

Pandemic Pedagogy Article Series



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This study compares the academic performance of students in two delivery modes, face-to-face and online. Results of a paired t-test demonstrate that student performance in unsupervised assessments is better than in supervised assessments regardless of the delivery mode and that there is no statistically significant difference in the academic performance of students in unsupervised assessments in either delivery mode.

This study provides empirical evidence that delivery mode is not the primary reason affecting students' academic performance and provides feedback to the educators and policy maker when designing effective assessment tools in the digital era education.

2

A Comparison of Academic Performance among Pre-University Accounting Students: Face-to-Face Delivery Mode Versus Online Learning

Chin Sok Fun

Introduction

Online learning consists of a range of technologies that impact education, like the worldwide web, email, chat, news groups and texts, audio and video conferencing delivered over computer networks (Dhull & Sakshi, 2017). It has gained popularity in the last decade, providing opportunity to learn new skills, and in 2020, due to the COVID-19 outbreak, schools and universities in Malaysia were forced to work remotely.

Could online learning act as a substitute for traditional face-to-face learning? Would online learning affect student achievement and progress in college? Is the performance of students comparable between the two delivery modes? This study intends to offer some advances in understanding the efficacy of online education. Since I teach accounting in a pre-university programmed called the South Australian Certificate of Education (SACEi), I used the results of a paired t-test on a group of students to demonstrate that there is no statistically significant difference in the academic performance of students in the two delivery modes.

Literature Review and Hypotheses of The Study

Unsupervised assessments are often open-book and less time pressured compared to supervised assessments (Maclean & McKeown, 2013). In the process of completing unsupervised tasks, if the student has not prepared enough or does not recall a piece of information, he/she has time to carefully search notes, textbooks or other materials for answers. However, in a supervised assessment, students must try to anticipate what material will be covered by the assessment and prepare accordingly. This disallows the accumulation and retention of more knowledge during or after the assessment (Evans & Culp, 2015).

Supervised assessment is timed. Calafiore and Damianov (2011) and Damianov et al. (2009) show that in online economics and business courses, students who spend more time online utilizing course material perform better on timed assessment. However, Lesaux, Pearson and Siegel (2006) claim that when students with reading disabilities were given timed exams, there was significant performance difference between those with normal reading abilities and those with less severe reading disabilities. These differences disappeared when the examination was untimed. Accordingly, I hypothesize that

H1: Irrespective of the mode of delivery, the academic performance of accounting students in unsupervised assessments is better than in supervised assessments.

In a face-to-face environment, students possess a sense of belonging largely defined by the physicality of the learning environment (Weegar & Pacis, 2012). A face-to-face conversation, with its capacity for nonverbal expression and body language, is spontaneous and beneficial. However, the asynchronicity in online communication allows learners who have language and cultural differences, time to reflect and think about what is being said (Jung, Wong, Li, Baigaltugs & Belawati, 2011). Yet there are many conditions for online learning to be effective, for instance, multimedia programmes, regular activities, feedback and a carefully organized system of delivery (Peters, 2002). The online approach also requires more discipline from both students and educators (Arias, Swinton & Anderson, 2018). Accordingly, this study proposes that

H2: The academic performance of accounting students is better in the Face-to-face delivery mode compared to the online delivery mode.

Research Design

This study was conducted on 31 SACEi accounting students where 70% of their final grade is obtained from school-based assessments and 30% from a final examination. The study period started in October 2019 and ended in May 2020. The students had experienced face-to-face learning since October 2019 and were required to sit for a supervised assessment carrying a 10% weightage in February 2020, followed by an unsupervised assignment carrying a 10% weightage in the middle of March 2020. Thereafter, they undertook online classes and were

given an unsupervised assignment in May which had a 10% weightage. During online classes, all interactions, whether lectures or class discussions, occurred on online discussion boards and participation was often asynchronous, while face-to-face learning occurred on campus at scheduled times. The quality of the assessment materials was scrutinised by the SACE examination board to ensure validity and compliance with the performance standards. Students' results were analysed using a paired t-test to determine whether there is significant difference in the performance of the students in these three assessments.

Table 1: Operational definition

Term	Remark
F2F1	Marks range from 0 to 100 for a supervised assessment conducted when students learned via face-to-face delivery mode. This is the first school-based assessment taken by the students.
F2F2	Marks range from 0 to 100 for an unsupervised assessment conducted when students learned via face-to-face delivery mode. This is the second school-based assessment taken by the students.
Online3	Marks range from 0 to 100 for an unsupervised assessment conducted when students learned via online delivery mode. This is the third school-based assessment taken by the students.

Results and discussion

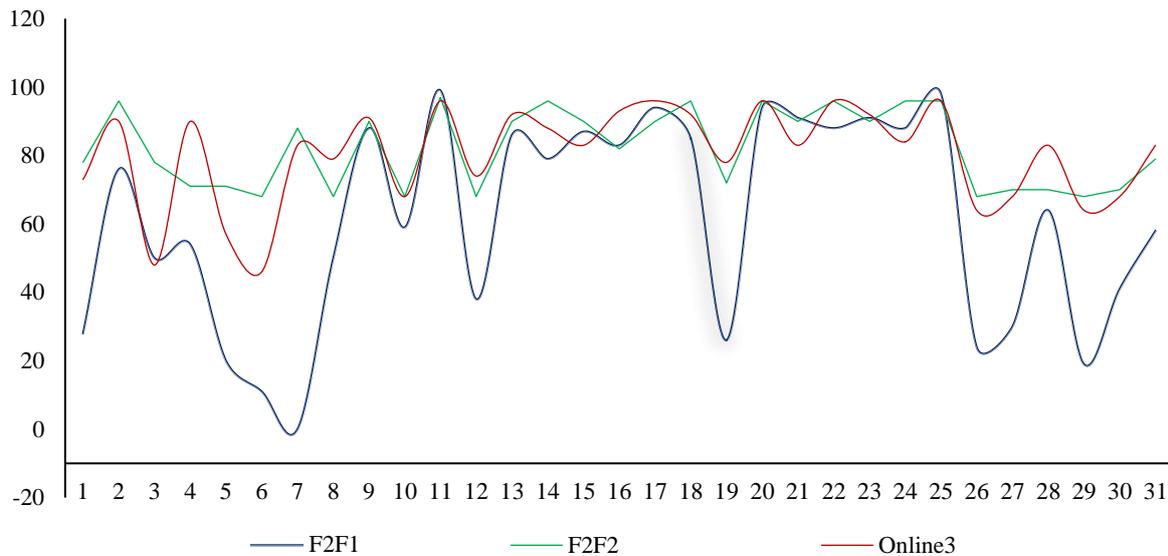
Table 1 reports the descriptive statistics for the variables employed in the analyses. Based on the results of the 31 students who participated in this study, the maximum marks achieved in the three assessments ranged from 96-99, suggesting that top students were able to achieve goods result irrespective of the mode of delivery. The F2F1 reported the lowest mark at 11% and the mean was 62%, suggesting that student performance was worse in the supervised assessment face-to-face learning mode.

Diagram 1 presents the results of student performance in the three assessments visually. The marks in F2F1 are worse than the marks in F2F2 and Online3, while the marks in F2F2 and Online3 are comparable.

Table 1: Descriptive statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
F2F1	31	61.61	29.56	11.00	99.00
F2F2	31	82.13	11.56	68.00	97.00
Online3	31	80.45	14.22	46.00	96.00

Diagram 1: Assessments: F2F versus Online



There was one student who did not sit for the first assessment but sat for the subsequent two assessments, while one student sat for the first assessment but missed the two subsequent assessments. In view of this, the analyses of the paired t-test were based on students who sat for at least two assessments, specifically F2F1 versus F2F2 and F2F1 versus Online3.

The results of the paired t-test in Table 3a compares marks between the supervised assessment (F2F1) and the unsupervised assessment in the face-to-face delivery mode (F2F2). Table 3c compares marks between the supervised assessment (F2F1) and the unsupervised assessment in the online delivery mode (Online3). At P value <0.05 , there is significant difference between F2F1 and F2F2, and between F2F1 and Online3, with F2F1 reporting a lower mean in both tables. This study supports H1: irrespective of the mode of delivery, the academic performance of accounting students in unsupervised assessments is better than in supervised assessments. This study is consistent with Damianov et al. (2009) and Evans and Culp (2015) as unsupervised take home assignments allow students time to recall relevant information and do well in the tasks. It also enables students to accumulate and retain more knowledge while doing the tasks.

At P value > 0.05 , Table 3b reports that there is insufficient evidence to suggest that students' academic performance is better in the Face-to-face delivery mode than online, rejecting H2. Student performance as measured by grade appears independent of the mode of instruction despite Ni (2013) claiming that in online classes, lower participation reduces the quality and

quantity of interaction, especially among the more dependent students, possibly impacting their grades. Although Thai, De Wever and Valcke (2020) report that students experience more flexibility in time and place when studying in online environments, and have positive perceptions about flexibility, motivation and self-efficacy, I find that these benefits are often cancelled out by constraints like the computer literacy of the learner and educator, and internet connectivity issues. Knowing this, I engaged students continuously and provided constructive, timely feedback to make learners feel supported and confident.

Table 3a: Paired T-Test Results: F2F1 versus F2F2

95% Confidence Interval								
Variable	Obs	Mean	Std. Err.	Std. Dev.	Lower	Upper	T-Statistic	Degree of freedom
F2F1	30	63.30	5.20	28.50	52.66	73.94		
F2F2	30	81.93	2.14	11.70	77.56	86.30		
Diff		-18.63	3.50	19.19	-25.80	-11.47		
							-5.32	29

Mean(diff) = mean (F2F1 – F2F2)

Ho: mean(diff) = 0

H1: mean(diff) < 0

Pr(T < t) = 0.00

H1: mean(diff) != 0

Pr(|T| > |t|) = 0.00

H1: mean(diff) > 0

Pr(|T| > t) = 1.00

Table 3b: Paired T-Test Results: F2F2 versus Online3

95% Confident Interval								
Variable	Obs	Mean	Std. Err.	Std. Dev.	Lower	Upper	T-Statistic	Degree of freedom
F2F2	31	82.13	2.08	11.56	77.89	86.37		
Online3	31	80.45	2.55	14.22	75.24	85.67		
Diff		1.68	1.75	9.74	-1.90	5.25		
							0.96	30

Mean(diff) = mean (F2F2 – Online3)

Ho: mean(diff) = 0

H1: mean(diff) < 0

Pr(T < t) = 0.83

H1: mean(diff) != 0

Pr(|T| > |t|) = 0.35

H1: mean(diff) > 0

Pr(|T| > t) = 0.17

Table 3c: F2F1 versus Online3

95% Confident Interval								
Variable	Obs	Mean	Std. Err.	Std. Dev.	Lower	Upper	T-Statistic	Degree of freedom
F2F1	30	63.30	5.20	28.50	52.66	73.94		
Online3	30	80.37	2.64	14.45	74.97	85.76		
Diff		-17.07	3.31	18.14	-23.84	-10.29		
							-5.15	29

Mean(diff) = mean (F2F1 - Online3)

Ho: mean(diff) = 0

H1: mean(diff) < 0

Pr(T < t) = 0.00

H1: mean(diff) != 0

Pr(|T| > |t|) = 0.00

H1: mean(diff) > 0

Pr(|T| > t) = 1.00

Conclusion

This study compares the academic performance of students in two delivery modes, face-to-face and online. The results have demonstrated that student performance in unsupervised assessments is better than in supervised assessments regardless of the delivery mode and that there is no statistically significant difference in the academic performance of students in unsupervised assessments in either delivery mode. This is because I tried to create an effective learning environment that would ensure strong academic performance despite the technical constraints my students and I experienced. I focused on engaging students using chat rooms in Zoom and Microsoft Teams, and Google Docs to get students to participate in the class. These platforms provided students sufficient opportunity to check their understanding when they answered questions. I also created formative assessments to monitor the students' progress. After having experienced both modes, most students prefer the face-to-face mode. Although they enjoyed using my pre-recorded videos to study new content before the lesson and using reWIND for knowledge reinforcement, even good students found it difficult to ask questions during live lectures and tutorials due to internet connectivity problems and other technical glitches. Nevertheless, the results demonstrate that the two pedagogical approaches may be interchangeable. A blended learning approach to promote student engagement with the course content and ensure academic success may be considered. Future research may examine emotional wellbeing, student efficacy in face-to-face learning, online learning and blended learning.

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