labor market, e.g., employment opportunities and salary levels. The government sector is the major employer in the region offering employees attractive salaries, benefits and stability. Despite reforms in labor policies and efforts to encourage private industry to support nationalization agendas, the public sector continues to provide for most of the nationals' employment (World Economic Forum, 2018a). Other important demographic characteristics in the GCC that create driving forces in the labor market include high levels of expatriate labor, both skilled and unskilled, a high percentage of young people and youth unemployment, and low but improving gender equality and female labor force participation.

The GCC countries employ varying levels of expatriates which creates an interesting dynamic in the employment setting. In professional jobs, salaries and benefits are typically higher for nationals compared to expatriates in similar positions and all the GCC countries have nationalization initiatives and quotas to encourage employment for locals as well as increase the participation rate of female nationals. According to The Global Gender Gap Report (World Economic Forum, 2018b), the female participation rate in the labor force is less than the males and many of the GCC countries rank low in areas such as health and survival and political empowerment (see Table 3). At the same time, educational levels for women are rising and life expectancies are increasing. More than a third of the population in the region is under the age of 25 (World Bank, 2018). When combined with rising educational levels in many of these countries,

this generates a large pool of younger, more educated new entrants to the labor market. Nonetheless, the quality of education measured by externally benchmarked standards remains low compared to other regions in the world (World Bank, 2017).

Falling oil prices are leading indicators to GCC countries' GDP. To illustrate, as shown in Figure 2, plummeting oil prices ultimately affected the UAE's GDP. As the GCC economies started to contract, initial predictions were dire. When oil prices fall, oil-dependent governments are forced to cut spending and the resultant impact on the banking industry can be lower profitability, higher loan defaults and a decrease in deposits. However, the diversification efforts of the GCC economies to reduce their dependence on oil is paying off. The effect of the dramatic drop in oil prices on GDP and the subsequent impact on sovereign bond issues is shown in Figure 3.

When oil prices fall, there is a significant contraction in credit growth and profitability, deterioration of credit quality and a decline in economic growth (Ibrahim, 2019). Credit rating agencies respond by downgrading global quality ratings. Standard & Poor (S&P) rates a cohort of banks in the GCC. In 2018 and 2019, the average long-term rating of this group was BBB+. Some summary predictions of the S&P GCC Industry Report Card (Damak, Young, Tuli & Nasreddine, 2019) are:

- Except for a geopolitical risk, e.g., a military intervention in the region or a disruption in oil production or supply, or a significant decrease in oil prices, the banks should remain stable.
- GCC economies are expected to grow and recover from the attack on the Saudi Aramco facilities but will likely be constrained if there is a broader economic slowdown.
- Profitability may stabilize or slowdown due to global monetary policies toward lower interest rates. Following US Federal Reserve cuts in interest rates, GCC central banks followed suit in the first half of 2019 which compressed profit margins.
- Banks may adopt a more aggressive approach on lowering costs by increasing digitalization in core business activities, i.e., corporate and retail loans, and cutting expenses, e.g., closing branches and reducing staff.

In general, the outlook for the GCC is favorable due to high government spending which will support lending and economic growth.

For several GCC countries, national development plans resulting in policies and reforms that support growth, education, economic diversification and improvement of the business climate are reflected in advances in the World Economic Forum's (2017) global competitiveness index. The UAE improved in overall rank of global competitiveness to a country ranking of 17th and leads the region (see Table 4). The high rankings in goods market efficiency, institutions and infrastructure are indicative of the government's investment in information technology infrastructure and a stable macroenvironment.

There are numerous global banks in the GCC, but the largest banks are domestic and state-owned. While governments in all countries play a major role in regulating financial services to achieve important social and economic objectives, bank competition in the GCC is low compared to the rest of the world due to strict entry requirements and regulations for foreign banks and poor credit information systems (The World Bank, 2016). In addition, a report conducted by The World Bank (2016) found that government owned banks in the GCC had advantages such as access to lower funding costs and were perceived as less risky by investors and depositors. These factors tended to reduce the threat of new entrants especially from smaller, private banks. At the same

time, the cost of switching banks for the customer can be high especially when there are early settlement fees on loans or complex fee structures for closing accounts.

Network readiness relates to a country's population and organizations' capability of adopting new innovations and technologies and translating them into economic and social benefits (World Economic Forum, 2018b) According to the World Economic Forum (2016), the UAE, Qatar and Bahrain rank 26, 27 and 28, respectively, in the world on overall network readiness which measures a country's capability to leverage information and communication technologies (ICTs) to improve competitiveness and well-being (see Table 5). Moreover, the UAE ranks 2nd in the world on government usage and social impacts which reflects the government's commitment to develop ICTs to diversify and grow a sustainable, competitive economy. Government investments in ICTs to improve services and the country's competitiveness is also reflected in the World Economic Forum (2016) technology report where the UAE, Qatar, KSA and Bahrain are ranked in the top 10 countries in the world.

A bank depends on Information Technology (IT) to conduct its business operations, such as online banking, payments and phone transactions. The growth of mobile based applications with the internet has made e-commerce an increasingly convenient mode for conducting commercial transactions. IT applications have the potential to help banks manage finances more effectively, increase sales, cut costs and save time.

However, IT-enabled business operations are subject to numerous security threats which include identity theft and hacking. While banks have diverse security mechanisms, they are vulnerable to unauthorized attacks. According to the Norton Cyber Security Insights Report (2017), hackers stole $172 billion from 978 million consumers in 20 countries—of which over a billion was accounted for from 3.72 million consumers in the UAE. The costliest cybercrime incident reported by consumers in the UAE in the report was credit/debit card fraud.

Risk management is increasingly important in financial institutions. Bank fraud is a problem in the industry as financial crimes are growing and becoming more sophisticated. According to an American Bankers Association (2018), fraud cost the industry $2.2 billion in 2016 with debit card fraud accounting for 58%, check fraud for 35% and online banking and electronic transactions for 7%. Prevention measures stopped approximately $17 billion in fraudulent losses. Banks play a key role in data protection and ensuring consumer privacy.

The UAE Banking Industry

While the Gulf region continues to pose important political, social, economic and environmental challenges, the UAE has weathered the geopolitical instability well. The UAE continues to expand and grow by investing the revenues from oil and international investments into public and private ventures. Dubai and Abu Dhabi have numerous government related entities (GREs)--commercial corporations, financial institutions and investment firms that are related to the municipality's government. In the wake of the 2009 financial crisis, the UAE introduced changes in regulation to improve financial stability, corporate governance and transparency, provide early warning signs and moderate the effects of volatility in oil prices (International Monetary Fund, 2013), such as, maintaining higher capital requirements and limiting large dividend payouts in periods of prosperity. Socio-economic and political conditions are stable, and the government has made significant efforts to strengthen its banking sector. Economic downturns can contribute to loan defaults and reduced borrowing, but a strong banking sector with the capacity to facilitate large investments in the economy through lending and borrowing provides

the backbone driving economic growth. Residential, infrastructure, commercial, and industry construction are expected to increase with government's focus on investments for the upcoming World Expo 2020. In addition, a rising population and increasing urbanization will contribute to growth opportunities.

The UAE aspires to be the leader in the financial services sector in the ME. In 2018, the combined assets of all banks grew to $780 billion, the largest in the Arab world (UAE Banks Federation, 2018). Like many countries in the GCC, the UAE has numerous large and well financed local, regional and international banks competing for business. During the oil boom, banks formed to help hold and invest the wealth generated by the surge in GCC economic growth. However, since the oil price shock, some international banks closed their operations. In late 2018, the banking sector was ripe for further consolidation given the large number of banks that continued to operate in the country, i.e., 22 national banks plus 38 foreign banks (Central Bank of the UAE, 2018). However, when comparing the number of branches, the national banks had more branches than foreign banks, i.e., 743 compared to 80, respectively. The government owns majority shares in two of the five largest local banks (The World Bank, 2016).

The Central Bank regulates the banks in the UAE with the responsibility of overseeing the financial stability of the industry. The Central Bank supplies money and has regulatory powers to set interest rates that banks must comply with. With banks offering similar products and services, e.g., interest rates are regulated, an excellent customer experience can result in a competitive advantage. The customer touchpoints include branches, ATMs, call centers, online banking, and mobile banking. While customer satisfaction has improved for retail banks in the UAE, it remains low compared to other industries (UAE Customer Satisfaction on the Rise, 2017) and not all banks are focused on customer satisfaction across all channels. With more adults working, a growing number of customers prefer to access the bank through the call center instead of the branch and call centers are problematic areas for bank performance (Leijen, 2012). According to Souqalmal (2018), 32% of bank customers are largely satisfied and the most recommended banks by customers are ENBD (Emirates National Bank of Dubai), Abu Dhabi Commercial Bank (ADCB) and Dubai Islamic Bank (DIB).

New entrants in the financial management sector, such as insurance, mutual funds and fixed income securities, that offer investment management services, place pressure on margins in more specialized segments. At the same time, many consumers trust their finances to full service, convenient, and well-known names. Once established with a particular bank, transferring accounts and properties between banks can be a difficult, expensive and complex process.

There is increasing pressure on telecommunication networks to increase capacity in response to an explosion in demand for newly available internet services such as online banking. Mobile communication services and penetration have become important predictors of economic growth and prosperity (World Economic Forum, 2016). Mobile phones have improved communication with customers and expanded economic activity for financial institutions. As technology develops, mobile services are increasingly available and in demand from consumers and businesses. The growing use of the internet and mobile devices in both consumer and business spheres combined with the increasing presence of social networking have already led banks to create new solutions and tools to add greater value to customers. Particularly relevant to the banking industry, mobile network coverage in the UAE, the percentage of the total population that is covered by a mobile network signal, is ranked one of the highest in the world. Government use of ICTs which result from a clear plan to utilize ICTs to improve the country's overall competitiveness is ranked the first in the world (World Economic Forum, 2016).

The UAE is considered a high-income country with a GDP per capita of $37,677 US (see Table 2). The total population in the UAE is estimated by the United Nations (2017) to be 9,400,145 and nationals make up about 12% of this total. Most of the population is made up of South Asians, Egyptians, and Westerners.

Age is another key demographic factor that will affect the UAE growing retail banking sector. While wealth tends to be held in the older generation, as shown Figure 4, there is a large pipeline of youth that will be needing banking services as they grow into adulthood. This pyramid shape is similar in other GCC countries. According to the United Nations (2017) World Population Prospects report, the UAE population growth projection through 2020 is 1.52% annually compared to 1.1% global growth. While older customers may have more wealth and prefer the face to face interactions of the branch, modern customers want solutions that are convenient, quick and reliable and will not accept solutions that stop at national borders.

Staffing usually represents the major portion of a bank's non-interest costs (Baltrop and McNaughton, 1992) and for banks presents several challenges. Hiring decisions must consider high cost, high tech professionals as well as the high cost of nationals vs. lower paid expatriate/clerical staff in the call centers and branches. All banks have key performance indicators of which the percentage of nationals in the work force is high on the government's agenda. However, compared to public sector jobs, a bank job may pay half the wages, have fewer benefits and longer working hours (World Economic Forum, 2018a). Thus, there is less incentive for nationals to work for a bank and turnover can be problematic if they land a highly valued government job. While reducing staffing expense can improve efficiency in the short term, long term problems may result from lower morale and turnover when employees find a job with better remuneration.

National Bank of Abu Dhabi (NBAD)

With operations in 19 countries, NBAD was one of the largest banks in the UAE with total assets in 2016 of over $114 billion. NBAD's vision was to be recognized as the World's Best Arab Bank. Their mission was to provide excellent products and customer service across a range of banking and related financial products including deposits, savings, loans and brokerage services. The bank targeted individual and corporate customers at the corporate, retail and private levels and in their home market, they aim to be the largest, safest and best performing bank. In addition, NBAD offered asset management platforms and catered to high-net-worth clients with wealth management and investment services. The Abu Dhabi government, through the Abu Dhabi Investment Council, was the largest shareholder at 70%.

NBAD was organized into three core businesses: global wholesale, global wealth, and retail and commercial operations. The bank is implementing several strategic initiatives over the next five years. First, in their home market, there is a major initiative to rebrand and boost its extensive network of branch businesses. Furthermore, the bank was changing its e-banking platform and to offer smartphone and tablet applications.

On the international front, NBAD focused on the $137 billion corporate banking market in the West-East corridor which spans from West Africa to East Asia. By targeting megacities (cities with a population of more than 10 million) and a growing middle class, NBAD planned to build bank franchises in the largest, fastest growing markets in the world.

NBAD has received numerous impressive accolades. Since 2009, the bank has been ranked as one of the World's 50 Safest Banks by Global Finance magazine. In 2013, the bank was awarded

the Sheikh Khalifa Excellence Award (SKEA)—the diamond category. The UAE adopted the SKEA in 1999. SKEA uses the European Foundation for Quality Management (EFQM) model which recognizes organizations that demonstrate high levels of performance excellence and continuous improvement. There are three award levels: diamond, gold and platinum. No other banks received the award in 2013. In the same year, NBAD was upgraded in ratings by Standard & Poor (S&P) from A+ to AA-. However, in 2016, with oil prices expected to remain low, S&P placed NBAD on CreditWatch with negative implications. See Table 6 for the financial statements from 2012-2016.

First Gulf Bank (FGB)

Established in 1979, FGB offered a wide range of financial services through its Wholesale, Consumer, and Treasury and Global Markets divisions that both met client needs and supported the development of the UAE. On the international front, FGB had branches in Singapore and Qatar, representative offices in India and Hong Kong, and a subsidiary in Libya. Their mission was to maximize value for shareholders, customers and employees. Stemming from a commitment to excellence, the bank invested significantly in people and technology to provide superior customer service. The majority of FGB is owned by several sons of the late Sheikh Zayed bin Sultan Al Nahyan.

FGB had a banner year with record profits of $1.6 billion at the end of 2016. At the Banker Middle East Industry Awards, FGB was awarded the Best Bank in the United Arab Emirates. FGB received the award for above average financial performance due to a winning strategy based on (1) concentration on core processes and fundamentals, (2) market development through geographic expansion, (3) differentiation through innovation, and (4) product development through strategic alliances. Like other banks in the UAE, FGB pursued a rebranding platform to reflect their global, contemporary and ambitious plans to grow revenues. While committed to the development of nationals and being a leading service provider across all core businesses and operations, FGB focused on both the Emirati (nationals) and the expatriate markets. To address prominent health concerns in the UAE, FGB developed insurance programs for diabetes and breast cancer. Moreover, FGB formed a strategic partnership with an insurance company in India to develop insurance and retirement plans primarily for the Indian expatriate market—the largest demographic group in the UAE.

Late in 2013, FGB purchased Dubai First, a consumer financial services business with a strong market share in credit cards for AED 601 million. The acquisition afforded FGB the opportunity to offer an impressive range of new credit cards that were targeted to meet the needs and add value to various market segments. Dubai First specializes in innovative and value-centric credit cards, that serve the unique characteristics of contemporary "lifestyle-savvy" customers. The product line includes exclusive, super-premium, premium, commercial and value cards. For example, the Royale Card is a MasterCard that targets royalty and the elite echelons of society. The Royale Card is the region's first *diamond-embedded* World MasterCard. It is available by invitation only and has no pre-set spending limit. Costing a mere AED 1,500 annual fee, the card, has a myriad of benefits and perks to the user. See Table 7 for the FGB financial statements from 2012-2016.

FAB: The Merger

First Abu Dhabi Bank (FAB) is the largest bank in the UAE. Operating from the capital city of Abu Dhabi, the Bank has an international presence in 19 countries. Offering a broad array of unique, customized products and services to its customers, their slogan to, 'Grow Stronger', represents a commitment to putting their customers at the forefront of their business operations. The slogan was coined from FGBs faster growth rate and NBADs larger size. FAB meets a range of regulatory disclosure requirements (Risk Management, Basel II-Pillar III Disclosure Reports and Corporate Governance Report) and has also adopted the internationally recognized Equator Principles, a framework that provides oversight on environmental and social risks of projects. FAB's mission is to empower the communities in which they operate in by creating a positive impact, whilst investing in people and utilizing user-friendly technology to improve their services. In short, FAB aims to be the leading financial partner for customers, businesses and governments doing business along the West-East corridor linking Asia, the ME and Africa. The Bank publishes sustainability reports and their guiding principles for corporate governance are: leadership, accountability, transparency, and strong corporate governance standards.

Not since 2007, when Emirates Bank merged with National Bank of Dubai to become Emirates Bank of Dubai, has there been a high-profile merger like NBAD and FGB. In 2017, the combined asset value of the two banks was over $175 billion making it second only to Qatar National Bank in the GCC. When measuring the size of banks, total assets are important, but Tier 1 capital is considered the core measurement of financial strength by experts. While expected losses are accounted for with provisions for nonperforming loans, Tier 1 capital provides protection against unexpected losses. It is a minimum amount, i.e., percentage of equity, held by the bank that is set by regulators and ultimately limits the amount that a bank can loan. Tier 1 capital ratios are defined as the bank's equity capital / the total of risk-weighted assets. International banking standards, known as Basel I, II, and III, are determined by a committee comprised of central bank governors. Since the financial crisis in 2008, the UAE and other Gulf countries adopted Basel I and II and are starting to adopt Basel III. Each subsequent version increases the level (%) of Tier 1 capital that is required (Basel III requires 6%). In 2020, FAB's Tier 1 capital was 21.2 and Qatar's was 25.4 (see Table 9).

The consolidated financial statements for FAB follow in Table 8. Table 9 shows the financial data and analysis for the top banks in the Middle East. Qatar is the largest in terms of revenues, followed by FAB. The capital adequacy ratio is the ratio of real capital to total risk weighted assets and is an indication of margin of protection for both depositors and creditors against unanticipated losses, e.g., economic downturns. ROA is considered by many analysts to be the best indicator of soundness and management's effectiveness as it is less subject to distortion from inaccurate loan loss provisions which do affect ROE (Baltrop and McNaughton, 1992).

Mergers afford banks the opportunity to combine strengths, overcome weaknesses and take advantage of more growth opportunities. By creating a new, larger entity, the FAB merger will provide access to new markets and segments while allowing the Bank to leverage its significant assets to aggressively pursue new business in the region and abroad (Khan, 2017). The major strengths that NBAD brings to the table are their overall size built on successful domestic wholesale operations and a strong international market presence. Combined with FGBs internal operating efficiencies and profitable domestic retail business, FAB aims to be a major player in the West-East corridor and beyond (Khan, 2017). Consolidating management/staff functions and operations can eliminate redundancies and develop economies of scale. Additionally, the merger

helps the new bank, First Abu Dhabi Bank (FAB), move from a AA-/Watch Neg to AA- Stable. This improvement in credit rating helps lower the bank's overall borrowing cost from capital markets. In general, mergers create opportunities but face significant reorganization challenges as redundant operations are merged. A new organizational structure is needed with common practices, systems and policies. Will NBADs larger size dominate the new organization, or will they be able to leverage FABs faster agility in the market?

The Future

With solid economic and financial fundamentals in place, the GCC economies are predicted to grow. Global hydrocarbon prices, a key driver of growth, are predicted to steadily rise boosting government revenues and investor confidence in the region (World Bank, 2018). Other oil exporters in the region, e.g., Iraq, are mired in conflict with difficult humanitarian, economic and political conditions. Nonoil (tourism, retails sales, and trade) sectors are predicted to grow at an even faster rate. Furthermore, in 2017, all the GCC countries voted to implement a Value-Added-Tax (VAT). Projections for the UAE economy are especially favorable. With the launch of the VAT in January 2018 and the date for the Dubai Expo 2020 nearing, the International Monetary Fund predicts the UAE economy will grow 3.4% in 2018 and gain momentum over the next few years (Combes, 2018).

Does the megamerger that created FAB provide an opportunity for the bank to consolidate resources and improve profitability while achieving growth at home and abroad? The merger provides an opportunity for the bank to consolidate resources, e.g., human resources, and as evidenced by the strategic initiatives in human resource management that are shown in Table 10. While the total number in the workforce declined since the merger, the percentage of nationals in senior management positions increased from 25% to 37%. At the same time, the total number of national employees has increased from 1,278 to 1,339 and the number of female nationals increased from 944 to 1,031. Combined with a high retention rate, the human resource management programs have had significant success in nationalizing jobs in all levels. See Figure 5 for a generic bank strategy map.

In May 2019, Abu Dhabi Commercial Bank (ADCB), a "one country bank," announced a merger with Union National Bank and Al Hilal Bank to create the 3rd largest lender in the UAE (Gulf Business, 2019). With assets totaling $115 billion, the newly formed ADCB has 21% of the retail loans market (Gulf Business, 2019). It is expected that the latest merger will result in at 500 job cuts. Employment is a cost that can be quickly reduced during an economic contraction or merger.

At the announcement of the ADCB merger, industry analysts are wondering whether consolidation in the region will continue and if FAB is well positioned for future growth.

Table 1
Internet Users and World Population Statistics

Year	Internet Users**	Internet Users Change	World Population	World Population Change	Penetration
2016*	3,424,971,237	7.5%	7,432,663,275	1.1%	46%
2015*	3,185,996,155	7.8%	7,349,472,099	1.2%	43%
2014	2,956,385,569	8.4%	7,265,785,946	1.2%	41%
2013	2,728,428,107	9.4%	7,181,715,139	1.2%	38%
2012	2,494,736,248	11.8%	7,097,500,453	1.2%	35%
2011	2,231,957,359	10.3%	7,013,427,052	1.2%	32%
2010	2,023,202,974	14.5%	6,929,725,043	1.2%	29%
2009	1,766,403,814	12.1%	6,846,479,521	1.2%	26%
2008	1,575,067,520	14.7%	6,763,732,879	1.2%	23%
2007	1,373,226,988	18.1%	6,681,607,320	1.2%	21%
2006	1,162,916,818	12.9%	6,600,220,247	1.2%	18%
2005	1,030,101,289	12.8%	6,519,635,850	1.2%	16%
2004	913,327,771	16.9%	6,439,842,408	1.2%	14%
2003	781,435,983	17.5%	6,360,764,684	1.3%	12%
2002	665,065,014	32.4%	6,282,301,767	1.3%	11%
2001	502,292,245	21.1%	6,204,310,739	1.3%	8%
2000	414,794,957		6,126,622,121	1.3%	7%

*Estimate
**Internet User = individual who can access the Internet at home, via any device type and connection.
Source: Internet Live Stats (2016)

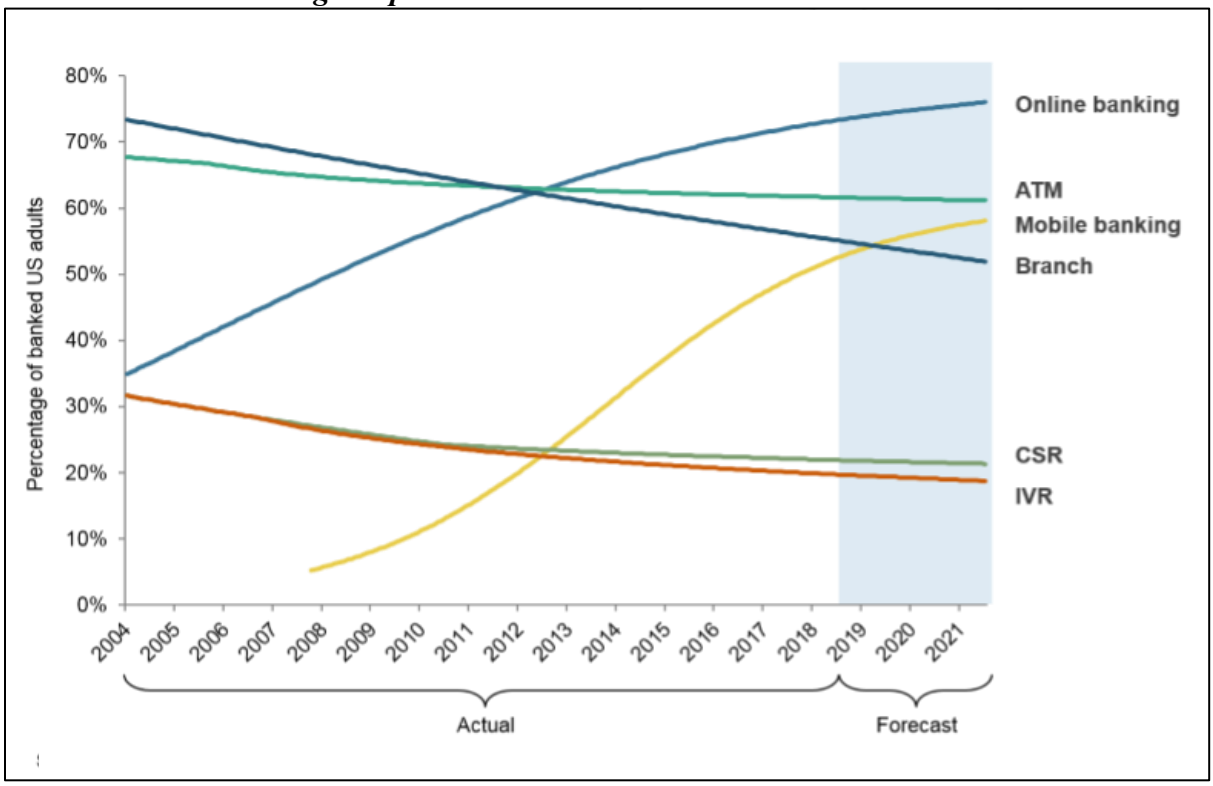
Table 2
Population, Internet Users and GDP by Country

Country	Population (thousands)[a]	Internet Users[b]	Penetration Rate	GDP (US$ billions)[c]	GDP Per Capita (US$)[c]
Saudi Arabia	34,269	30,257,715	88.3%	639.6	20,150
United Arab Emirates	9,771	9,385,420	96.1%	371.4	37,678
Kuwait	4,207	4,104,347	97.6%	109.9	26,005
Oman	4,975	3,310,260	66.5%	63.2	15,964
Qatar	2,832	2,644,580	93.4%	156.7	60,787
Bahrain	1,641	1,535,653	93.6%	31.9	24,183

[a]United Nations, Department of Economic and Social Affairs, Population Division (2019)
[b]Internet World Stats (2019)
[c]World Economic Forum (2017)

Figure 1

Mobile Banking Adoption Won't Match Online in the Foreseeable Future



Javelin Strategy & Research (2018)

Table 3

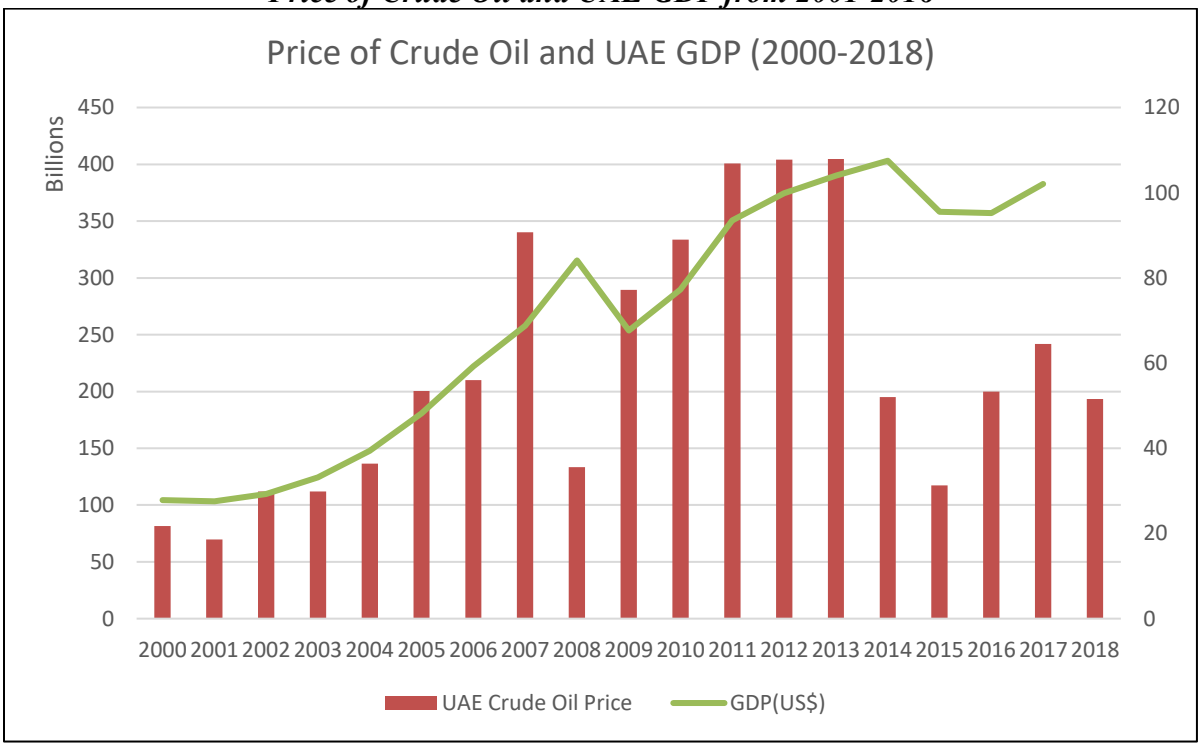
GCC Country Rankings on Gender Gap

	Country Rankings						
	Global Index	Economic Participation & Opportunity	Educational Attainment	Health & Survival	Political Empower-ment	Labor Force Participation Female	Labor Force Participation Male
UAE	121	134	95	94	68	42	93
Kuwait	126	127	74	140	146	49	86
Qatar	127	127	74	140	146	59	95
Bahrain	132	128	43	142	143	46	88
Oman	139	137	83	49	148	32	89
Saudi Arabia	141	145	93	136	127	23	82

World Economic Forum (2018b)

Figure 2

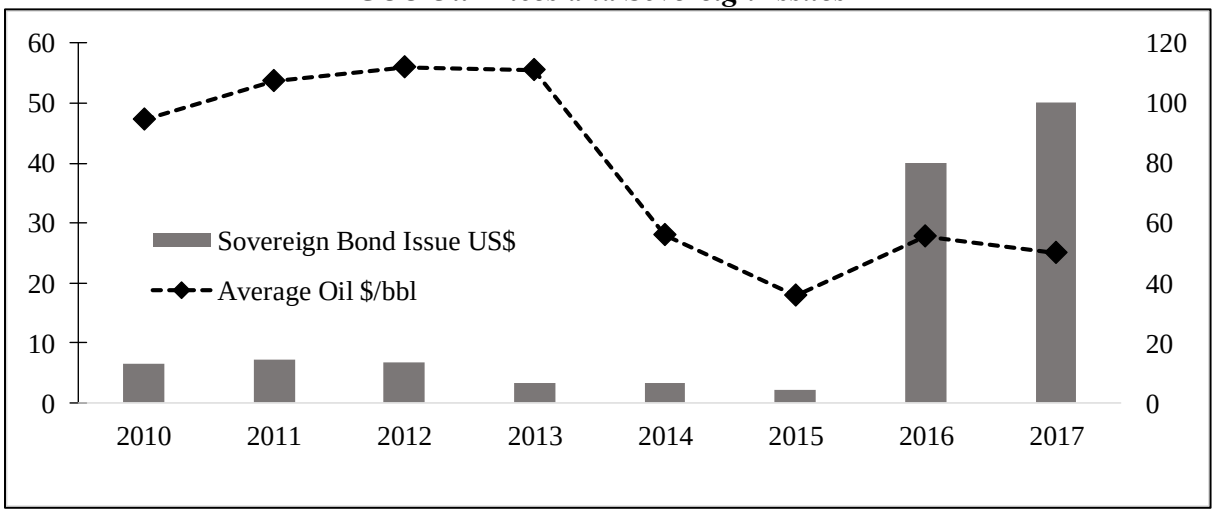
Price of Crude Oil and UAE GDP from 2001-2016



Bloomberg Finance (2018)

Figure 3

GCC Oil Prices and Sovereign Issues



Bloomberg Finance (2018)

Table 4

Global Competitiveness Index and Subindexes Country Rankings

	2017-18 Overall Rank	2016-17 Overall Rank	Institutions	Infrastructure	Macroecon Environment	Health & Primary Educ	Higher Educ & Training	Goods Market Efficiency	Labor Market Efficiency	Financial Market Dev	Technological Readiness	Market Size	Sophistication	Innovation
UAE	17	16	5	5	28	33	36	3	11	24	24	29	25	13
Qatar	25	18	10	13	20	34	37	15	19	25	34	51	21	22
Saudi Arabia	30	29	26	29	58	51	43	42	80	56	44	15	40	34
Bahrain	44	48	23	33	108	37	39	23	37	46	31	90	45	36
Kuwait	52	38	57	64	30	83	95	89	119	62	68	50	103	70
Oman	62	66	28	36	66	63	71	47	122	54	59	62	76	72

World Economic Forum (2017)

Table 5

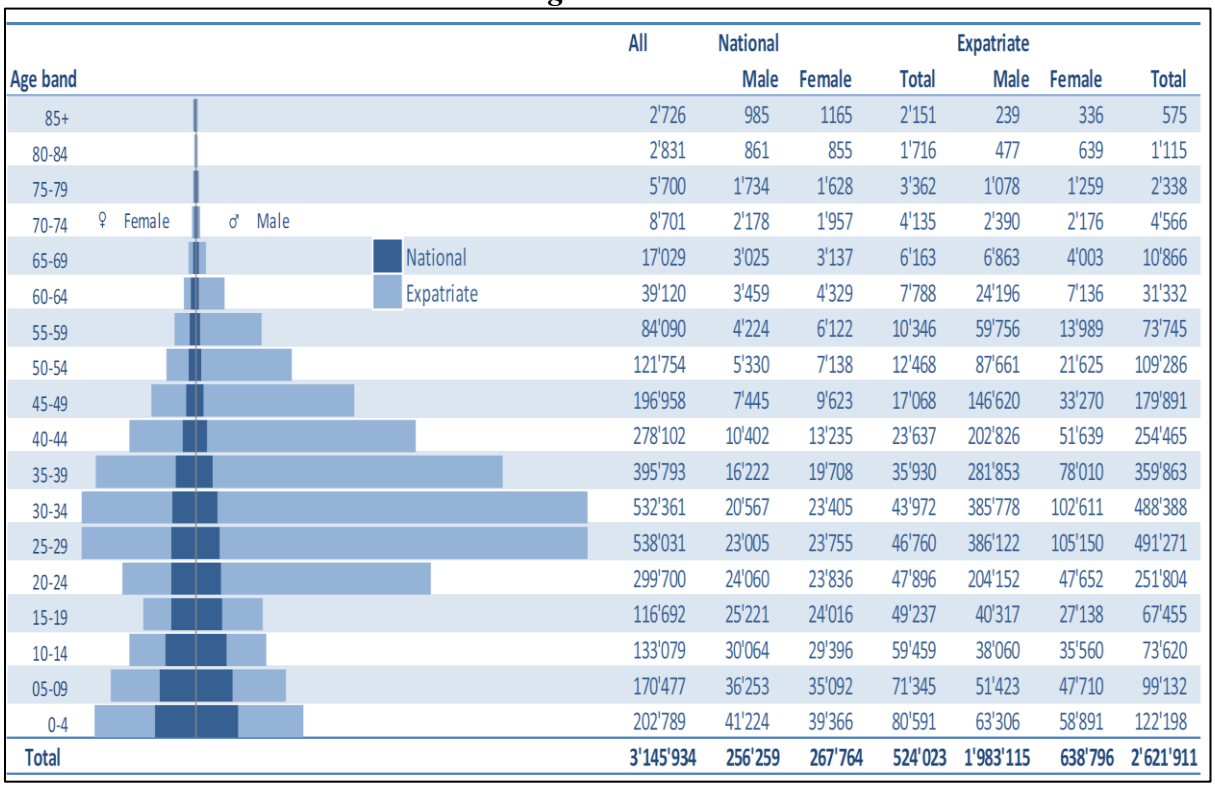
Network Readiness Index and GCC Countries

	2016 Overall Rank	2015 Overall Rank	Political & Regulatory Environment	Business & Innovation Environment	Infrastructure	Affordability	Skills	Individual Usage	Business Usage	Government Usage	Economic Impacts	Social Impacts
UAE	26	23	25	13	28	116	22	19	27	2	26	2
Qatar	27	27	18	15	29	120	5	23	25	5	28	10
Bahrain	28	30	36	29	31	40	31	14	37	3	48	13
Saudi Arabia	33	35	29	25	36	101	49	21	42	11	40	36
Oman	52	42	53	58	46	96	76	39	94	34	95	46
Kuwait	61	72	63	72	30	89	77	32	72	81	102	84

World Economic Forum (2016)

Figure 4

UAE Age Distribution



Age band	All	National			Expatriate		
		Male	Female	Total	Male	Female	Total
85+	2'726	985	1165	2'151	239	336	575
80-84	2'831	861	855	1'716	477	639	1'115
75-79	5'700	1'734	1'628	3'362	1'078	1'259	2'338
70-74	8'701	2'178	1'957	4'135	2'390	2'176	4'566
65-69	17'029	3'025	3'137	6'163	6'863	4'003	10'866
60-64	39'120	3'459	4'329	7'788	24'196	7'136	31'332
55-59	84'090	4'224	6'122	10'346	59'756	13'989	73'745
50-54	121'754	5'330	7'138	12'468	87'661	21'625	109'286
45-49	196'958	7'445	9'623	17'068	146'620	33'270	179'891
40-44	278'102	10'402	13'235	23'637	202'826	51'639	254'465
35-39	395'793	16'222	19'708	35'930	281'853	78'010	359'863
30-34	532'361	20'567	23'405	43'972	385'778	102'611	488'388
25-29	538'031	23'005	23'755	46'760	386'122	105'150	491'271
20-24	299'700	24'060	23'836	47'896	204'152	47'652	251'804
15-19	116'692	25'221	24'016	49'237	40'317	27'138	67'455
10-14	133'079	30'064	29'396	59'459	38'060	35'560	73'620
05-09	170'477	36'253	35'092	71'345	51'423	47'710	99'132
0-4	202'789	41'224	39'366	80'591	63'306	58'891	122'198
Total	**3'145'934**	**256'259**	**267'764**	**524'023**	**1'983'115**	**638'796**	**2'621'911**

UAE Department of Health (2016)

Table 6
NBAD Financial Statements

NATIONAL BANK OF ABU DHABI					
INCOME STATEMENT	*US$ in millions*				
Year End	**2012**	**2013**	**2014**	**2015**	**2016**
Interest Income	2,259	2,291	2,442	2,546	2,768
Interest Expense	599	519	532	556	779
Net Interest Income	1,660	1,772	1,911	1,990	1,989
Non Interest Income	639	713	925	885	954
Operating Income	2,299	2,485	2,835	2,874	2,943
Provision For Loan Losses	364	328	240	256	323
Total Revenues	1,935	2,157	2,595	2,619	2,619
Salaries and Benefits	528	596	690	755	743
Selling General & Admin Ex	194	220	247	294	287
Other Expense	59	64	70	63	62
Total Non-Interest Expense	781	879	1,006	1,112	1,093
Adjusment for Unusual Items	61	73	4	(1)	(1)
Earnings Before Taxes	1,154	1,278	1,589	1,507	1,527
Income Tax Expense	36	59	74	81	84
Net Income	1,179	1,291	1,519	1,425	1,442
BALANCE SHEET					
Cash & Investments	30,816	29,867	39,904	43,983	49,625
Loans	44,813	50,044	52,891	56,066	54,602
Other Assets	6,211	8,590	9,594	10,650	10,328
Total Assets	81,840	88,500	102,390	110,699	114,555
Deposits	61,470	67,209	76,191	74,419	80,147
Long Term Debt	5,960	4,553	3,606	4,929	6,701
Other Liabilities	12,154	12,120	16,163	24,649	21,823
Total Liabilities	73,364	79,061	92,055	98,931	101,892
Total Equity	8,476	9,440	10,335	11,768	12,663
Liabilities & Equity	81,840	88,500	102,390	110,699	114,555
ASSET QUALITY					
Nonperform Loans/Loans %	3.8	3.6	3.6	3.2	3.2
Nonperform Loans/Assets %	2.2	2.1	1.9	1.7	1.6
Tier 1 Capital	8,286	9,209	10,242	11,735	12,460

Table 7
FGB Financial Statements

First Gulf Bank					
INCOME STATEMENT	*US$ in millions*				
Year End	**2012**	**2013**	**2014**	**2015**	**2016**
Interest Income	2,081	2,142	2,246	2,257	2,327
Interest Expense	578	511	484	507	588
Net Interest Income	1,503	1,632	1,761	1,751	1,739
Non Interest Income	459	611	648	656	866
Operating Income	1,962	2,242	2,410	2,407	2,605
Provision For Loan Losses	450	479	371	383	395
Total Revenues	1,512	1,763	2,039	2,023	2,210
Salaries and Benefits	187	221	238	237	235
Selling General & Admin Ex	185	243	238	260	271
Other Expense	16.9	17.1	22.0	27.8	32.6
Total Non-Interest Expense	388	481	498	524	538
Adjusment for Unusual Items	17	34	29	150	(2)
Earnings Before Taxes	1,141	1,316	1,562	1,643	1,664
Income Tax Expense	5	9	9	4	11
Net Income	1,136	1,307	1,553	1,639	1,653
BALANCE SHEET					
Cash & Investments	8,012	5,829	6,794	6,712	9,017
Loans	31,213	34,194	38,035	40,778	42,681
Net Property, Plant & Equip	170	221	318	405	416
Other Assets	8,259	13,720	12,615	14,048	14,626
Total Assets	47,654	53,964	57,761	61,943	66,740
Deposits	33,549	38,976	41,888	43,659	46,669
Long Term Debt	4,581	3,925	3,327	4,381	3,847
Other Liabilities	1,395	2,414	3,089	4,018	5,969
Total Liabilities	39,524	45,314	48,304	52,058	56,486
Total Equity	8,130	8,650	9,457	9,885	10,254
Liabilities & Equity	47,654	53,964	57,761	61,943	66,740
ASSET QUALITY					
Nonperform Loans/Loans %	3.3	3.3	2.5	2.8	2.3
Nonperform Loans/Assets %	2.2	2.2	1.7	1.9	1.5
Tier 1 Capital	0	7,666	8,106	8,418	8,793

Table 8
FAB Financial Statements

FIRST ABU DHABI BANK PJSC (FAB UH)				
	Millions AED			
INCOME STATEMENT	**12/31/2017**	**12/31/2018**	**12/31/2019**	**12/31/2020**
Interest income	16,332	21,836	24,368	20,100
Interest expense	4,936	8,810	11,594	7,843
Net interest income	**11,396**	**13,026**	**12,774**	**12,257**
Fee and commission income	4,026	4,880	4,731	4,346
Fee and commission expense	(1,128)	(1,488)	(1,561)	(1,442)
Net fee and commission income	**2,898**	**3,392**	**3,169**	**2,903**
Net foreign exchange gain	928	2,042	2,600	1,240
Net gain on investments and derivatives	686	826	1,506	951
Other operating income	472	159	197	1,222
Operating income	**16,380**	**19,446**	**20,246**	**18,573**
Salaries and benefits	3,423	3,167	55	53
General & admin expense	1,479	2,161	5,498	5,060
Total Non-Interest Expense	**4,902**	**5,329**	**5,553**	**5,113**
Profit before net impairment and taxes	**11,479**	**14,117**	**14,750**	**13,514**
Provison for loan losses (net impairment)	2,087	1,726	1,842	2,619
Profit before taxation	**9,392**	**12,391**	**12,908**	**10,895**
Overseas income tax expense	225	325	314	341
Profit for the year	**9,167**	**12,066**	**12,594**	**10,554**
BALANCE SHEET				
Cash & Investment	322,830.0	370,336.4	394,566.9	513,119.7
Loans	330,465.9	353,205.2	114,644.4	131,573.8
Other Assets	15,672.4	20,583.6	19,923.3	15,951.0
Total Assets	668,968.3	744,125.2	821,968.0	919,060.5
Deposits	395,843.7	465,475.9	519,161.9	540,882.5
Long Term Debt	42,145.7	42,268.2	56,133.1	62.907.9
Other Liabilities	128,769.5	134,408.1	22,870.9	22,122.6
Total Liabilities	566,758.9	642,152.2	713,931.0	810,021.5
Total Equity	102,209.4	101,973.0	108,037.0	109,039.0
Liabilities & Equity	668,968.3	744,125.2	821,968.0	919,060.5
ASSET QUALITY				
Nonperform Loans/Loans %	3.1	3.1	3.23	3.97
Nonperforming Loans	12,492	11,500	13,529	15,845
Tier 1 Capital Ratio	16.6	14.6	15.7	15.4

Bloomberg Finance (2020)

Table 9
Ratio Analysis 2020

			Adequacy		Profitability				Asset Quality		Liquidity		
GCC Peer Group Banks	**Country**	**Revenues**	**Tier 1 Capital (000,000,000)**	**Tier 1 Captial Ratio**	**ROE (%)**	**ROA (%)**	**Net Profit Margin**	**Net Interest Margin**	**Nonperf Loans/ Loans**	**Nonperf Loans/ Assets**	**Loans (000,000,000)**	**Deposits (000,000,000)**	**Loans/ Deposits**
Qatar National Bank	Qatar	13.3	25.4	18.1	14.7	1.2	45.9	2.3	2.1	1.5	202	200	101
First Abu Dhabi Bank (FAB)	UAE	7.6	21.2	15.4	10.4	1.2	52.7	2.0	4.0	1.7	108	147	74
Emirates NBD	UAE	9.7	21.1	17.4	8.6	1.0	27.6	3.1	6.2	4.3	130	126	103
Abu Dhabi Commercial Bank	UAE	4.8	13.2	15.9	7.0	0.9	28.5	2.8	6.3	3.8	68	68	100
Samba Financial Group	KSA	3.0	13.5	19.2	9.0	1.5	44.6	2.3	1.5	0.8	43	55	77
Mashreq Bank	UAE	2.8	5.2		-6.2	-0.8	-19.5	2.2	4.6	2.3	22	25	88
Arab National Bank	KSA	2.0	8.1	19.5	7.1	1.1	31.8	3.1	3.5	2.3	31	34	91
Saudi British Bank	KSA	2.8	11.1	19.0	-7.8	-1.5	-42.6	3.1	6.2	3.6	43	50	85
Banque Saudi Fransi	KSA	2.3	10.3	20.6	4.6	0.8	20.3	3.1	2.8	1.9	36	34	106
Group Average		**5.4**	**14.3**	**18.1**	**5.3**	**0.6**	**21.0**	**2.6**	**4.1**	**2.5**	**76**	**82**	**92**

Bloomberg Finance 2020

Table 10

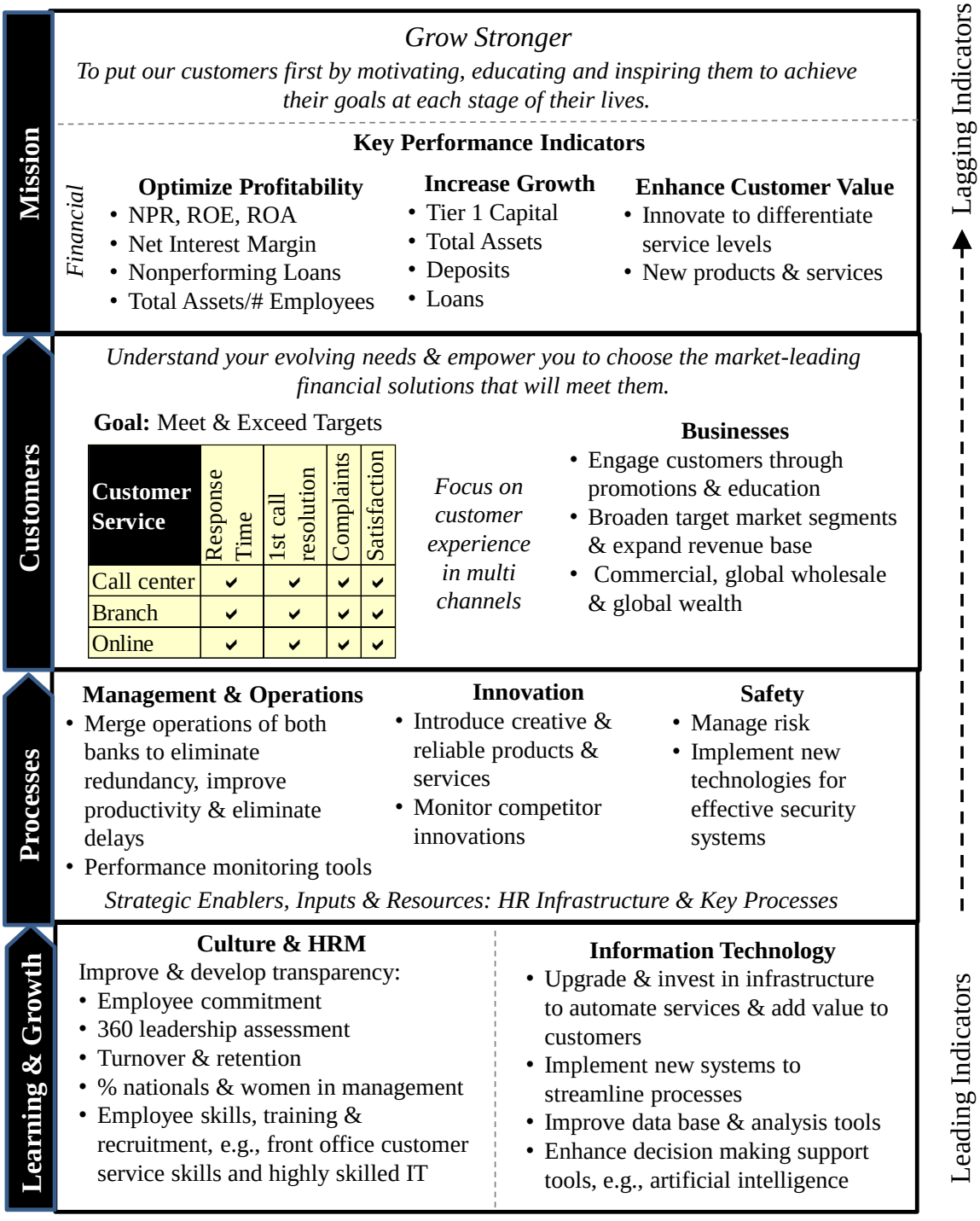
FAB Human Resources Data Table

Key Performance Indicator	**2017**	**2018**	**2019**	**2020**
Nationalisation				
Total Workforce	5,393	5,433	5,451	5,054
% Nationals in Sr Management	25	8	17	37
% Nationals in Total Workforce	31	33	33	24
Number of National Employees	1,278	1,370	1,298	1,339
Number of Female National Employees	944	1,038	999	1,031
Workforce by Gender				
Male	3,354	3,336	3,337	3,029
Female	2,039	2,097	2,114	2,025
Number of Nationalities	89	82	85	81
Female Representation				
Employees in Sr Management	91	40	45	41
Females in Sr Management	10	3	2	4
Employees in Mid Management	3,298	3,853	4,135	3,934
Females in Mid Management	1,095	1,364	1,476	1,482
Turnover				
% Employee turnover (voluntary)	14.0	10.0	9.9	6.0

Corporate ESG Report 2020

Figure 5

Bank Strategy Map: Pathway to Excellence Model



References

American Bankers Association. (2018). Deposit account fraud survey. Retrieved from https://www.aba.com/news-research/research-analysis/deposit-account-fraud-survey-report

Bloomberg Finance. (2018). *UAE crude oil price 2000-2018 in proportion to UAE GDP-function GP.*

Carter, J. (2012). *Next generation branch banking*. England: Financial News Publishing Ltd.

Central Bank of the UAE. (2018). *Annual report*. Retrieved from https://www.centralbank.ae/sites/default/files/2019-05/Central%20Bank%20-%20Annual%20Report%20-%202018.pdf

Combes, J. (2018). Steady rising global oil prices to be key driver of growth in the GCC. *CPI Financial*.

Damak, M., Young, B.J., Tuli, P., & Nasreddine, Z. (2019, October 9). Industry report card: GCC banks 2020 industry outlook: Stable credit fundamentals clouded by event risks. *S&P Global Ratings.*

Devos, E., Krishnamurthy, S., & Narayanan, R. (2016). Efficiency and market power gains in bank megamergers: Evidence from value line forecasts. *Financial Management, Winter,* 1011-1039.

Emerging Trends (2018, December 6). New ITU statistics show more than half the world is now using the Internet. *International Telecommunications Union*. Retrieved from https://news.itu.int/itu-statistics-leaving-no-one-offline/

Forbes. (2012). *The world's most innovative companies*. Retrieved from https://www.forbes.com/innovative-companies/#345af711d654

Fraisse, H., Hombert, J., & Lè, M. (2018). The competitive effect of a bank megamerger on credit supply. *Journal of Banking and Finance*, 93, 151-161.

Gencoglu, B. (2016). Global mergers and acquisitions in an unpredictable political and economic political and economic environment. *IFN Reports*. Retrieved from https://www.islamicfinancenews.com/global-mergers-and-acquisitions-in-an-unpredictable-political-and-economic-environment.html

Giridhar, S., Notestein, D., Ramamurtby, S., & Wagle, L. (2011). *From complexity to client centricity*. IBM Global Business Services.

Gulf Business. (2019, May 1). Abu Dhabi banks ADCB, UNB and Al Hilal merge to create third largest UAE lender. Retrieved from https://gulfbusiness.com/abu-dhabi-banks-adcb-unb-al-hilal-merge-create-third-largest-uae-lender/

Ibrahim, M. H. (2019). Oil and macro-financial linkages: Evidence from the GCC countries. *Quarterly Review of Economics and Finance*, 72, 1-13.

International Monetary Fund. (2014). *Assessing concentration risks in GCC banks.* Retrieved from https://www.imf.org/external/np/pp/eng/2014/102514.pdf

International Monetary Fund. (2013). *United Arab Emirates*. (IMF Country Report No. 13/239). Retrieved from https://www.imf.org/external/pubs/ft/scr/2013/cr13239.pdf

Internet Live Stats. (2016). *Internet users in the world*. Retrieved from http://www.internetlivestats.com/internet-users/

Internet World Stats. (2019). *Internet Usage in the Middle East.* Retrieved from https://www.internetworldstats.com/stats5.htm

Javelin Strategy and Research. (2018). *Mobile banking adoption won't match online in the foreseeable future* (Ref: 16-2003J-OP). Retrieved from https://www.javelinstrategy.com/graphic/javelin-forecast-monthly-channel-usage-primary-fi-2004-2021

Khan, S. (2017). The changing dynamics of the UAE banking sector. *MEED Business Review*, 49-51.

King, J. (2018). FAB's arrival turns Middle East table on its head. *Top 1000 World Banks*.

Leijen, M. V. (2012). Bank call centres not ringing in satisfaction. *Emirates 24/7*. Retrieved from http://www.emirates247.com/eb247/banking-finance/banking/bank-call-centres-not-ringing-in-satisfaction-2012-03-05-1.446552?ot=ot.PringPageLayout

Magee, K. (2012, September 26). Ulster bank crisis: 'Several thousand' customers leave. *BBC*. Retrieved from https://www.bbc.com/news/uk-northern-ireland-19722678

McKinsey. (2011). Big data: The next frontier for innovation, competition, and productivity. *McKinsey Global Institute*.

Norton Cyber Security Insights Report. (2017). Symantec Corporation. Retrieved from https://us.norton.com/cyber-security-insights-2017

Poushter, J. (2016). *Smartphone ownership and internet usage continues to climb in emerging economies.* Washington, DC: Pew Research Center. Retrieved from http://www.pewglobal.org/2016/02/22/smartphone-ownership-and-internet-usage-continues-to-climb-in-emerging-economies/

PwC Middle East. (2019). *Banking and capital markets*. Retrieved from https://www.pwc.com/m1/en/industries/banking-capital-markets.html

Shim, J. (2019). Loan portfolio diversification, market structure and bank stability. *Journal of Banking and Finance*, 104, 103-115.

Smith, A. (2014). *PewResearch internet project: Usage and adoption.* Washington, DC: Pew Research Center. Retrieved from http://pewinternet.org/2014/04/03/usage-and-adoption/

Souqalmal. (2018, May 23). *Would you recommend your bank? 32% say 'YES'...* Retrieved from https://www.souqalmal.com/financial-education/ae-en/uae-bank-satisfaction-index-2018/

UAE Banks Federation. (2018). *Annual Report*. Retrieved from https://www.uaebf.ae/en/publications/publication-annual.html

UAE Customer Satisfaction on the Rise. (2017, August 8). *Gulf News*. Retrieved from https://gulfnews.com/technology/uae-customer-satisfaction-on-the-rise-1.2070968

UAE Department of Health. (2016). *Abu Dhabi Health Statistics*. Abu Dhabi: Health Authority of Abu Dhabi. Retrieved from https://www.haad.ae/haad/tabid/1516/Default.aspx

United Nations. (2017). *World population prospects: The 2017 revision.* New York: Department of Economic and Social Affairs, Population Division.

Weiß, G. N. F., Neumann, S., & Bostandzic, D. (2014). Systemic risk and bank consolidation: International evidence. *Journal of Banking & Finance, 40*, 165-181.

World Bank. (2010). *Economic integration in the Gulf Cooperation Council (GCC).* Washington, DC: The World Bank.

World Bank. (2016). *Competition in the GCC SME lending markets: An initial assessment.* Washington, DC: The World Bank.

World Bank. (2018). *Global economic prospects, January 2018: Broad-based upturn, but for how long?* Washington, DC: The World Bank.

World Economic Forum. (2016). *The global information technology report.* Geneva: World Economic Forum.

World Economic Forum. (2017). *The global competitiveness report 2017-2018.* Geneva: World Economic Forum.
World Economic Forum. (2018a). *The Arab global competitiveness report 2018*. Geneva: World Economic Forum.
World Economic Forum. (2018b). *The global gender gap report*. Geneva: World Economic Forum.