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Journal Profile

The *Journal of Research in Business Information Systems* (JRBIS) is a national blind-reviewed, refereed publication published annually by the Association of Business Information Systems. This refereed journal includes articles from fields associated with business information systems focusing on theory, problems associated with information systems and information resources in education, business and industry, government, and the professions.

Manuscripts are selected using a blind review process. The first issue of the Journal was available Spring 2008. The Journal is listed in the ERIC Database and Cabell's Directory of Publishing Opportunities in Accounting, Computer Information Systems, Education, Instructional Technology, and Management.

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All manuscripts must be submitted electronically in Microsoft Word format. Manuscripts, citations, and references must use the **APA 7th edition** style format.

Submissions should include a separate file attachment for the title page that contains the following information in this exact order:

- Title of the manuscript
- Each author's full name; position/title; institutional affiliation, including address, city, state, zip code; home, office, and cell phone numbers; and e-mail addresses (identify the main author who should receive all correspondence).
- Number of words in the article (including all parts–everything)
- Biographical paragraph (50-60 words) for each author
- Any acknowledgments or information about manuscript history (e.g., based on a conference presentation)

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- 1" margins all around
- Times New Roman, 12 pt. font-size text within article
- Bold and center primary headings, with major words capitalized
- Bold and left-align secondary headings, with major words capitalized
- No footnotes or endnotes
- No page numbers or headers or footers

Tables and figures may have varying font sizes (but must adhere to APA Style). Include tables or figures formatted and placed correctly within the manuscript.

Include the References page at the end of the manuscript, followed by any appendix information, if necessary.

All submissions will be reviewed by the editor and at least two reviewers, using a blind-review process. Authors will receive feedback 6-8 weeks after the initial peer review. Manuscripts will be "accepted," "accepted with minor revisions," "possibly accepted after major revision and resubmission for further peer review," or "rejected."

The editor reserves the right to edit selected/accepted manuscripts for publication as deemed appropriate and necessary for the optimization of journal publication and format. The author of the manuscript retains responsibility for the accuracy of a manuscript published in the *Journal of Research in Business Information Systems*.

To ensure your manuscript is considered for publication in the *2021 Journal of Research in Business Information Systems*, submit the manuscript by July 31, 2020, to JRBISeditor@gmail.com.

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STUDENT SELF-REGULATION: A CLOSER LOOK AT DIFFERENCES IN TIME MANAGEMENT PRACTICES OF COMPUTER INFORMATION SYSTEMS, ACCOUNTING, AND BUSINESS MAJORS ACROSS AGE AND GENDER

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Abstract

Time is a limited resource that college students must master in the self-regulated environments of higher education. Understanding how students of varying demographics practice time management is key to improving resources that enhance students' abilities. This study addresses the limited understanding of time management practices and behaviors of Computer Information Systems, Accounting, and Business majors related to age and gender. The purpose of this study is to expand on previous research to provide further evidence to support the two hypotheses. The two hypotheses reflect significant differences (a) between male and female and (b) among different academically mature students majoring in business fields concerning short-range planning, time attitudes, and long-term planning. The current study examines survey results for 490 business students by comparing between males (N=236) and females (N=254) and among three age groups of academically young (N=253), borderline mature (N=104), and mature (N=133) students. The analysis supports significant differences (a) between males and females in short-range and long-term planning and (b) between younger and more mature students.

Keywords: Time Management, Business Students, Self-Regulation, Academic Success Skills

Introduction

Time is a limited resource, and time management is an important skill in higher education's self-regulated learning environments. A college student must master the skill as part

of a strategic action plan that increases productivity while reducing stress and improving life balance (Alay & Kocak, 2002). It is essential as students are exposed to increasingly more information-processing tasks, such as reading, studying, and assignments, as they grow from academically young to mature students. Students naturally want to succeed and consider it natural to self-evaluate the management of these educational tasks.

This study addresses the limited understanding of time management practices and behaviors of Computer Information Systems, Accounting, and Business majors related to age and gender. Self-regulation and improving time-management skills require metacognition, motivation, and strategic planning (Zimmerman, 1990). A student must monitor and judge oneself, remaining alert to their environment. Assuming that students are self-aware of their time management skills, self-reporting surveys allow researchers to understand the role demographics play in time management skills that promote academic success. Studies using this technique include Britton and Tesser (1991), Trueman and Hartly (1996), Alay and Kocak (2002), and García-Ros et al. (2004). They have identified different factors in time management and their role with students.

The purpose of this study is to investigate and expand on the knowledge learned in previous research on the role of gender and academic maturity as related to time management skills among students majoring in business fields. The present study expands on the study by Powell, Hardy, and Pharris (2020), which reported on a 14-Likert scale survey comparable to the Trueman and Hartley (1996) study. This study expands to investigate the result of a 19-question survey divided into three time management factors originally proposed by Britton and Tesser (1991): short-range planning, time attitudes, and long-range planning. This study analyzes 490

participants to provide further empirical evidence of significant differences between males and females and among age groups of business students.

Literature Review

Time management behaviors have been positively associated with health, job satisfaction, and perceived control over time (Claessens, Van Eerde, Rutte, & Roe, 2007). The findings of a study by Macan, Shahani, Dipboye, and Phillips (1990) revealed that students who perceived they were more in control of their time reported better academic performance and more work and life satisfaction. These students also indicated fewer job-induced tension, role ambiguity, and role overload. The study results reveal that people practicing time management behaviors possess a more precise grasp of their role and believe that they are better performers than others.

Time Management Construct

According to Claessens et al. (2007), the time management construct is not well defined across the body of literature. This lack of consistency in the definition has led to questionable measurement instruments, which may account for the inconsistent findings across the literature body. García-Ros, Pérez-González, and Hinojosa (2004) recognize the importance of considering time management as multi-dimensional, a variable that requires that it be studied in many and varied contexts to help researchers genuinely grasp the impact of time management on academic achievement and student success. For instance, inadequate time planning skills, one of the dimensions of time management, can hinder people from allocating adequate time for academic activities, resulting in reduced academic achievement, but it also results in less time for personal or social activities (Kaya, Kaya, Palloş, & Küçük, 2012; Campbell, Svenson, & Jarvis, 1992). People with poor time planning skills often report higher stress levels and more flawed decision-making, leadership, and critical thinking capabilities (Campbell et al., 1992).

Gender. The current study investigates differences between time management constructs and student gender. Research indicates that women are enrolled in undergraduate degree programs more often than men, and in general, female students manage time better than male students (Kaya et al., 2012). Also, female students tend to complete all the tasks required across a long time in a shorter time frame than male students. They also discovered in a study of 320 four-year public institution business students majoring in accounting, business, and information systems programs that "women scored significantly higher than men overall" in total time management (Powell et al., 2020, p.8). Even while female college students exhibited more effective time management behavior than male students, they also suffered from higher anxiety and academic stress (Misra & McKean, 2000). Kaya et al. (2012) support these findings, having discovered that women reason that a lack of time kept them from making important changes to reduce stressors.

Academic maturity. Time-related beliefs, attitudes, and preferences influence how individuals manage their time (Aeon & Aguinis, 2017). Moreover, beliefs, attitudes, and preferences vary depending on demographics and student populations. Because education is a lifelong, ongoing practice, it has become even more critical to understand the student population (Blaxter & Tight, 1994). On average, students believe they have strong time management skills, with senior students showing a greater ability to estimate final course outcomes than less experienced students (McFadden & Dart, 1992). Students also believe that their time management skills improve as they gain experience in their respective undergraduate programs (Williams, Hussain, Manojkumar, & Thapa, 2016). In 2020, Hardy, Powell, & Pharris conducted a comparative study among 207 freshman and senior business students to determine any significant differences in time management skills among accounting, business, computer

information systems majors and their academic classifications. The researchers concluded the results demonstrated partial support of the hypothesis that "there is a significant difference between freshmen and senior students when involving short-range planning" but not time attitudes and long-range planning.

Self-regulation and conscientiousness. Self-regulation involves how effectively a student manages distractions, possesses technical self-efficacy, and takes responsibility for studying, goal-setting, self-reflection, time management, and establishing an assignment completion schedule (Ramdass & Zimmerman, 2011). Over time and with practice, people can develop their self-regulatory behaviors, often through homework assignments as students attempt to stay motivated, reduce distractions, and stay on task until activity completion. A learner exhibits self-regulatory behaviors when employing the applicable cognitive and behavioral mechanisms and strategies to optimize their learning ability (Zimmerman, 2008). Kyllonen et al. (2014) argue that making changes to the narrower dimension of personality, such as time management, is more accessible than changing the broader personality domain, like conscientiousness. Conscious personalities tend to have an intrinsic motivation for achievement, leading people to engage in high-performance levels and seek additional ways to improve performance (Devaraj, Easley, & Crant, 2008).

Self-regulation strategies. Educational research on time management has centered around (1) self-regulation of study time, (2) suitability of time management, and (3) interventions related to time management skills and behaviors (García-Ros, Pérez-González, & Hinojosa, 2004). Nonis and Hudson (2006) claim that today's college students are not prepared to tackle the rigor of college-level work as college students from earlier generations. A 2017 study by Thibodeaux, Deutsch, Kitsantas, and Winsler supports this assertion. They examined

the relationships among time use and academic self-regulation strategies that first-year college students employ and their target and actual GPA over three different time points. The results suggest that students' self-regulated learning skills in their first year are lower than success in college-level classes requires. According to the findings, students spent more time focusing on socialization and work responsibilities than academics during their first semester. Students intended and planned to spend more time focused on academics during the second semester. Interestingly, students failing to meet their target GPA during the first semester adjusted their second semester GPA target downward rather than changing their plans to study more. Students who exceeded their GPA target planned to socialize more in the second semester. Students seem to underestimate the amount of time college academics require.

Study habits. In a 2003 study by Zuriff, psychology students reported spending less than 10 hours a week on academic work over a semester. Even after considering previous exam scores in the course, study findings showed that the students who spent more time studying performed better than their peers who spent less time studying. Fouché (2017) had similar results when investigating time management practices in accounting majors. Students with good study habits showed a significantly positive correlation with how well they performed, and students with poor study habits showed a significant negative association with their performance. Study time is strongly correlated with academic conscientiousness and higher GPAs (Brint & Cantwell, 2010). The study by Brint and Cantwell (2010) also shows that actively engaging in non-academic pursuits, such as physical exercise and volunteering, is associated with increased academic conscientiousness levels. Fittingly, students cannot complete all assignments in a class without planning their time and self-regulating their learning for any academic and non-academic activities requiring their attention (Sharma, Van Hoof, & Ramsey, 2017).

Time Management in the Curriculum

McFadden and Dart (1992) share concern that business schools have not provided adequate effort in emphasizing time management skill development throughout their curriculum, considering its importance to future career and financial success. More recently, universities have attempted to incorporate time management skills into the curriculum, but these attempts are often only moderately effective (Permzadian & Credé, 2016). Yet, Friess and Davis (2016) maintain that current homework practices do not purposefully support self-regulatory skills development like goal setting, self-reflection and evaluation, and time management. These skills do lead to higher academic achievement.

Conflicting time goals. In attempting as many activities as possible, people find that conflicts arise between their goal to maximize the number of activities completed and their desire and ability to produce the highest quality outcome. These two goals appear to be at odds. A study by Rapp, Bachrach, and Rapp (2013) supports the assertion that conflicts exist between task and outcome maximization. They show how employee task performance suffers when they engage in organizational citizenship or helping behaviors. The study also found that as employees became more skilled at managing their time, their behavior-based task performance increased at higher citizenship levels. Still, Malkoc and Tonietto (2018) express the importance of finding a balance between activity and outcome maximization to ensure optimal task outcomes.

Methodology

The study uses a 19-question survey instrument, Table 1, adapted from the Britton and Tesser (1991) 18-question survey. We altered one question to use “semester” to resemble American university terminology and added question #14 to capture social media that was almost nonexistent in 1991. Participants answered questions by selecting options ‘never,’

'infrequently,' 'sometimes,' 'frequently,' and 'always,' using a Likert scale ranging from 1 (negative practices) to 5 (positive practices). The survey questions are in three factors. Short-Range Planning (SRP) with seven questions and an aggregate average score from 7 to 35. Time Attitudes (TA) with seven questions and an aggregate average score from 7 to 35. Long-Range Planning (LRP) with five questions and an aggregate average score from 5 to 25. The Time Management Questionnaire (TMQ) score aggregates all questions into a score from 19 to 75.

Table 1

Time-Management Questionnaire

Short-Range Planning (SRP)
1. Do you make a list of the things you have to do each day?
2. Do you plan your day before you start it?
3. Do you make a schedule of the activities you have to do on work/school days?
4. Do you write a set of goals for yourself for each day?
5. Do you spend time each day planning?
6. Do you have a clear idea of what you want to accomplish during the next week?
7. Do you set and honor priorities?
Time Attitudes (TA)
8. Do you often find yourself doing things which interfere with your schoolwork simply because you hate to say "No" to people?[a]
9. Do you feel you are in charge of your own time, by and large?
10. On an average class day, do you spend more time with personal grooming than doing schoolwork?[a]
11. Do you believe that there is room for improvement in the way you manage your time?[a]
12. Do you make constructive use of your time?
13. Do you continue unprofitable routines or activities?[a]
14. On an average class day, do you spend more time on social media (Facebook, Twitter, Instagram, Snapchat, text messages, email, etc.) than doing schoolwork?[a]
Long-Range Planning (LRP)
15. Do you usually keep your desk clear of everything other than what you are currently working on?
16. Do you have a set of goals for the entire semester?
17. The night before a major assignment is due, are you usually still working on it?[a]
18. When you have several things to do, do you think it is best to do a little bit of work on each one?
19. Do you regularly review your class notes, even when a test is not imminent?

[a] Reversed scored so that 'never' received a score of 5

Hypothesis

The general hypothesis is whether a difference in time management practices exists between gender and age groups. To compare this study with Trueman and Hartley (1996), we use their age grouping of young students (18-20 years), borderline mature students (21-25 years), mature students (over 25 years), and will refer to them as young, borderline, and mature. The hypotheses are:

H1: There is a significant difference between males and females in (a) short-range planning, (b) time attitudes, (c) long-range planning, and (d) overall time-management.

H2: There is a significant difference between young, borderline, and mature students in (a) short-range planning, (b) time attitudes, (c) long-range planning, and (d) overall time management.

Subjects

Participants include students enrolled at a Louisiana four-year public institution during fall 2017, spring 2018, fall 2018, fall 2019, and spring 2020 semesters. They voluntarily completed the survey in a freshman-level introduction to information technology class or a senior-level capstone class. All were 18 years or older and school of business majors. The university's institutional research office supplied demographic information using the participant's identification number with IRB approval. There were 490 participants, including 253 young, 104 borderline, 133 mature, or 254 females and 236 males. In majors, 109 were accounting, 255 were business administration, and 126 were computer information systems.

Table 2
Subject Counts

Age Group	Female	Male	Total
Young (≤ 20)	101	152	253
Borderline (21 – 25)	73	31	104
Mature (≥ 26)	80	53	133
Total	**254**	**236**	**490**

Results

This study analyzed survey responses using the R Project for Statistical Computing and followed the statistical model in Britton and Tesser (1991), Trueman and Hartley (1996), Hardy et al. (2020), and Powell et al. (2020). Hypothesis testing used t-Tests to compare women and men and a one-way ANOVA with Tukey HSD post hoc analysis among the three age groups, assuming equal variance as indicated by Bartlett's Test for Homogeneity of Variance. Table 3 provides the average response to each question, the aggregate scores, and the t-test p-value results from comparing genders and age groups.

Gender

Women have positive responses to SRP questions with average scores between 3 ('sometimes') and 4 ('frequently'), except with daily goal setting. Men have mostly positive responses, except in list-making and daily goal setting, which generated the lowest score. In all SRP questions, men had lower average responses than women, and they were significantly different in all but one question: daily goal setter. The SRP scores show a significant difference with women (M=25.34, SD=5.46) having a higher average score than men (M=23.03, SD=5.33); t(488)=4.750, p=0.000.

Table 3

Average Survey Responses and t-Test Results for Women versus Men

	All (N = 490)		Female (N =254)		Male (N = 236)			
Question	**M**	**SD**	**M**	**SD**	**M**	**SD**	**t**	**p**
Short-Range Planning (SRP)								
1. List making	3.26	1.15	3.56	1.09	2.94	1.14	6.062	0.000***
2. Pre-day planner	3.68	1.02	3.85	0.96	3.50	1.04	3.916	0.000***
3. Activity scheduling	3.67	1.12	3.89	1.08	3.43	1.11	4.658	0.000***
4. Daily goal setter	2.68	1.25	2.74	1.18	2.62	1.32	1.043	0.298
5. Daily planning	3.25	1.11	3.42	1.09	3.06	1.11	3.637	0.000***
6. Weekly planning	3.77	1.04	3.88	1.02	3.66	1.06	2.355	0.019*
7. Priority setter	3.91	0.94	4.00	0.92	3.81	0.95	2.252	0.025*
Total SRP Average	24.23	5.52	25.34	5.46	23.03	5.33	4.750	0.000***
Time Attitudes (TA)								
8. Unable to say "no" [a]	3.37	1.01	3.31	1.03	3.44	0.99	-1.416	0.157
9. In charge of own time	3.75	0.97	3.71	0.89	3.79	1.05	-0.861	0.390
10. Over groomer [a]	4.16	0.86	4.19	0.83	4.12	0.89	0.851	0.395
11. Room for improvement [a]	1.85	0.99	1.80	0.98	1.90	1.00	-1.158	0.248
12. Constructive use of time	3.66	0.72	3.73	0.73	3.59	0.71	2.139	0.033*
13. Unprofitable routines [a]	3.27	0.86	3.30	0.84	3.23	0.87	0.961	0.337
14. Social media overuse [a]	3.39	1.08	3.41	1.04	3.36	1.11	0.589	0.249
Total TA Average	23.44	3.47	23.46	3.61	23.43	3.31	0.092	0.927
Long Range Planning (LRP)								
15. Keeps desk clear	3.52	1.13	3.68	1.07	3.36	1.18	3.163	0.002**
16. Semester goal setter	3.69	1.18	3.77	1.14	3.60	1.21	1.600	0.110
17. Procrastination [a]	2.80	0.91	2.80	0.93	2.81	0.89	-0.123	0.902
18. Multitasking	3.14	1.09	3.28	1.07	2.99	1.09	2.911	0.004**
19. Regular note taker	3.12	0.96	3.24	0.99	2.98	0.91	2.980	0.003**
Total LRP Average	16.27	3.01	16.76	3.10	15.74	2.83	3.806	0.000***
TMQ Total Average	63.94	9.20	65.56	9.44	62.19	8.62	4.114	0.000***

[a] Reversed scored—'never' received a score of 5

Significance codes: 0 '***', 0.001 '**', 0.01 '*', 0.05 '.'

The TA questions' responses were positive for both genders, except for 'room for improvement,' which had low scores. Only one question generated a significant difference. Women (M=3.73, SD=0.73) had significantly higher scores than men (M=3.59, SD=0.71) on the 'constructive use of time' question; t(488)=2.139, p=0.033. There was not a significant difference between them in the TA score.

LRP responses were positive in four of the five questions for females, but only two questions for men. Both responded negatively to procrastination, and there is no significant difference between them. Men also responded slightly negatively in multitasking and regular note-taking. There were significant differences in keeping your desk clear, multitasking, and regular note-taking. First, women (M=3.68, SD=1.07) had higher scores than men (M=3.36, SD=1.18) in keeping their desk clear; t(488)=3.163, p=0.002. Second, women (M=3.28, SD=1.07) had higher scores than men (M=2.99, SD=1.09) in multitasking; t(488)=2.911, p=0.004. Third, women (M=3.24, SD=0.99) had higher scores than men (M=2.98, SD=0.91) in regular note-taking; t(488)=2.980, p=0.003. Last, the overall LRP score is significantly different from women (M=16.76, SD=3.10), having a higher average score than men (M=15.74, SD=2.83); t(488)=3.806, p=0.000.

This study revealed significant differences between men and women. SRP and LRP responses led to an overall significant difference in the TMQ score. Women (M=65.56, SD=9.44) scored themselves higher than men (M=62.19, SD=8.62); t(488)=4.114, p=0.000.

Age Groups

The age groups show significant differences for six of the seven SRP questions (Table 4), with priority setting as the exception. For each question, borderline and mature students had higher scores than young students. Young students had negative responses to daily goal setting and daily planning, but the other age groups only had negative responses to daily goal setting. The post hoc analysis, Table 5, shows that the differences are between young students and the other age groups, but not between the two other groups. This is also the case with the overall SRP score as young (M=22.92, SD=5.41), borderline (M=25.65, SD=4.79), and mature (M=25.59, SD=5.67) students show significant differences; F(2, 487)=15.503, p=0.000. Here,

the post hoc also shows the difference between the younger students and the borderline and mature students.

Table 4
Average Survey Responses and ANOVA Results for Age Groups

	All (N = 490)		Young (N = 253)		Borderline (N = 104)		Mature (N = 133)			
Question	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**F**	**p**
Short-Range Planning (SRP)										
1. List making	3.26	1.15	3.01	1.11	3.55	1.09	3.52	1.19	13.270	0.000***
2. Pre-day planner	3.68	1.01	3.53	1.08	3.82	0.96	3.87	0.88	6.237	0.002**
3. Activity scheduling	3.67	1.12	3.43	1.14	4.05	0.96	3.83	1.10	13.500	0.000***
4. Daily goal setter	2.67	1.25	2.51	1.25	2.79	1.20	2.92	1.23	5.243	0.006**
5. Daily planning	3.25	1.11	2.96	1.11	3.61	0.99	3.50	1.07	18.260	0.000***
6. Weekly planning	3.77	1.04	3.60	1.31	3.83	1.00	4.06	0.81	9.070	0.000***
7. Priority setter	3.91	0.94	3.88	0.98	4.02	0.84	3.89	0.93	0.871	0.419
Total Average	**24.23**	**5.52**	**22.92**	**5.41**	**25.65**	**4.79**	**25.59**	**5.67**	**15.530**	**0.000*** **
Time Attitudes (TA)										
8. Unable to say "no" [a]	3.37	1.01	3.54	0.96	3.01	1.11	3.34	0.96	10.660	0.000***
9. In charge of own time	3.75	0.97	3.85	0.96	3.63	0.91	3.64	1.01	3.078	0.047*
10. Over groomer [a]	4.15	0.86	4.08	0.87	4.05	0.82	4.39	0.83	6.977	0.001**
11. Room for improvement [a]	1.85	0.99	1.79	0.95	1.80	1.04	2.00	1.02	2.147	0.118
12. Constructive use of time	3.66	0.72	3.64	0.77	3.67	0.69	3.75	0.66	1.731	0.178
13. Unprofitable routines [a]	3.27	0.86	3.28	0.92	3.08	0.80	3.40	0.75	4.208	0.015*
14. Social media overuse [a]	3.39	1.08	3.20	1.04	3.14	1.05	3.93	0.99	25.970	0.000***
Total Average	**23.44**	**3.47**	**23.35**	**3.33**	**22.38**	**3.43**	**24.45**	**3.50**	**11.000**	**0.000*** **
Long Range Planning (LRP)										
15. Keeps desk clear	3.52	1.13	3.50	1.22	3.56	1.14	3.53	1.16	0.098	0.907
16. Semester goal setter	3.69	1.18	3.58	1.23	3.73	1.18	3.86	1.05	2.573	0.077 .
17. Procrastination [a]	2.80	0.91	2.81	0.87	2.77	0.97	2.83	0.93	0.120	0.887
18. Multitasking	3.14	1.09	3.13	1.07	3.16	1.15	3.14	1.07	0.035	0.966
19. Regular note taker	3.12	0.96	3.06	0.91	3.07	1.05	3.26	0.98	2.140	0.119
Total Average	**16.27**	**3.01**	**16.08**	**2.81**	**16.29**	**3.18**	**16.62**	**3.24**	**1.414**	**0.244**
TMQ Total Average	**63.94**	**9.20**	**62.34**	**8.80**	**64.33**	**8.59**	**66.66**	**9.80**	**10.080**	**0.000*** **

a Reversed scored—'never' received a score of 5
Significance codes: 0 '***', 0.001 '**', 0.01 '*', 0.05 '.'

Time attitude responses were positive except for 'room for improvement'. Five questions received significantly different responses, and the TA score was significantly different. The age

group with the highest score varies, but overall, mature students (M=24.45, SD=3.50) had the highest TA score, borderline mature students (M=22.38, SD=3.43) had the lowest, and young students (M=23.35, SD 3.33) were between them; F(2, 487)=11.000, p=0.000. The post hoc analysis also shows mixed results. Young students (M=3.54, SD=0.96) reported themselves to be better at saying no than borderline (M=3.01, SD=1.11) students, but it was not significantly different from older students (M=3.34, SD=0.96); however, the borderline students were significantly different from mature students; F(2, 487)=10.660, p=0.000. Furthermore, young students (M=3.85, SD=0.96) have significantly higher scores on being in charge of their own time than borderline (M=3.63, SD=0.91) and mature (M=3.64, SD=1.01) students; F(2, 487)=3.078, p=0.047.

Table 5
Post Hoc Significant Differences Among Age Groups

Question	**Young – Borderline**	**Young – Mature**	**Borderline – Mature**
Short-Range Planning			
1. List making	0.000***	0.000***	0.978
2. Pre-day planner	0.038*	0.004**	0.908
3. Activity scheduling	0.000***	0.002**	0.270
4. Daily goal setter	0.130	0.006**	0.706
5. Daily planning	0.000***	0.000***	0.750
6. Weekly planning	0.133	0.000***	0.193
Total Average	**0.000*** **	**0.000*** **	**0.996**
Time Attitudes (TA)			
8. Unable to say "no" [a]	0.000***	0.138	0.032*
9. In charge of own time	0.127	0.096 .	0.999
10. Over groomer [a]	0.947	0.002**	0.006**
13. Unprofitable routines [a]	0.109	0.375	0.011*
14. Social media overuse [a]	0.896	0.000***	0.000***
Total Average	**0.040***	**0.007****	**0.000*** **
Long-Range Planning (LRP)			
16. Semester goal setter	0.500	0.068 .	0.690
TMQ Total Average	**0.144**	**0.000*** **	**0.120**

a Reversed scored—'never' received a score of 5
Significance codes: 0 '***', 0.001 '**', 0.01 '*', 0.05 '.'

In over-grooming, the significant difference was between young (M=4.08, SD=0.87) and mature (M=4.39, SD=0.83) students, and borderline (M=4.05, SD=0.82) and mature students, but not between young and borderline students F(2, 487)=6.977; p=0.001. Borderline (M=3.08, SD=0.80) and mature (M=3.40, SD=0.75) students show significant difference, but young (M=3.28, SD=0.92) students do not show significant differences with these groups with respect to continuing unprofitable routines; F(2,487)=4.208; p=0.015. In social media overuse, all three rated themselves positively; however, young students (M=3.20, SD=1.04) were like borderline students (M=3.14, SD=1.05) in having significantly lower scores than mature students (M=3.93, SD=0.99); F(2, 487)=25.970; p=0.000.

Overall in time attitudes, mature students (M=24.45, SD=3.50) scored the highest, followed by young (M=23.35, SD=3.33) and then borderline students (M=22.38, SD=3.43), with significant differences seen among all groups; F(2, 487)=11.000; p=0.000. Long-range planning has positive responses except in procrastination, in which all three groups were below 3.0 on average. There was only one significant difference: semester goal-setter with young students (M=3.58, SD=1.23) was significantly lower than mature students (M=3.86, SD=1.05) but not with borderline students (M=3.73, SD=1.18) students; F(4, 487)=2.573, p=0.077. Overall, there is not a significant difference in the LRP scores.

The TMQ scores for the three groups are significantly different. Young students (M=62.34, SD=8.80) had the lowest score, followed by borderline (M=64.33, SD=8.59) and older students (M=66.66, SD=9.80); F(2, 487)=10.080; p=0.000. The post hoc analysis shows that the difference is between younger students and mature students.

Discussion

Short-Range Planning

Table 6
Summary of Significant Differences in Short-Range Planning

Question	Female - Male	Young - Borderline	Young - Mature	Borderline - Mature
1. List making	Y	Y	Y	
2. Pre-day planner	Y	Y	Y	
3. Activity scheduling	Y	Y	Y	
4. Daily goal setter			Y	
5. Daily planning	Y	Y	Y	
6. Weekly planning	Y		Y	
7. Priority setter	Y			
Total Average	Y	Y	Y	

Y indicates a significant difference

Short-range planning questions encapsulate daily and weekly activities, with higher scores indicating that students organize daily and weekly. Table 6 summarizes the significant differences, all occurring between females and males and between young and more mature groups. The average female responses were higher than male responses, with six of the seven questions being significantly higher. Concerning age groups, young students did score lower than borderline and mature students in all seven questions. Six of the seven SRP questions had significant differences, with four showing the difference between young and borderline and six showing the difference between young and mature. In both gender and age groups, there is a significant difference in the SRP scores; therefore, we fail to reject hypotheses H1(a) and H2(a).

Time Attitudes

Table 7
Summary of Significant Differences in Time Attitudes

Question	Female - Male	Young - Borderline	Young - Mature	Borderline - Mature
8. Unable to say “no”		Y		Y
9. In charge of own time			Y	
10. Over groomer			Y	Y

11. Room for improvement				
12. Constructive use of time	Y			
13. Unprofitable routines				Y
14. Social media overuse			Y	Y
Total Average		Y	Y	Y

Y indicates a significant difference

Time attitude questions concern how students perceive their responsibility and constructive time use, with higher scores indicating a more positive attitude of responsibility and time management. Table 7 summarizes the significant differences, with most occurring among the age groups. Both genders had similar scores, with only one question generating significant differences in the TA score responses. Women had a significantly higher score than men on their responses to the 'constructive use of time' question. No significant difference existed in the overall TA score between men and women.

Regarding age groups, there were significant differences in five of the seven questions. Young students' responses were significantly different from borderline students for one of the questions, 'Unable to say no,' and different from mature students in three other questions. Borderline students were different from mature students in four of the questions. Overall, the age groups do show a difference in time attitudes. Therefore, we reject hypothesis H1(b) because there is no significant difference in time attitudes between genders. Still, we fail to reject H2(b) because age groups have a significant difference.

Long-Range Planning

Table 8
Summary of Significant Differences in Long-Range Planning

Question	Female - Male	Young - Borderline	Young - Mature	Borderline - Mature
15. Keeps desk clear	Y			
16. Semester goal setter			Y	
17. Procrastination				
18. Multitasking	Y			

19. Regular note taker	Y
Total Average	Y

Y indicates a significant difference

Long-range planning questions involve capturing the student's skills in working beyond the current week with higher scores implying that students are thinking long-term. Table 8 summarizes the significant differences, with most occurring between females and males. Females reported themselves higher than males on every question except for procrastination. Significant differences occur in three of the five questions and the overall LRP score. Only one question produced a significant difference among the age groups, and the overall LRP score does not show a significant difference. Therefore, we fail to reject hypothesis H1(c) because there is a significant difference between genders, but we reject hypothesis H2(c) because there is very little difference among the age groups.

Overall Time Management

Ten of the 19 questions generated significant differences between the genders, and two of the total scores, SRP and LRP, are significantly different, as summarized in Tables 6 and 8. It led to a significant difference in the overall TMQ score, such that females answered more positively than males. Considering all factors, we fail to reject hypothesis H1 but acknowledge that females and males have similar time management attitudes. Twelve of the 19 questions generated significant differences among the age groups, and two of the total scores, SRP and TA, are significantly different, as summarized in Tables 6 and 7. It led to a significant difference in the overall TMQ score. Considering all factors, we fail to reject hypothesis H2, but those age groups have similar long-range planning skills.

Limitations

This study relies on students self-reporting their time management attitudes and behaviors. It may contain bias if students attempt to appear more positive in their survey responses than their actual behaviors exhibit; however, several average responses were below 3.0, indicating that students are self-identifying deficiencies. This study intended to investigate students majoring in business fields. Still, the study is limited to using convenience sampling with the population from one school of business. As such, it is too early to generalize to a broader population.

Additionally, the study primarily relies on Britton and Tesser's (1991) questionnaire, which other studies have used, but was developed in 1991 and contained one additional question about social media that was not independently verified. The question uses similar language as the other questions and does not significantly differ in the analysis outcome or hypothesis. Furthermore, this study used the same univariate statistical analysis with t-Tests and ANOVA like Britton and Tesser (1991), Trueman and Hartley (1996), Hardy et al. (2020), and Powell et al. (2020).

Suggested future work includes revalidating the questions for the current generation of students, using larger sample sizes, and performing a long-term study to see if individual students are changing over time. Also, the study could expand to other majors. Finally, multivariate analysis, including MANOVA, covariance, multiple discriminate analysis, and principal components analysis, could identify interrelated relationships among the data.

Study Implications and Concluding Remarks

Understanding the time management skills of business students is important because having strong time management skills plays such a pivotal role in their ability to succeed

academically. Additionally, the findings of this study are valuable because educators can use them to understand business majors' time management practices, specifically how genders and age groups vary in their application of time management skills. Specifically, the study is relevant for educators of accounting, business, and computer information systems students. Understanding student time management practices can enable educators to develop appropriate supports and interventions that strengthen the time management skills of students in their classes, thus enabling more students to be successful in their academic pursuits.

As noted in the 2020 study by Powell et al., students remain deficient in critical time management skills and practices, even thirty years after Trueman and Hartley (1991) and Britton and Tesser (1991) published their studies. Moreover, as Hardy et al. (2020) mentioned, this study is also applicable to curriculum designers and administrative leadership of business programs that are well-positioned to coordinate time management intervention efforts, as they can use these findings to offer and implement time management training and support for students earlier and across the curriculum. The findings support the use of an earlier, triangulated approach to incorporating time management training across the business curriculum, which, according to Willman et al. (2016), could prove fruitful in helping students enhance their time management skills, which in turn could improve overall student performance and success for students in business programs.

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COVID-19'S IMPACT ON UNIVERSITY INSTRUCTION: FACULTY CHALLENGES IN A 100 PERCENT VIRTUAL TEACHING ENVIRONMENT

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Abstract

In this research, the authors investigate faculty perceptions of the technology challenges presented in a rapid conversion to 100 percent virtual education to complete the spring term of 2020, during the Covid-19 pandemic. Previously published research has addressed various challenges presented in online instruction as it evolved over the past several decades. The authors questioned what additional challenges had emerged with a critically short conversion time and the entire organization's switch to virtual instruction. This project reports findings from a survey of faculty at the authors' institution, specifically looking at faculty confidence levels and what challenges they faced. With only a week to convert any face-to-face class into a synchronous online format, what were faculty perceptions of their confidence levels in communicating with students, engaging students, delivering content, and assessing student learning for the remainder of the spring 2020 term? Which aspects did they find most challenging? Additionally, what were their personal stress levels in doing so and how much extra time was required? Faculty also reported what technology tools they used to accomplish the online instruction. Some statistical differences were identified in responses based on the independent variables of gender, college in which faculty reside, and years of teaching.

Keywords: Online learning, faculty perceptions, delivery of instruction, student motivation, student engagement, educational technology

Introduction

March 2020 may have changed the format of higher education as we know it. In what appeared to be overnight, thousands of college campuses switched from traditional brick and mortar instruction to completely online as institutions sent students home during the Covid-19 pandemic. At the authors' university, this online conversion required, among other adjustments, online synchronous lectures for those courses that had previously been face-to-face. Faculty had one week to restructure for 100 percent virtual instruction. Faculty and students alike had little time to adapt, and many did not have the resources they needed to be successful in a totally virtual instruction environment. Some faculty had never experienced teaching online courses; some students had never expected to be cut off from in-person instruction and were unprepared for succeeding in a 100 percent virtual environment. Universities scrambled to provide support for faculty and students to ensure the completion of the spring semester. Faculty were challenged to maintain effective communication with students, maintain student engagement, provide effective delivery of instruction, and complete online assessment of learning, all the while doing everything possible to ensure student success.

Statement of the Problem

This paper provides an overview of what faculty at a mid-sized public university in the south perceived to be the more challenging aspects of finishing the semester in a completely online format. Although the University worked hard to provide some faculty support through training, some additional software, and some office technology moved to home offices, the researchers questioned what the faculty experienced during the completion of the term. A survey was designed by the authors and approved by the University's Human Subjects Institutional

Review Board. Specific questions in the survey asked faculty opinions to gather the following concerning completion of spring semester 2020 in a 100 percent virtual environment.

- What was the faculty confidence level in ability to deliver classes in an online setting?
- What was the faculty confidence level in communicating with students?
- What was the faculty confidence level in engaging students?
- What was the faculty confidence level in delivering course content?
- What was the faculty confidence level in assessing student learning?
- Which of the above was the most challenging aspect of Spring 2020 semester?
- What was the faculty perception of the amount of extra time required to handle online instruction?
- What was the faculty perception of personal stress level?
- What technology did faculty use in their virtual instruction in spring 2020? What changes in technology do they plan for fall 2020?
- Are there statistical differences in responses based on gender, college in which the faculty teach, and years of teaching experience?

Review of the Literature

Distance education is not a new concept. Baum and McPherson (2019) provided a history of how it has evolved over the past 100 years. In the mid 1920s, broadcast radio was seen as a tool to distribute instruction on a vast scale at a very low cost. It was once called a 'super radio university' that could provide each home with broadcasts from Carnegie Hall to Harvard. Several universities created radio stations on their campuses to broadcast radio education to the masses. However, in reality the concept was short lived and only reached a small geographic area. In the late 1950's, educational television picked up where radio

universities left off, offering information, instruction, and visuals in various fields of study. While both educational radio and television are still in existence today, neither have revolutionized college education.

The format of distance education changed again in the late 1990's with the introduction of personal computers and the Internet. The information delivered by radio and television was in one direction; there was no interaction between the source and the receiver. Personal computers and the Internet changed that format. Students now had the flexibility to receive in-depth lessons, from any location, and at any time that was convenient for them. Additional tools such as MOOCs allowed for student–teacher and student-student interactions, thus making higher education more attainable and more engaging to many students.

However, the development of an effective online course takes time. In the early stages of online education, many junior-level and tenure-track faculty did not have the time to step aside from their other academic responsibilities to develop such courses, and they were often discouraged from doing so (Brouw, 2001). Still twenty years after the introduction of online education at most universities, some faculty members have never developed an online course or taught in an online formation. While many universities today offer a strong mix of both traditional, face-to-face courses and plenty of online courses as well, not all Universities were in such position in March 2020. For example, in March of 2020, prior to the university shutdown, Rice University only offered three for-credit online courses. In a matter of days, they had to train 487 professors how to setup and deliver online courses; most of whom had never taught online before (Silverman, 2020).

Creating a successful online course takes time and planning. Research has shown that students retain information and have a better understanding of the material when they actively

work with the material, compared to simply listening to recorded lectures. One research article gave the example of teaching someone to drive a stick-shift car from a lecture (Baum and McPherson, 2019). Research has also shown that successful online courses have both asynchronous and synchronous components (Singh and Pan, 2004). Asynchronous aspects such as recorded lectures, discussion threads, and virtual labs allow students the opportunity to work at their own pace, on their own time, and review the material as much as needed. Synchronous aspects such as live chats, group meetings, and interactive projects give the student real-time feedback and a sense of community in the course.

How can faculty that have never taught online, successfully go from a traditional classroom setting to completely online in a matter of days? Research by Terenko and Ogienko (2020) shows that a majority of faculty surveyed expressed concerns with the transition. Some of those concerns included: complete transition to online delivery (91%), distance learning and learning management tools (48%), lack of well-designed web-based curriculum resource (41%), proper level of IT competence of teachers (33%), and student motivation (69%). The conclusion of their study was that online training requires empathy, understanding, and active communication between all participants of the learning process.

As reported in the Chronicle of Higher Education (Nelson and Early, 2020), surveys of faculty during and immediately after the Spring 2020 semester showed a variety of reactions. Many felt the social distancing and remote work environment left a feeling of exhaustion on a daily basis. According to Times Higher Education, which surveyed business, management, and economics faculty, many of which had already provided some form of online instructional delivery, seventy-six percent of faculty felt that online teaching was more time-consuming to prepare and deliver, and forty percent felt online grading took up more time. The research also

showed that this varied between junior faculty, who felt a larger increase in time required for teaching and assessment, than senior faculty, who reported they were still able to allot adequate time for research. This was especially felt by female faculty, who in addition to teaching in an online environment, also found themselves with additional home responsibilities such as childcare and home schooling.

Terenko and Ogienko (2020) also surveyed students who addressed initial concerns of unstable Internet access (21%), lack of self-study skills (31%), and lack of live communications (47%). At the conclusion of the semester, eighty-seven percent of students in that study were satisfied with the learning outcomes but addressed technical issues (43%). Similarly, in a survey from Visual Objects, fifty-one percent of high school and college students reported not having consistent access to high-speed internet and WiFi, and thirty-one percent remain uncomfortable with remote learning (Kelly, 2020).

Online, remote education has shown to create more challenges and gaps in student success than the traditional delivery, stemming from demographic, technological, economic, and societal pressures (Houlden and Veletsianos, 2019). Students with weaker academic backgrounds need more personal contact with faculty and other students. Holden and Veletsianos report studies of community college students by the Community College Research Center (CCRC); those studies show that males, students with lower GPAs, and black students have more difficulty adjusting to online learning. First generation students and those who attended weaker high schools, may have trouble developing good study stills. In contrast, students with more access and exposure to technology, with strong time-management and self-directed learning skills, perform better in online learning (Baum and McPherson, 2019). Baum and McPherson also note that hybrid courses, those with some in-person and some online components, or those

with some asynchronous and synchronous components appear to have better student outcomes than those completely online and/or completely asynchronous.

So as the Fall 2020 semester approaches, what does Higher Education look like? According to a July 27, 2020, article from the National Conference of State Legislatures (Smalley, 2020), the Chronicle of Higher Education estimates that roughly sixty percent of schools were planning on in-person instruction, while twenty-four percent planned to operate in a hybrid model, and nine percent planned to operate online-only. To assist students with issues in accessing technology, even online universities planned to open libraries on a limited basis and provide mobile hotspots. Smalley further reports that some universities have even modified their grading systems from letter grades to pass/fail to help students with the stress and limitations of this new format.

Universities have also spent thousands of dollars to purchase equipment, online resources, and training for their faculty. In a survey of over 800 colleges and university educators conducted by TopHat, an active learning platform for in-class and online interactions, seventy-one percent of those surveyed stated that they would have either completely online (31%) or some form of hybrid/hyflex delivery (40%) for Fall 2020. While sixty-three percent of the faculty received at least 20 hours of online training in the summer of 2020 (42% of which received over 40 hours of training), fifty percent of those still reported feeling uncertain about the upcoming academic term. Some of their concerns included the following: ensuring students stay motivated (81%), students having the access to the Internet (64%) and the technology/computers they needed (61%), meeting needs of students who are at risk of dropping or failing a course based on course-delivery format (54%), and providing opportunities for experiential or hands-on learning (49%).

Survey results in the same TopHat research (2020) show that after the training they received, faculty felt confident (34%) or very confident (32%) in their ability to support the learning tools they will implement in their approach to learning for the Fall 2020 semester. However, their confidence decreased when asked if they felt students would see the value of their education and if they felt their students will be successful learners in the announced course format(s).

Although the delivery of distance education has changed numerous times over the decades as technological advancements have emerged, the fact remains that developing online courses takes time, and issues such as effective faculty-student communication, motivation of students, delivery of content, and assessment of learning remain challenges even with today's sophisticated technology. Another sobering reality is that not all students are well equipped to learn successfully in a virtual environment. Very recent surveys conducted about the switch to virtual delivery of instruction during the Covid-19 pandemic provide evidence of some of the challenges reported by faculty and students. The analysis of findings from a faculty survey reported in the remainder of this paper provide information related to faculty perceptions at the authors' university to add to the literature of online education.

Research Methodology

During the 2020 summer semester, the authors designed a survey to be administered to faculty in all disciplines within their university, which is classified as a mid-sized public university in the south. The University's Human Subjects Institutional Review Board reviewed the study plan and survey design and granted approval to proceed with the dissemination of the survey. In early Fall 2020, faculty were emailed a link to the survey created in Qualtrics. In addition to capturing demographics of faculty participants to facilitate analysis, this survey

addressed issues such as faculty confidence levels in dealing with communicating with students, engaging students, delivering content to students, and assessing student learning from the spring semester and their predictions about the fall semester. Overall, perceptions of stress levels and time commitment for the spring semester were captured, as well as their choice of technology tools for both the spring and fall semesters.

Data Analysis

Of the 277 full-time faculty members at the researchers' university, 134 responded to the survey for a response rate of 48.3%. Gender, college, and years teaching were used as independent variables for the study. Characteristics of the survey respondents are illustrated in Figure 1 below. Not all survey respondents answered all classification items. For gender, 117 faculty responded; for college, 117 faculty responded; for years of teaching experience, 118 faculty responded.

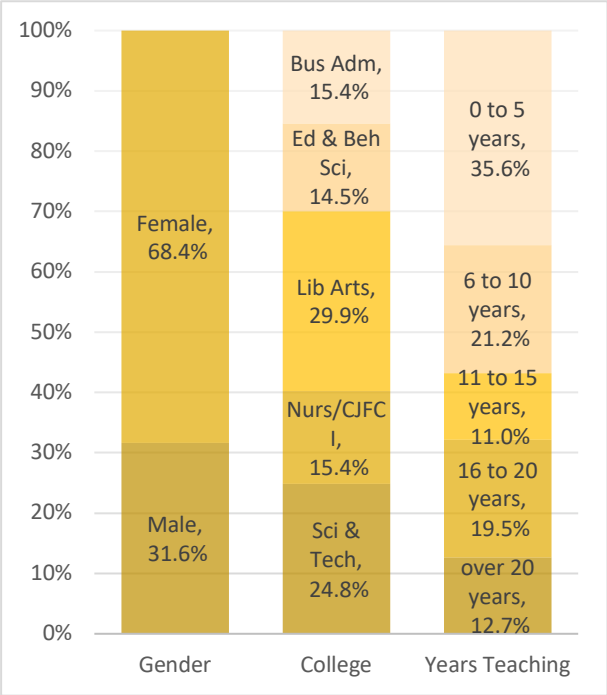

Figure 1. Responding Faculty Characteristics

In summary, most of the respondents are female (68.2%), Liberal Arts faculty (29.9%), and have been teaching for 0 to 5 years (35.6%). The second largest years teaching group to respond were those with 6 to 10 years. The Science and Technology faculty are the second largest group to respond (24.8%), followed by Business Administration faculty (15.4%). The College of Nursing faculty was combined with the faculty from the Chef John Folse Culinary Institute (CJFCI) due to small numbers in both faculty groups. This combination resulted in representation of 15.4%, also. The smallest responding groups included the College of Education and Behavioral Sciences (14.5%) and those faculty with the "most teaching experience," over 20 years at 12.7%.

The mean and standard deviation for each of the dependent variables were computed (see Table 1). Questions 1 through 6 used a five-point Likert scale (not confident at all, slightly confident, somewhat confident, fairly confident, completely confident) for answer choices. Question 7 (extra time required) used a five-point Likert scale (0 to 2 hours, 3 to 5 hours, 6 to 9 hours, 10 to 15 hours, more than 15 hours) for answer choices. Question 8 (faculty stress level) used a five-point Likert scale (no stress, mild stress, moderate stress, much stress, extreme stress) for answer choices. Questions 9 through 13 (most challenging aspect) used a five-point Likert scale (strongly disagree, disagree, no opinion, agree, strongly agree) for answer choices.

Of the 13 questions, "*What was your confidence level during the second half of the Spring 2020 semester when dealing with communicating with students?"* had the highest mean (M = 4.05, SD = .950) while the dependent variable "*Using technology was the most challenging aspect of the Spring 2020 semester.*" had the lowest (M = 2.75, SD = 1.149).

Table 1
Mean and standard deviation of dependent variables

Question	N	Mean	Std. Dev.
1. How confident were you in your ability to deliver your classes in an online setting when we left campus on March 16, 2020?	128	3.44	1.155
2. How confident are you in your ability to deliver your classes in an online setting for Fall 2020?	130	4.03	0.835
3. What was your confidence level during the second half of the Spring 2020 semester when dealing with communicating with students?	118	4.05	0.950
4. What was your confidence level during the second half of the Spring 2020 semester when dealing with engaging the students?	118	3.33	1.046
5. What was your confidence level during the second half of the Spring 2020 semester when dealing with delivering the content?	118	3.79	0.994
6. What was your confidence level during the second half of the Spring 2020 semester when dealing with assessing material presented?	118	3.76	0.976
7. After we left campus on March 16, 2020, how much extra time did you spend each week working with your classes?	117	3.32	1.236
8. What was your overall stress level for the Spring 2020 semester?	118	3.78	1.055
9. Using technology was the most challenging aspect of the Spring 2020 semester.	118	2.75	1.149
10. Communicating with students was the most challenging aspect of the Spring 2020 semester.	118	2.81	1.054
11. Engaging students was the most challenging aspect of the Spring 2020 semester.	118	3.49	1.107
12. Keeping students on task was the most challenging aspect of the Spring 2020 semester.	117	3.43	1.085
13. The time commitment needed was the most challenging aspect of the Spring 2020 semester.	117	3.68	1.143

Independent Samples t-tests and Analysis of Variance

Independent samples t-tests were conducted using the independent variable, **Gender**. All tests were conducted to the .05 level of significance. Relating to the 13 questions on the survey, hypotheses (H1-H13) were formulated about the differences in the mean of the dependent variables by gender. Two hypotheses in this grouping were found to be statistically significant.

The first hypothesis was do male faculty feel the same about the statement "*What was your overall stress level for the Spring 2020 semester?*" as female faculty members? There was a significant difference in the means for males ($M = 3.46$, $SD = 1.070$) and females ($M = 3.91$, $SD = 1.021$); $t(115) = -2.198$, $p = 0.030$. These results suggest the female faculty members had an overall higher stress level than the male faculty members during the Spring 2020 semester.

The second hypothesis was do male faculty feel the same about the statement "*The time commitment needed was the most challenging aspect of the Spring 2020 semester.*" as female faculty members? There was a significant difference in the means for males ($M = 3.27$, $SD = 1.146$) and females ($M = 3.85$, $SD = 1.099$); $t(115) = -2.604$, $p = 0.010$. Here again, the results suggest the female faculty members felt the time commitment needed was the most challenging aspect of the Spring 2020 semester in comparison to the male faculty members. The two statistically significant results can be seen in Table 2.

Table 2
Independent Samples t-test

	Males		**Females**		
	M	**SD**	**M**	**SD**	***t*-test**
What was your overall stress level for the Spring 2020 semester?	3.46	1.070	3.91	1.021	-2.198
The time commitment needed was the most challenging aspect of the Spring 2020 semester.	3.27	1.146	3.85	1.099	-2.604

Using the independent variable **College**, 13 ANOVA tests were established, where the Likert-type statements were the factors and **College** was the variable. All tests were conducted to the .05 level of significance. Three of these thirteen hypotheses were found to be statistically significant and can be viewed in Table 3.

Table 3
Significant Analysis of Variance (ANOVA)

What was your confidence level during the second half of the Spring 2020 semester when ***dealing with communicating with students****?*

Source	***df***	***SS***	***MS***	***F***	***p***
Between groups	4	10.39	2.587	3.054	0.020
Within groups	11	94.40	0.850		
Total	115	104.78			

What was your confidence level during the second half of the Spring 2020 semester when ***dealing with engaging the students****?*

Source	***df***	***SS***	***MS***	***F***	***p***
Between groups	4	11.21	2.802	2.728	0.033
Within groups	11	113.99	1.027		
Total	115	125.20			

What was your confidence level during the second half of the Spring 2020 semester when ***dealing with delivering the content****?*

Source	***df***	***SS***	***MS***	***F***	***p***
Between groups	4	9.39	2.348	2.054	0.018
Within groups	11	126.91	1.143		
Total	115	136.30			

For the statement, "*What was your confidence level during the second half of the Spring 2020 semester when dealing with communicating with students?",* there was a statistically significant difference between groups as determined by one-way ANOVA (F (4,111) = 3.054, p = .020). Because of unequal group sizes, Fisher's LSD post hoc test was used to determine the nature of the difference between members of each **College**; this analysis revealed that there was a statistically significant difference between the mean of the College of Education and Behavioral Sciences faculty (M = 4.59, SD = .795) and the mean of the College of Liberal Arts faculty (M = 4.03, SD = 1.029). In addition, analysis revealed that there was a statistically significant difference between the mean of the College of Education and Behavioral Sciences faculty (M = 4.59, SD = .795) and the mean of the College of Nursing/CJFCI faculty (M = 3.50, SD = .985). The analysis also revealed that there was a statistically significant difference

between the mean of the College of Nursing/CJFCI faculty (M = 3.50, SD = .985) and the mean of the College of Sciences and Technology faculty (M = 4.07, SD = .842).

For the statement, "*What was your confidence level during the second half of the Spring 2020 semester when dealing with engaging the students?",* there was a statistically significant difference between groups as determined by one-way ANOVA (F (4,111) = 2.728, p = .033). Because of unequal group sizes, Fisher's LSD post hoc test was used to determine the nature of the difference between members of each **College**; this analysis revealed that there was a statistically significant difference between the mean of the College of Education and Behavioral Sciences faculty (M = 3.82, SD = .883) and the mean of the College of Nursing/CJFCI faculty (M = 2.89, SD = 1.132). In addition, analysis revealed that there was a statistically significant difference between the mean of the College of Education and Behavioral Sciences faculty (M = 3.82, SD = .883) and the mean of the College of Sciences and Technology faculty (M = 3.03, SD = .865). The analysis also revealed that there was a statistically significant difference between the mean of the College of Liberal Arts faculty (M = 3.50, SD = 1.108) and the mean of the College of Nursing/CJFCI faculty (M = 2.89, SD = 1.132).

For the statement, "*What was your confidence level during the second half of the Spring 2020 semester when dealing with delivering the content?",* there was a statistically significant difference between groups as determined by one-way ANOVA (F (4,111) = 3.099, p = .018). Because of unequal group sizes, Fisher's LSD post hoc test was used to determine the nature of the difference between members of each **College**; this analysis revealed that there was a statistically significant difference between the mean of the College of Education and Behavioral Sciences faculty (M = 4.24, SD = .562) and the mean of the College of Nursing/CJFCI faculty (M = 3.39, SD = 1.243). The analysis also revealed that there was a statistically significant

difference between the mean College of Liberal Arts faculty ($M = 3.97$, $SD = 1.114$) and the mean of the College of Nursing/CJFCI faculty ($M = 3.39$, $SD = 1.243$). In addition, analysis revealed that there was a statistically significant difference between the mean of the College of Liberal Arts faculty ($M = 3.97$, $SD = 1.114$) and the mean of the College of Sciences and Technology faculty ($M = 3.45$, $SD = .910$).

Another 13 ANOVA tests were established using **Years Teaching** for the variable and the Likert-type statements as the factors. None of these 13 hypotheses were found to be statistically significant.

Prior Online Teaching Experience

The authors included a question on the survey to determine what prior teaching experience the faculty had in terms of online teaching prior to March 16, 2020. Of the 114 responses to this question, 61.6% reported prior asynchronous experience, 27.5% reported no prior experience, and only 10.9% reported prior synchronous experience. (See Figure 2.)

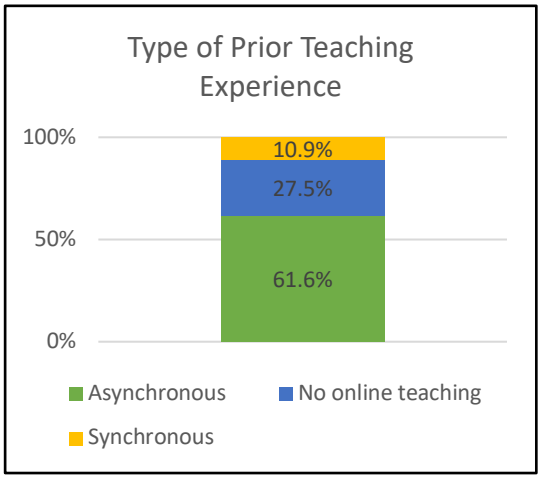

Figure 2. Prior Online Teaching Experience

Technology Usage Spring 2020 and Fall 2020

The survey also captured the types of technology used in certain situations. Analysis of responses to "*Which tools did you use in Spring 2020 to assist in* ***your online class meetings***

(check all that apply)?" revealed that Zoom was overwhelmingly the most popular tool in Spring 2020 with 67.9% of the faculty reporting its usage and 74.5% planning to use it for the Fall 2020 semester. While full reporting of all software usage percentages are not presented due to manuscript length restrictions, Google Meets was a distant second (14.5% Spring 2020 semester and 12.4% Fall 2020 semester), followed by Google Hangouts (8.2% Spring 2020 Semester and 7.6% Fall 2020 semester).

Two more technology usage questions asked, *"Which tools did you use in Spring 2020 and Fall 2020 to assist in **your recordings of lectures** (check all that apply)?*" Zoom had the highest percentage of usage at 50.0% in Spring 2020, moving up slightly in Fall 2020 to 56.3% of responses. Screencast-O-Matic was second choice in both semesters, with 23.8% Spring 2020 and 24.3% Fall 2020. The smallest reported usage was Google Meet at 3.3% Spring 2020 and 2.8% Fall 2020.

Two more technology questions asked, *"Which tools did you use in Spring 2020 and Fall 2020 to assist in **your capturing of screenshots** (check all that apply)?"* Screencast-O-Matic was used by 31.8% of respondents in Spring 2020, with an increase to 43.2% of respondents in Fall 2020. Receiving the largest percentage of votes in both Spring 2020 (36.4%) and Fall 2020 (43.2%) was "other," which included using built-in screen capturing/screenshots in the operating systems of Windows and Mac OS. Snip & Sketch dropped from 30.3% usage in Spring 2020 to 13.5% usage in Fall 2020.

Overall, faculty used a variety of technology, with Zoom being the most frequent choice for online class meetings and delivery and recording of lectures, both in Spring 2020 and Fall 2020. Screencast-O-Matic and built-in screen capturing/screenshots in the operating systems of Windows and Mac OS were the most predominant tools identified for screen captures.

Changes in Software Usage

Using the categories within each of the independent variables, along with responses concerning prior online teaching experience, the authors created tables comparing Spring 2020 to Fall 2020 software usage percentages. The categories included Gender (male and female), College (Business Administration, Education and Behavioral Sciences, Liberal Arts, Nursing/Chef John Folse Culinary Institute, Science and Technology), Years Teaching (0-5, 6-10, 11-15, 16-20, over 20), and the addition of Prior Online Teaching (Asynchronous, Synchronous, Synchronous and Asynchronous, and no previous online teaching experience).

Software usage in Spring 2020 versus software faculty planned to use for Fall 2020 classes was tracked in three different ways: a) online meetings, b) recording of lectures, and c) screen capture. For each of the 16 categories described in the previous paragraph, tables were created to track percentage change for software tools comparing spring and fall. Table 4 below shows the analysis for female faculty Spring 2020 and Fall 2020 for online meetings, recording lectures, and screen capture software. Slightly more females used Zoom for both online meetings and recording lectures in Fall 2020 than in Spring 2020. Screencast-O-Matic usage increased in Fall 2020 for recording lectures and for screen captures.

Table 4
Females—Software Usage Spring and Fall

n =79	Zoom	Google Hangouts	Google Meet	MS Teams	Other	Total
SPRING Online meetings	71.3%	7.9%	13.9%	1.0%	5.9%	100.0%
FALL Online meetings	74.3%	7.9%	11.9%	0.0%	5.9%	100.0%

	Zoom	Screencast-O-Matic	Google Meet	OBS Studio	Castify	Other	Total
SPRING Recording lectures	53.0%	27.7%	2.4%	3.6%	0.0%	0.0%	100.0%
FALL Recording lectures	54.4%	32.0%	1.9%	1.0%	1.9%	1.9%	100.0%

	Screencast-O-Matic	Snip & Sketch	ScreenHunter	Other	Total
SPRING Screen capture	40.0%	30.0%	0.0%	30.0%	100.0%
FALL Screen capture	57.1%	22.4%	0.0%	20.4%	100.0%

Tables were prepared for the other 15 categories as well. Analysis of findings revealed numerous comparisons of 10% or higher changes in technology; in the following paragraphs only the top five changes (at least 25% change) are specifically discussed with accompanying tables.

Faculty reporting "no previous online teaching experience" had a 26% increase in the usage of **Screencast-O-Matic for screen capture** from Spring 2020 to Fall 2020 (19.0% usage in Spring 2020 to 45% usage in Fall 2020). The complete reporting of software changes by this group of faculty can be seen in Table 5.

Table 5
No Previous Online Teaching Experience—Software Usage Spring and Fall

n = 37	Zoom	Google Hangouts	Google Meet	MS Teams	Other	Total
SPRING Online meetings	73.0%	3.0%	12.0%	4.0%	8.0%	100.0%
FALL Online meetings	76.0%	6.5%	11.0%	0.0%	6.5%	100.0%

	Zoom	Screencast-O-Matic	Google Meet	OBS Studio	Castify	Other	Total
SPRING Recording lectures	55.0%	10.5%	3.0%	10.5%	0.0%	21.0%	100.0%
FALL Recording lectures	53.0%	23.5%	3.9%	3.9%	0.0%	15.7%	100.0%

	Screencast-O-Matic	Snip & Sketch	ScreenHunter	Other	Total
SPRING Screen capture	19.0%	31.0%	0.0%	50.0%	100.0%
FALL Screen capture	45.0%	23.0%	0.0%	32.0%	100.0%

Faculty reporting "teaching 16 to 20 years" had a 29.2% increase in the usage of Screencast-O-Matic for screen capture from Spring 2020 to Fall 2020 (40.0% usage in Spring 2020 to 69.2% usage in Fall 2020). The complete reporting of changes can be seen in Table 6.

Faculty reporting "Liberal Arts" as their college had a 29.3% increase in the usage of Screencast-O-Matic for screen capture from Spring 2020 to Fall 2020 (from 31.8% Spring 2020 to 61.1% Fall 2020). The complete reporting of changes can be seen in Table 7.

Table 6

Faculty Teaching 16 to 20 Years—Software Usage Spring and Fall

n = 23	Zoom	Google Hangouts	Google Meet	MS Teams	Other	Total
SPRING Online meetings	57.6%	9.1%	21.2%	0.0%	12.1%	100.0%
FALL Online meetings	73.3%	10.0%	16.7%	0.0%	0.0%	100.0%

	Zoom	Screencast-O-Matic	Google Meet	OBS Studio	Castify	Other	Total
SPRING Recording lectures	42.9%	38.1%	4.8%	0.0%	0.0%	14.3%	100.0%
FALL Recording lectures	51.9%	33.3%	3.7%	0.0%	3.7%	7.4%	100.0%

	Screencast-O-Matic	Snip & Sketch	ScreenHunter	Other	Total
SPRING Screen capture	40.0%	20.0%	6.7%	33.3%	100.0%
FALL Screen capture	69.2%	15.4%	0.0%	15.4%	100.0%

Table 7

College of Liberal Arts Faculty—Software Usage Spring and Fall

n = 33	Zoom	Google Hangouts	Google Meet	MS Teams	Other	Total
SPRING Online meetings	75.0%	7.5%	10.0%	0.0%	7.5%	100.0%
FALL Online meetings	71.4%	9.5%	9.5%	0.0%	9.5%	100.0%

	Zoom	Screencast-O-Matic	Google Meet	OBS Studio	Castify	Other	Total
SPRING Recording lectures	51.6%	22.6%	0.0%	6.5%	0.0%	19.4%	100.0%
FALL Recording lectures	59.5%	29.7%	0.0%	2.7%	0.0%	8.1%	100.0%

	Screencast-O-Matic	Snip & Sketch	ScreenHunter	Other	Total
SPRING Screen capture	31.8%	13.6%	0.0%	54.5%	100.0%
FALL Screen capture	61.1%	11.1%	0.0%	27.8%	100.0%

Faculty reporting “Nursing” or “Chef John Folse Culinary Institute” as their college had a 31.8% increase in the usage of Screencast-O-Matic for screen capture from Spring 2020 to Fall 2020 (from 50.0% Spring to 81.8% Fall). The complete reporting of changes can be seen in Table 8.

Table 8

College of Nursing and Chef John Folse Culinary Institute Faculty—Software Usage Spring and Fall

n = 18	Zoom	Google Hangouts	Google Meet	MS Teams	Other	Total
SPRING Online meetings	83.3%	5.6%	0.0%	0.0%	11.1%	100.0%
FALL Online meetings	90.0%	10.0%	0.0%	0.0%	0.0%	100.0%

	Zoom	Screencast-O-Matic	Google Meet	OBS Studio	Castify	Other	Total
SPRING Recording lectures	57.9%	26.3%	0.0%	0.0%	0.0%	15.8%	100.0%
FALL Recording lectures	64.0%	32.0%	0.0%	0.0%	4.0%	0.0%	100.0%

	Screencast-O-Matic	Snip & Sketch	ScreenHunter	Other	Total
SPRING Screen capture	50.0%	25.0%	0.0%	25.0%	100.0%
FALL Screen capture	81.8%	18.2%	0.0%	0.0%	100.0%

The highest change of all the comparisons was found among faculty reporting "Previous online teaching experience – Synchronous." These faculty had a 50% increase in the usage of Screencast-O-Matic for screen capture from Spring 2020 to Fall 2020 (from 50% Spring to 100% in Fall). The complete reporting of changes can be seen in Table 9.

Table 9

Previous Online Teaching Experience—Synchronous—Software Usage Spring and Fall

n = 4	Zoom	Google Hangouts	Google Meet	MS Teams	Other	Total
SPRING Online meetings	75.0%	25.0%	0.0%	0.0%	0.0%	100.0%
FALL Online meetings	75.0%	25.0%	0.0%	0.0%	0.0%	100.0%

	Zoom	Screencast-O-Matic	Google Meet	OBS Studio	Castify	Other	Total
SPRING Recording lectures	60.0%	20.0%	20.0%	0.0%	0.0%	0.0%	100.0%
FALL Recording lectures	50.0%	33.0%	17.0%	0.0%	0.0%	0.0%	100.0%

	Screencast-O-Matic	Snip & Sketch	ScreenHunter	Other	Total
SPRING Screen capture	50.0%	0.0%	0.0%	50.0%	100.0%
FALL Screen capture	100.0%	0.0%	0.0%	0.0%	100.0%

The authors were not surprised by the popularity of Zoom and Screencast-O-Matic as tools of choice by faculty. During the summer of 2020, university administration hosted a three-week professional development course on using the teaching method of Hyflex for fall classes. Both Zoom and Screencast-O-Matic were presented in multiple sessions of that training. In every instance of the "Top 5" increases in particular software usage discussed above, it was the

usage of Screencast-O-Matic for screen capture. The authors' university did purchase a site-license for Screencast-O-Matic for the academic year 2020-2021. Did that purchase, coupled with the summer training influence the usage? Even though Snip & Sketch, ScreenHunter, and other software used were free, one can speculate that it did.

Conclusions and Implications

While distance learning has changed drastically since the early form described by Baum and McPherson (2019), research over the past two decades focused on modern online learning reports challenges in course design, content delivery, motivation of students, and assessment of student learning. Challenges routinely exist for both faculty and students, as not all students are equipped to complete online courses successfully. The other reality is that not all faculty want to teach online courses, nor had all faculty done so prior to spring 2020. The Covid-19 pandemic forced thousands of institutions to very rapidly move their entire course offerings to a virtual environment while spring semester students were sent home to complete the work of the term virtually.

The current study reports the findings from a faculty survey at a mid-sized public institution in the south. Of the faculty responding, 27.5% had not previously taught online, and another 10.9% of respondents had only taught online using an asynchronous structure. Findings show that faculty overall have gained confidence in their ability to deliver instruction between the Spring 2020 semester online conversion and the beginning of the Fall 2020 semester. When asked to consider instructional components including communicating with students, delivering content, engaging students, and assessing student learning, faculty were most confident in their ability to communicate with students, but least confident in their ability to engage students. Engaging students was also the bigger challenge in directly working with students, in line with

findings reported by Nelson (2020). Faculty reported an average of six to nine extra hours a week necessary to handle their virtual semester, and the time commitment was the biggest overall challenge of all those presented in the survey. Faculty stress level averaged 3.78 on a five-point scale. These results are in line with those reported by Terenko and Ogienko (2020) and the Chronicle of Higher Education (Nelson, 2020).

Female faculty responses were statistically higher than males regarding extra time per week and the challenge level of that extra time, supporting research reported by TopHat (2020). Statistically, Education and Behavioral Science faculty were more confident than Nursing and Culinary faculty in delivering content. Those same Educational and Behavioral Science faculty were also statistically more confident in their ability to communicate with students than faculty in Liberal Arts and more confident in their ability to engage students than Nursing faculty and Science and Technology faculty. However, the current study revealed no significant differences in survey items when analyzed by years of teaching experience.

Faculty reported Zoom as the predominant tool for delivering online synchronous classes, as well as for recording lectures for later posting online. Screencast-O-Matic and built-in screen capturing/screenshots in the operating systems of Windows and Mac OS were the most predominant tools identified for screen captures. Minimal switching of technology was found in the fall 2020 technology the faculty reported they would use other than more usage of Screencast-O-Matic for screen captures; this change may have been impacted by software presented to faculty in free summer training.

The researchers plan to share findings with academic administrators at their institution. Findings from studies discussed in the literature review show the same types of faculty challenges at other schools when delivering instruction online. While the University made

numerous efforts in the spring to rapidly add software capabilities, address additional equipment needed, and provide some virtual training both in the spring and over the summer, the findings from this study may help guide decisions on additional training and other types of support the university can provide to faculty in the future. Ultimately, the goal is more engaged students, more successful delivery of instruction, and less stress for faculty, all while focusing on successful student mastery of material and course completion.

Adding these survey findings to the body of literature about online learning provides additional research results linked to the challenges that faculty continue to face when presenting curricula in a 100% virtual environment.

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DIGITAL HOARDING IN TODAY'S ELECTRONIC WORLD

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Abstract

Digital hoarding occurs when enormous volumes of redundant, outdated, and/or needless data are saved and never deleted. Initially, digital hoarding appears to be harmless since huge amounts of data can be stored in a small space. Unfortunately, digital hoarding creates more problems than users realize. For the purposes of this study, issues, solutions, and preventive practices of digital hoarding were identified through multiple sources. Digital hoarding can cause various problems, including security risks, excess costs, and unnecessary anxiety. Possible solutions can be the creation of a data and records retention policy to routinely schedule deletion of expired, unnecessary data; to organize large clusters of data; and to limit the amount of available storage. Additionally, organizations can implement training programs to better equip employees with knowledge about digital hoarding.

Keywords: digital hoarding, electronic retention, file organization

Introduction

Digital hoarding is defined as the "excessive acquisition and reluctance to delete electronic material no longer valuable to the user" ("Digital hoarding," 2019). Electronic material comes in all shapes and sizes: pictures, text messages, emails, Word documents, Excel spreadsheets, PowerPoint slides, etc. In one way or another, most people have too much of some form of data, and some people have far more than others. Physical hoarding is noticeable and can

affect the physical world around the hoarder. However, digital hoarding can be hidden and is not talked about as much as it should be, especially in today's digital world (Beck, 2012).

Individuals are not the only entities who suffer from digital hoarding. Organizations suffer greatly from having too much data and can use preventive measures to help combat digital hoarding practices. Training programs can help explain what digital hoarding is and how employees should properly store data. Also, having certain policies in place, such as data retention, can help prevent further damage and liability caused by digital hoarding ((Douglass et al., 2014).

End users can be difficult when they want to save everything. Digital hoarding exists because of the challenge of dealing with huge amounts of data and/or because people want to keep everything. Whatever the reason, hoarding massive amounts of data can be harmful to not only oneself, but also to the organization and its employees (Cushing, 2013).

Problem Statement

The problem of this study was to determine the issues of digital hoarding and to determine how to resolve those issues for personal and organizational efficiency.

Purpose of the Study

The purpose of the study was to identify some of the issues, solutions, and preventive practices of digital hoarding. The report answers the following specific questions:

1. What issues arise from digital hoarding?
2. How can issues caused by digital hoarding be resolved?
3. What can organizations do to prevent digital hoarding practices?

Methods and Procedures

The data for the study were collected by surveys e-mailed to university employees in Information Technology Departments. Twenty-three respondents completed the survey. The responses were analyzed with codes and themes to find similarities and differences in the data. See Appendix A to examine the survey questions used in the study.

The review of the literature included searches for topics related to digital hoarding, data hoarding, and virtual hoarding. The purpose of this secondary research was to find common trends about the subjects of digital hoarding from multiple authors and to compare those findings with the results of this study.

Data Findings and Analysis

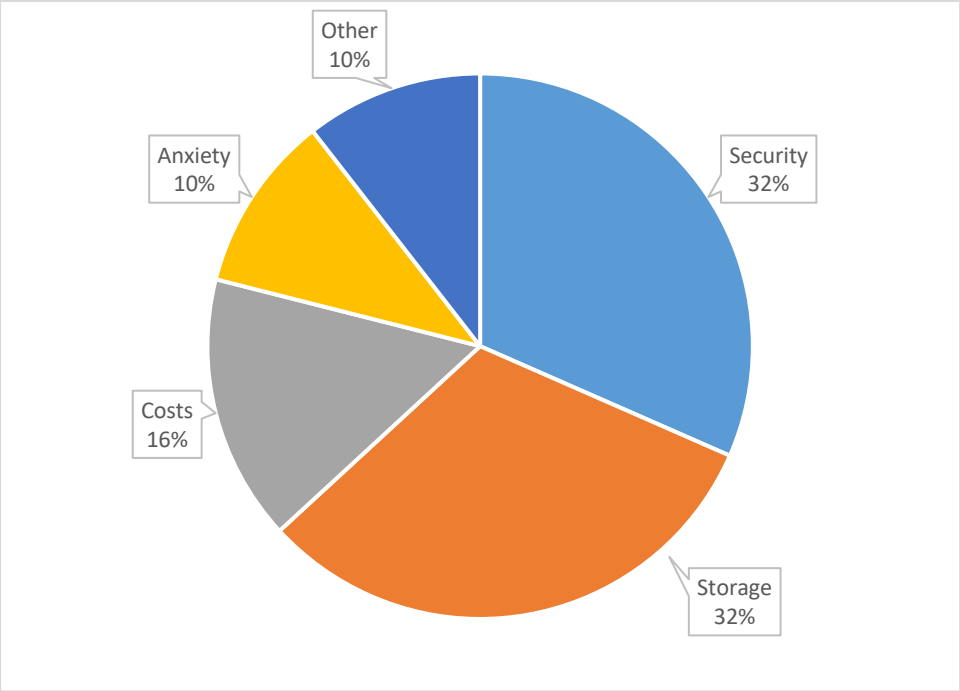
The data findings and analysis of the digital hoarding research has been grouped into the following three categories: (a) issues caused from digital hoarding, (b) solutions to digital hoarding, and (c) methods organizations can use to prevent digital hoarding.

Issues Caused from Digital Hoarding

Digital hoarding can lead to many negative factors, as shown in Figure 1. Hoarding extensive amounts of data results in less available storage that might be needed for the future. Data security, productivity, and efficiency are at risk when servers and/or computers process data more slowly. Encryption, data sensitivity, speed, backup, and other factors are impacted from keeping too much data. Digital hoarding can also cause user anxiety from sifting through volumes of data and files. Additionally, the more data that are hoarded, the more costs that are incurred throughout the organization (Gormley & Gormley, 2012).

Figure 1

Issues Caused from Digital Hoarding



Thirty-two percent (32%) of survey respondents stated that lack of storage is an issue caused from digital hoarding. The more data that are stored, the less available storage for future use. Storage can mean personal user storage or shared storage within an organization. For example, if an employee in an organization or a family member is using most of the shared storage space to hoard pictures or files, then that hoarding behavior can cause tension and/or conflict between co-workers or family members (Beck, 2012). Even though people in today's digital age can gain access to multiple storage spaces, using a lot of storage for hoarding invaluable data can still cause issues in different areas. These areas include server security and computers where data are stored.

Thirty-two percent (32%) of the respondents to the study's survey said that another important issue caused from digital hoarding is security. Security refers to the safety of data in a

server or computer. Servers and computers base their security on how fast the machines are, and having more data stored means slower speeds; and therefore, a greater risk for hackers to breach the machines and steal data. Security is a major concern for organizations since typically they store much more sensitive and confidential information than do individuals (e.g., universities store thousands of people's financial information for payroll). The risk of losing security from hoarding more data can lead to increased spending costs for more storage or faster servers or computers (Gormley & Gormley, 2012).

Sixteen percent (16%) of survey respondents reported that digital hoarding could cause cost concerns. Costs can refer to buying more storage or buying faster servers or computers to keep up with the amount of data being stored. Storage and speed costs can add up quickly over time. Emotional, social, and/or psychological costs pertaining to the health of digital hoarders or their families can also be considered a cost (Neave et al., 2017; Thorpe et al., 2019).

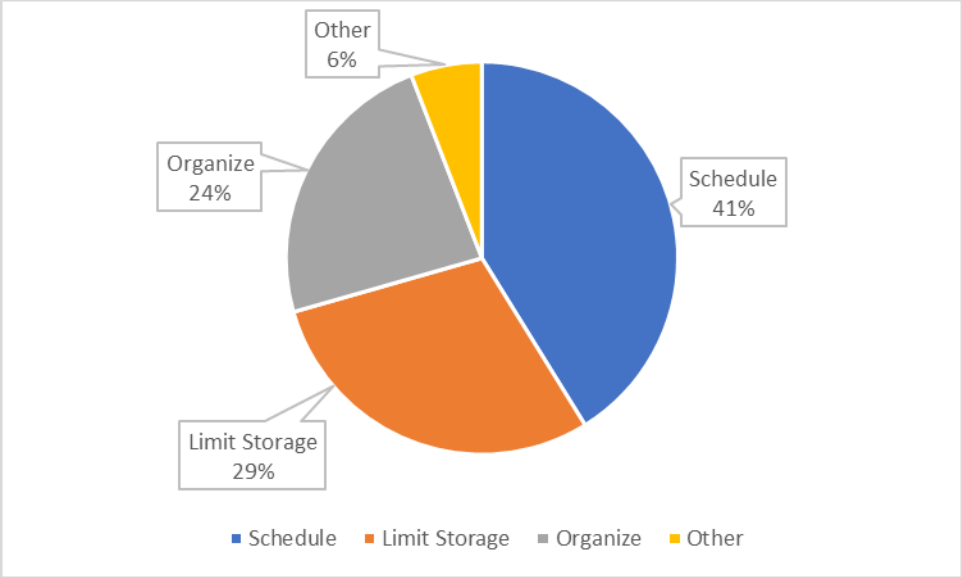
Finally, 10% of the respondents stated that anxiety can result from digital hoarding. Anxiety can be caused from dealing with too much data and not finding needed data and files promptly. Anxiety also can be caused from being emotionally attached to data that are being hoarded. Schiele and Ucok Hughes (2013) did a study on people's pinning habits on Pinterest and found that people become so attached to their data that it becomes just as hard to dispose of images as it would be to dispose of a physical object because of how valuable those images have become to the user. Anxiety caused from digital hoarding is summed up nicely by van Bennekom and others stating that "digital hoarding is the accumulation of digital files to the point of loss of perspective, which eventually results in stress and disorganization" (2015, p. 1).

Solutions to Digital Hoarding

Many solutions can be implemented to combat digital hoarding, as shown in Figure 2. Scheduling a routine "checkup" of stored data and cleaning out unwanted data are consistent methods. Limiting storage space is an effective way to ensure smaller amounts of digital hoarding. Additionally, organizing hoarded data can help resolve anxiety and cost issues.

Figure 2

Solutions to Digital Hoarding



Forty-one percent (41%) of those surveyed suggested creating a schedule to resolve digital hoarding. Scheduling calendar reminders every two weeks to clean up data can help reduce the amount of stored data. Regularly checking data and determining what data are not necessary to keep longer can help reduce digital hoarding little by little over time. If a schedule is not created and followed regularly, then data will be forgotten and will cause more issues to appear, such as less available storage.

Twenty-nine percent (29%) of the respondents mentioned that limiting the amount of available storage is a good solution to digital hoarding. Basically, not buying or not having access to additional storage can help force a person to clean up data to free more storage (Vitale et al., 2018). Castelluccio mentioned how old, long rolls of film "would only allow you 36 chances (exposures) for a great photo, unlike conventional digital cameras (now mostly smartphones)" (2014, p. 60). Setting a limit on storage helps to moderate how much data need to be kept and how much data need to be deleted, as well as what data are most important. Organizing data during the process of cleaning up data to free more space is also a good solution to digital hoarding (Vitale et al., 2018).

Finally, twenty-four percent (24%) said that organizations can help resolve digital hoarding issues. Data organization can not only lead to finding data more easily, but also can help reduce anxiety associated with finding data and associated mental costs. When it comes to organizing data, the more details the better. Vague folder or file names (e.g., "Spring 2021" or "Brother's Wedding") will not be as effective as more detailed names to help distinguish different data (Gulotta el al., 2013).

Little attention to detail in storing and organizing data can cause the hoarding of "dark data," which refers to data "not carefully indexed and stored so it becomes nearly invisible to scientists and other potential users and therefore is more likely to remain underutilized and eventually lost" (Heidorn et al., 2008; Oravec, 2017). However, some organizational methods may not be best for certain people. For example, in Whittaker and Sidner's study (1996) about email overload, "automatic filing" emails from the inbox into different folders was not a method that all participants agreed with since some of the participants in the study preferred to see an

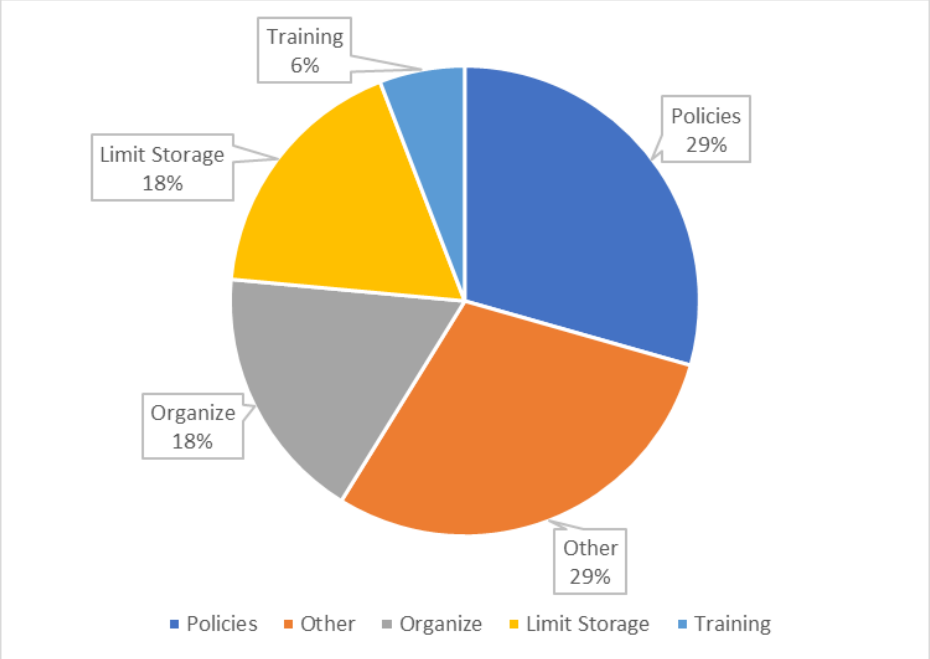
email in their inbox before it was filed away and possibly forgotten about. Again, organizing data can be applied to both personal and organizational digital hoarding.

Methods Organizations Can Use to Prevent Digital Hoarding

Organizations can use multiple methods to prevent digital hoarding practices, as shown in Figure 3. Policies should be enforced to reduce digital hoarding from occurring in the first place. Organizations can create training for employees on methods to avoid hoarding data in the workplace.

Figure 3

Methods Organizations Can Use to Prevent Digital Hoarding



Twenty-nine percent (29%) of respondents suggested implementing certain policies to help prevent digital hoarding. The policy mentioned the most by the respondents was a data retention policy. A data retention policy dictates when certain data must be deleted after so many days (e.g., all emails in the deleted folder are erased permanently every 60 days). Data retention

policies are an easy way to clean up data automatically and prevent data hoarding situations from occurring too frequently (Whitaker & Sidner, 1996). Not only can policies such as data retention help erase unwanted data, but policies can also help shared storage become more accessible and sharable throughout an organization (Gormley & Gormley, 2012). Policies created for the sole purpose of preventing digital hoarding can be explained during orientation and employee training sessions.

Additionally, six percent (6%) of respondents stated that providing some form of training could reduce or prevent digital hoarding. Training could include how to manage the digital life cycle or how to determine what data carry more value to the organization. Cushing (2013) explained how certain "digital possessions" can acquire unnecessary value depending on the person's feelings or emotions towards the certain data. Digital hoarding prevention training can address how not to become overly attached to unnecessary data. Chen stated, "the call for 'early intervention,' the practice of educating the digital public about archives-friendly organizational practices while its members are still creating and managing their own digital records, has emerged as an urgent chorus in the archival literature" (2014, p. 128).

Alerting people early about digital hoarding can help prevent some issues caused by digital hoarding. Any of the problems or solutions presented in the previous sections can be addressed in a training session to educate and make people conscientious of digital hoarding and what can happen to an organization or a person because of digital hoarding practices.

Summary

In today's digital environment, data storage is plentiful; however, more storage does not always mean fewer problems with storing data. More storage usually means paying for that

additional storage. Additionally, the more storage that is used, the more at risk of being hacked and having data stolen. Plus, between buying more storage and being more at risk to hacking, there is also the chance of forming more anxiety from dealing with all of the data that piles up over time. Issues caused from digital hoarding start to appear more frequently as the digital age evolves, and solutions are not as quick to fix these issues as people would like.

While digital hoarding can cause many issues, some solutions are available that can actually counteract those issues. Going back to the massive amounts of storage available, being able to hold back and limit what storage can be used instead of acquiring more storage can help control how much data can be stored. If holding back is not an option, then organizing the archived data can help reduce anxiety and possibly reduce time costs when looking for a certain file in a clutter of files. Additionally, making a schedule to routinely clean up data can help reduce unwanted data and help organize data over time.

Conclusions

The following conclusions are based upon the data findings and analysis of digital hoarding:

1. Storage, security, costs, and anxiety result from digital hoarding. The consequence of less available storage leads to increased costs and less security. Less available space can lead to more anxiety when trying to find specific files in a web of massive data.
2. A routinely enforced retention schedule to clean up data regularly and organize all stored data can help resolve problems caused by digital hoarding. Limiting the amount of storage available to end users reduces digital hoarding.

3. Organizations can implement certain policies, such as data retention, to prevent digital hoarding within the organization. Training employees on digital hoarding and its repercussions can prevent digital hoarding.

Recommendations

Based upon the results of the study, the following recommendations are made:

1. The user should create an organized file structure to store important data more effectively and efficiently. The more detailed the information, the more organized the data will be.
2. The user should have a routine or scheduled calendar reminder to review unnecessary or obsolete data files and delete them. Cleaning up data on a regular basis will prevent further damage caused by digital hoarding.
3. Organizations should have a training program that will inform employees about digital hoarding and its consequences.

Resolving the digital hoarding issues can be time-consuming, but successful omission of digital hoarding can be increased efficiency and productivity. Scheduling routine "data cleaning" policies can help reduce data slowly. Data organization can reduce the anxiety and time spent trying to find certain data. Also, attempting to limit available storage can enforce the need for users to delete unused data as a result of their need for more available storage.

Finally, organizations can be at the forefront in attempting to prevent further damages caused from digital hoarding. Developing and enforcing data retention policies can ensure that specific unwanted data will be deleted after a certain period. All of the issues and solutions involved with digital hoarding can be explained in a training program that can help prevent digital hoarding practices. Organizations and people in general can maintain the growing inflow

of data, but effort and determination must be present to overcome the problems of digital hoarding. The more that end users are aware of digital hoarding, the more efficient the organization will be with data storage, organization, and retrieval.

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Appendix A

Digital Hoarding Survey

Taking part in this survey is completely voluntary and you do not have to complete it, All submissions will remain anonymous. It will take about 5 minutes to complete this survey.

The purpose of this study is to determine the reasoning and problems of digital hoarding and how to resolve it in a business environment.

The definition of digital hoarding is the "excessive acquisition and reluctance to delete electronic material no longer valuable to the user. The behavior includes the mass storage of digital artifacts and the retention of unnecessary or irrelevant electronic data."

Data in this study refers to pictures, text messages, Word documents, Excel spreadsheets, PowerPoint presentations, emails, music, etc.

Please answer the following statements as best as you can by selecting the most appropriate number, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree.

1. **I never delete data from my phone and/or computer.**
   Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

2. **Deleting certain data causes me discomfort.**
   Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

3. **I think that some data could be useful some day.**
   Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

4. **I lose track of how much data I have.**
   Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

5. **Finding certain data is difficult since I have so much.**
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

6. **I can convince myself to delete certain data if the need arises.**
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

7. **Certain policies can be put into place to help prevent digital hoarding in businesses.**
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

8. **I think that digital hoarding can become hazardous to my mental or emotional health.**
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Please answer the following questions in the text box below it. If you prefer not to answer, then just leave it blank.

9. **What are some issues that you think could arise from digital hoarding?**

10. **In your opinion, what are some ways to resolve issues caused by digital hoarding?**

Please answer the following questions as best as you can.

11. **I am:**
Mark only one oval.

- ◯ Male
- ◯ Female
- ◯ Prefer not to say
- ◯ Other: _____

12. **I am in the age group:**
Mark only one oval.

- ◯ Under 18
- ◯ 18-25
- ◯ 26-35
- ◯ 36-45
- ◯ 46-55
- ◯ 56-65
- ◯ Over 65
- ◯ Prefer not to say

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