Students got mail: Do students read semi-tailored emails and what is the impact?

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This paper examines the effectiveness of providing personalised email feedback via an automated email application in a large undergraduate introductory accounting course. Over 1,200 students received feedback via emails sent weekly, semi-tailored to each student based on their results in online self-test learning quizzes. We first found that students read the majority of emails distributed. Second, through tracking, using regression analysis, we found that reading emails is related to significantly higher final examination performance in some cases. However, this is moderated by factors relating to diversity in a large cohort exceeding 1,000 students. The results indicate that feedback needs to be readily actionable and aligned with assessed learning outcomes to realise significant impacts on exam performance. This study is relevant to educators who teach large and diverse cohorts and need time-efficient solutions to tailor the learning experience to each student.

Implications for practice or policy:

- Undergraduate students read the majority of weekly emails distributed, indicating emails can be used as an instructor communication device.
- Emails should specifically encourage activity completion aligning with learning objectives to improve grades.
- Students who achieve lower grades in tertiary studies, from English-speaking backgrounds and medium to high socio-economic status, high performers at high school and younger students aged 20 or less are positively impacted. Therefore, emails should be used by instructors teaching cohorts with these characteristics.

Keywords: semi-tailored feedback, automated feedback, large course, student performance, student characteristics, quantitative

Introduction

This study had two research objectives related to the distribution of automated semi-tailored email messaging using a program called OnTask, a platform freely available to academics. The first was to examine the extent students read weekly email messages delivered to their university email account across the semester. Most of these emails were semi-tailored based on the completion of weekly optional self-test learning quizzes available in the learning management system. A smaller proportion of emails were untailored, where all students received the same email. In all cases, emails were addressed to students by their first name. For the purpose of semi-tailored emails, if a student had not completed the quiz, they were reminded to do so. If they had, they were provided guidance based on their quiz performance. We examined the extent to which students read the emails overall. In addition, we examined the extent to which emails are read based on whether students did or did not attempt the quizzes, for semi-tailored and untailored emails, emails relating to different course content, stage of the semester emails were distributed, and whether cohort characteristics moderated the extent of emails read (specifically based on commitment and interest, background, demographic factors).

The second research objective was to examine whether reading emails were associated with examination performance. We examined whether semi-tailored and untailored emails were associated with different components of the mid-semester and final exam performance while controlling for other factors. Importantly, we ensured alignment between the email content and exam content for the purpose of this analysis. Moderating factors relating to commitment and interest, background and demographic factors were considered when analysing our second objective.

This research was undertaken in the context of a large introductory accounting course, where the student cohort exceeded 1,000 students. Large cohorts in introductory courses at large universities in the context of this research, Australia, frequently exceed 1,000 students. Given the substantial student numbers, this study was motivated by the importance of meeting the learning needs of a large cohort, where there is diversity in study interests, background and demographic factors. Addressing the learning needs of students is consistent with high-quality feedback to enhance student learning and satisfaction (Pardo et al., 2019). With feedback noted as one of the most powerful factors for student learning (Hattie, 2007; Pardo, 2018) and one-size-fits-all approaches to feedback regarded as inappropriate, technological-based interventions facilitating the efficient delivery of tailored feedback at scale appear promising (Pardo et al., 2019). Tailoring of feedback is aligned with a dialogic approach between students and academic staff, which emphasises relevant information based on achieving expectations, promoting higher engagement (Molloy & Boud, 2013) and encouraging adjustments to learning consistent with self-regulated learning (Winne & Hadwin, 1998).

This research contributes to literature as follows. First, from an educational perspective, data relating to students' opening of emails is limited, with much evidence either anecdotal (Chaparro-Peláez et al., 2022; Salehian Kia et al., 2023; Sutton, 2017) and survey-based studies through inviting students to report email reading (Ha et al., 2018). Whether or not such evidence is reliable remains in question. Further, there are no comprehensive reports on the extent to which students read semi-tailored versus untailored emails and whether factors such as course engagement (quiz completion), stage of the semester and cohort characteristics relate to the reading of emails, as we report. We report on actual email openings based on tracking all emails distributed. Second, we contribute by extending our understanding of the impact of emails on student performance beyond the broad indications in literature. Literature has examined the overall impact of email distribution on students' course grades and grade point average (Iraj et al., 2021; Lim, Gentili et al., 2021; Salehian Kia et al., 2023). Recent literature indicates that students report motivation to invest more effort into their studies when receiving tailored messaging (Lim, Dawson et al., 2021). Whether or not specific emails which differ based on tailoring have specific impacts on content examined and how this impact varies across different cohort characteristics remains unclear and is addressed in this research.

In this study, we focused on email communication, as this is the key tool tertiary institutions use to communicate with students on a personalised basis. Learning management systems are generally only capable of distributing general cohort or group-based communications. There is no doubt that students use a range of communication tools via social media and messaging applications. However, tertiary institutions do not have systematic approaches to capturing and using students' contact details via these applications. In addition, considerable literature argues social media and messaging applications cause student distraction, leading to lower grades (Wakefield & Frawley, 2020). Accordingly, we examined whether email is an effective communication tool.

Theory development and the intervention

The introductory accounting context of this research is one where students need to build on their knowledge progressively. Effective sequential learning can be characterised by closing the loop in each topic before moving to the next. This would typically mean that students would be presented with materials, including lectures and readings, for each topic, then complete related homework exercises and discuss their attempts in class. Generally, it would be up to the student to identify the gaps in their understanding and take the initiative to revise. Accordingly, following the suggested sequence, completing each topic in a linear manner and addressing gaps in their understanding can present transition risks (Baard et al., 2010).

To aid students in addressing gaps in their understanding, online quizzes have been argued to be advantageous, allowing students to more acutely identify such gaps and take corrective action where relevant feedback is provided (Brink, 2013). Learning quizzes providing students with instant feedback, as well as the broader course resources available through learning management systems, are tools students

can use to close the loops in their understanding and achieve learning outcomes (Massoudi et al., 2017). In the context of this research, voluntary learning quizzes allow students to self-assess their progress on a specific topic in their own time, as many times as they choose. The voluntary and formative nature of the quizzes is very important in allowing students to construct meaning and self-regulate their learning in association with using other resources (Butler & Winne, 1995; Hattie, 2007).

The availability of learning quizzes does not mean students use them, particularly first-year students, who often do not understand how to self-regulate learning (P. A. Smith, 2001). Approaches are needed to raise student awareness of how they are learning to reach learning goals (Winne & Hadwin, 1998). Literature argues that we need to move towards dialogic feedback, emphasising relevant information based on the standards students are encouraged to achieve, promoting higher student engagement (Molloy & Boud, 2013; O'Donovan et al., 2016). In this research, we sent students semi-tailored emails encouraging the use of online learning quizzes and course resources more generally to close the gaps in their understanding of each topic as they progress. Such tailored guidance is aligned with the high school environments students advance from, where they were provided with extensive class feedback and individualised support (Briggs et al., 2012; Kift, 2015) and, thereby, relevant dialogue between students and academic staff.

Tailored learning has become possible using increasingly detailed student activity data (Dawson et al., 2010; Prieto et al., 2019). We used a pilot learning support software, OnTask (Pardo, 2018), to distribute emails. The emails were developed to ensure they were clear with the guidance easily executable, concise, used bullet points and numbering to simplify comprehension and were clearly signed off by the teaching team (Kelly, 2019). This was important given that, first, some students lacked intrinsic interest in the compulsory course and, second, these emails were distributed weekly (across 13 weeks), accordingly, students were more likely to engage with concise and actionable messaging. In recognition of the importance of using emails to provide learner-centred information and maintaining a close relationship with students based on their learning needs on a consistent, weekly basis (Hodges, 2008; Kim, 2008), most of the emails were semi-tailored based on whether the optional learning quizzes were attempted and, if so, relevant direction pertaining to the quiz performance. Specifically, this means encouragement to either complete quizzes, re-complete based on prior completions indicating low performance or continue completing on a consistent basis where performance meets or exceeds expectations. The emails were developed collaboratively by the teaching team, which consisted of the lecturer, coordinator, a tutor and a student who had recently passed the course.

In terms of email content, semi-tailored emails contained information related to quiz attempts. A statement was included indicating that the teaching team were aware of quiz completion and performance. A series of dot points followed, providing guidance on recommended courses of action, and for high-performing attempts at the quizzes, a simple congratulation and encouragement to continue. Standard information followed, providing course reminders on a numbered basis, facilitating ease of reading. The varied information in the emails is consistent with the dialogic process in which students comprehend information from varied sources to enhance their learning quality (Carless, 2015). Few non-tailored emails were distributed; they generally provided a series of dot points and numbered items relating to easy-to-follow guidance. An example of a semi-tailored and non-tailored email is provided in the appendix. The weekly emails aligned with the topics across the 12-week teaching semester. The content was structured such that students needed an adequate understanding of the content each week to progress to content in the following week. Therefore, the easily executable guidance delivered each week aligned with the content students were expected to learn.

Studies have demonstrated that students perceive value in semi-tailored emails, largely hold positive perceptions of tailored email feedback and, importantly, are motivated by it (Lim, Dawson et al., 2021; Ross et al., 2018). This can be particularly so for students who are lower achievers overall (Orsmond & Merry, 2013; Ryan & Henderson, 2018). It is important to note, however, that tailored email messages are part of a broader set of resources, including online learning quizzes and interactive classes, which by design are aimed to illustrate perceived care and thereby minimise negative responses to feedback (Fong et al., 2018).

OnTask provided the opportunity to deliver semi-tailored and automated feedback in a form specifically addressed to each student. While automated and not completely tailored, but semi-tailored, the emails provided specific and discreet direction. Accordingly, the emails were aligned with the tailored environment most students progressed from (P. J. Smith & Smith, 1999), high school, and also importantly, the discreet messages were actionable. By discreet and actionable, as recommended in the literature (Price et al., 2011; Winstone et al., 2017), we mean students were provided with a simple action to follow, that is, either complete the quiz, reattempt the quiz or continue doing so. Students were not provided with an extensive list of things to do, thereby alleviating confusion or disengagement with expectations perceived beyond the time they had available (Briggs et al., 2012; Kift, 2015). Based on the alignment of the semi-tailored emails with discreet, readily actionable direction and aligned with encouraging and initiating self-regulated learning for foundation topics in an introductory course, we expected students to understand and apply appropriate study strategies (Phang et al., 2014). Therefore, we proposed the following hypothesis:

> H1: Reading an email message, which includes semi-tailored information, is related to higher performance.

As detailed above, there is substantial diversity in student cohorts and therefore one-size-fits-all approaches are less than ideal (Pardo et al., 2017). Accordingly, sensitivity testing is warranted regarding whether hypothesis one is supported across different groups, thereby more comprehensively addressing our two research questions. In order to systematically examine factors moderating support for H1, and the extent of email reading, we were guided by the student-related factors in the presage stage of Biggs' presage, process, product model of classroom learning (J. Biggs, 1999; J. B. Biggs, 1993). The model sets out a series of factors relating to whether a student will engage in learning activities, in this case reading and acting on guidance in emails, thereby impacting learning outcomes. In this study, we related these factors to three broad categories.

First, we examined the moderation relating to students' level of study commitment and interest. Variation in interest has perpetuating implications on motivation, mindset and performance (Duff & Mladenovic, 2015). Factors we considered to reflect commitment and interest levels are students' commitment to attend classes (based on the selection of an assessment categorised as option A and B, requiring no participation and consistent class participation, respectively) and intention to complete a major in the same discipline area as the introductory course (accounting), which is noted to increase motivation and performance (Massoudi et al., 2017). In addition, we considered students' average university grades using the weighted average mark (WAM) score, which provided a broader indication of overall study disposition at university.

Second, student background was also considered as a moderator. It is not uncommon for students from diverse language backgrounds to experience language-related challenges and lack confidence. Further, whether students are local or international warrants consideration with students from different educational environments familiar with different teaching and learning styles (Hartnett et al., 2004; Mcdowall & Jackling, 2006).

The last category of moderators we considered relates to demographics. Gender is noted to lead to variation in the depth of learning (Byrne et al., 2002) and drive to study accounting (de Lange & Mavondo, 2004), while age is related to more mature learning approaches (Edmonds & Edmonds, 2008). Unsurprisingly, socio-economic status (SES), based on where students live, has well-known impacts on engagement (Al-Nimer & Mustafa, 2022). Students' entry scores, as shown by the Australian Tertiary Admission Rank (ATAR) and based on their Higher School Certificate (HSC; end-of-school) grades, reflect student aptitude (Edwards et al., 2013). Students' study of Business Studies as part of their HSC, in some way, reflects prior exposure to accounting. Biggs' model also includes presage factors relating to the teaching context, including curriculum, teaching model and assessment (J. Biggs, 1999; J. B. Biggs, 1993). These were kept constant in this study, and therefore, there is no scope to examine moderation relating to these factors.

Research method

Extent emails read

The OnTask platform determined if each email is read via tracking whether the content was downloaded once the email was opened. Although it was possible that the email could be opened, thereby downloaded, and not read, research indicates that when individuals receive a large number of emails, they open only the emails they read (Hanrahan et al., 2016; Kalman & Ravid, 2015). Short of surveying students on their email reading habits, subject to non-response issues, and monitoring the time an email is opened in the system, subject to privacy concerns, our proxy for emails read was the best measure available. The research method received ethics approval from the institution in which the intervention was conducted.

Ordinary least squares regression to test the hypothesis

An ordinary least squares (OLS) regression model was used to examine the degree to which emails were associated with a student's performance. All data used in the regression model were retrieved from the institutional data warehousing system, rather than relying on self-reported data from students, from the first half of 2019. The following OLS regression model was run multiple times to examine how different sections of the examinations, $Exam\_Performance_i$, were affected by engagement with emails read, $Email\_Read_i$, that correspond with these exam section topics. By "correspond", we mean the email measures (independent variable) focus on the same content examined in the exam section variables (dependent variable). This is detailed further in the section below, *Exam_Performance* and *Email_Read* variable matching explained.

The OLS regression model we used is as follows:

$$Exam\_Performance_i = \beta_0 + \beta_1 Email\_Read_i + \beta_2 Accounting\_major\_dummy_i + \beta_3 Age_i + \beta_4 Gender\_dummy_i + \beta_5 WAM_i + \beta_6 NESB\_dummy_i + \varepsilon_i$$

The variables in the OLS regression model above are as follows:

- *Exam_Performance:* The four different *Exam_Performance* measures correspond to a series of *Email_Read* measures. The four different *Exam_Performance* measures are described in the section below, *Exam_Performance* and *Email_Read* variable matching explained.
- *Email_Read:* The OnTask platform tracks whether each email was read. Based on this tracking, seven different *Email_Read* measures correspond with the *Exam_Performance* measures. Once again, the seven different *Email_Read* measures are described in the section below, *Exam_Performance* and *Email_Read* variable matching explained.
- *Accounting_major_dummy:* This variable was assigned 1 for a student majoring in accounting, 0 otherwise.
- *Age:* Literature has found that student maturity is a significant predictor of examination performance.
- *Gender _dummy:* This variable was assigned 1 for females and 0 for males. Literature has confirmed that females have higher intrinsic and extrinsic motivations to study accounting (de Lange & Mavondo, 2004).
- *WAM:* The WAM is based on the final results in all courses students had studied in their program, up to and including the semester they studied introductory accounting but excluding the introductory accounting course, and controls for general academic ability.
- *NESB_dummy:* This variable was assigned 1 for students who speak a language other than English at home, non-English English-speaking background (NESB), and 0 for students who only speak English at home.

Exam_Performance and *Email_Read* variable matching explained

We summarised the matching of the different $Exam\_Performance_i$ and $Email\_Read_i$ variables in Table 1 below. The matching of these variables was based on the $Exam\_Performance_i$ variable corresponding to the same content students were informed about in the emails. Table 1 provides the four dependent $Exam\_Performance_i$ variables (Column 2), the corresponding $Email\_Read_i$ variables (Column 4), and finally, the extent of email semi-tailoring for each $Email\_Read_i$ variable (Column 5). To clarify, the information in each column refers to the following:

- Column 1: This column provides the regression model number, which matches exam section performance with the reading of emails corresponding to the course content.
- Column 2: This column provides the dependent variables, $Exam\_Performance_i$, which are based on performance in different sections of the mid-semester and final exams.
- Column 3: This column explains the content examined in each section of the exams and thereby what $Exam\_Performance_i$ measures.
- Column 4: Our key independent variable of interest, $Email\_Read_i$, centres on the ability of the OnTask platform to monitor student engagement by recording whether each email was read by the student to whom it was sent. Consistent with the different components of $Exam\_Performance_i$, the $Email\_Read_i$ variable is segmented into corresponding measures of the emails read relating to the different sections of the exams. Some emails are semi-tailored based on optional quiz completion and an assessment metric, while others consist of identical distributions to the whole cohort (untailored emails, but still addressing students individually by their name). Across the first three sets of regression models (1–3), there are three $Email\_Read_i$ variables consisting of the percentage of all emails read, semi-tailored emails read and untailored emails read. For regression model 4, there were only semi-tailored emails related to this final exam topic. We focus on measuring the extent of emails read in blocks, rather than individual emails read, first because this matches the totality of the content examined in the different exam questions, and second, to align with the building of knowledge across the course. Individual emails read do not reflect the more holistic process of building course knowledge, for example, via dummy variables. They are, therefore, not used in the regression models.
- Column 5: This column identifies the specific emails and the associated read data used to calculate the percentage of emails read in each case.

Table 1

Matching of Exam_Performance and Email_Read variables

Regression model no.	Exam performance variable: *Exam_Performance*	*Exam_Performance* variable description	Email read variable: *Email_Read*	*Email_Read* variable description
1	Mid-semester exam – practical	% performance for mid-semester exam content relating to recording accounting information.	% read up to mid-semester exam	% of all emails read before sitting the mid-semester exam, which consisted of emails from Weeks 0 to 8.
			% semi-tailored read up to mid-semester exam	% of semi-tailored emails read before sitting the mid-semester exam, which consisted of emails from Weeks 3 to 8.
			% untailored read up to mid-semester exam	% of untailored emails read before sitting the mid-semester exam, which consisted of emails from Weeks 0 to 2.
2	Mid-semester exam – accounting theory	% performance for mid-semester exam content relating to accounting theory.	Same three variables as above	As above
3	Final exam – financial accounting	% performance for final exam content examining ability to analyse accounting information, record accounting information (in particular accounting for accounts owing and inventory).	% financial accounting emails read	% of all emails based on financial accounting, which consisted of emails from Weeks 0 to 10.
			% semi-tailored financial accounting emails read	% of semi-tailored emails based on financial accounting, which consisted of emails from Weeks 3 to 8 and 10.
			% untailored financial accounting emails read	% of untailored emails based on financial accounting, which consisted of emails from Weeks 0 to 2 and 9
4	Final exam – management accounting	% performance for final exam content relating to tools used to make informed decisions in business management.	% semi-tailored emails management accounting	% of all emails based on management accounting (semi-tailored), which consisted of emails from Weeks 11 to 12.

Results and discussion

Main results

The full sample comprised 1,218 students. The descriptive statistics and frequencies (Table 2) indicate sufficient variation for the regression analysis. Contrary to common expectations (Pardo et al., 2019), these statistics report a high level of engagement with emails distributed, with students opening a large percentage of emails across the teaching semester, reported in more detail below. Correlations and collinearity statistics (tolerance and variance inflation factors) are also reviewed, and multicollinearity is not present in the regression model results reported.

Table 2

Descriptive statistics and frequencies for complete sample (N = 1,218)*

Panel A: Descriptive statistics – continuous variables					
	Min.	Max.	M	Median	SD
Exam_Performance:					
Mid-semester – practical	0.000	20.000	11.970	13.000	5.861
Mid-semester – theory	0.000	20.000	9.739	10.000	5.820
Final exam – financial accounting	0.000	24.000	12.220	12.500	6.148
Final exam – management accounting	0.000	40.000	13.280	12.000	9.059
Email_Read (percentage):					
Read up to mid-semester exam	0.000	100.000	78.797	100.000	29.034
Semi-tailored read up to mid-semester exam	0.000	100.000	76.259	100.000	32.161
Untailored read up to mid-semester exam	0.000	100.000	86.412	100.000	30.372
Financial accounting	0.000	100.000	77.463	90.000	28.926
Semi-tailored financial accounting	0.000	100.000	75.381	85.714	31.751
Untailored financial accounting	0.000	100.000	82.321	100.000	28.941
Semi-tailored management accounting	0.000	100.000	70.156	100.000	40.363
Control variables:					
Age	16.828	39.284	18.888	18.362	1.737
WAM	0.000	91.960	67.782	67.782	12.425

Panel B: Frequencies – dummy variables	Binary codes	
	0	1
Accounting_major_dummy	92.207%	7.793%
Gender_female_dummy	54.143%	45.867%
NESB_dummy	63.003%	36.998%

Note. The statistics reported are based on the non-normalised variables. Where appropriate, the variables are normalised when used in regression analysis, consistent with the assumptions of OLS regression.

In terms of the main results, we present the percentage of emails read across the different email sub-groups based on diversity in the cohort (Table 3). The results indicate 76.2% of all emails distributed are read. This percentage appears higher than expected. A greater proportion of untailored emails are read, confirmed by untabulated t-statistic results. This significant difference remains consistent across all sub-samples relating to the extent of quiz attempts, class attendance, major selection, WAM, English-speaking background, gender, age, SES background and high school entry scores, with the exception of international students, possibly due to the different study patterns of such students. This higher proportion of untailored emails being read was likely the result of a larger proportion of such emails being distributed in the first few weeks of the semester and students generally paying more attention at this time.

The main regression results relating to the whole sample are presented below in Table 4, Panel A. The results indicate reading emails is related to significantly higher performance in the financial accounting section of the final exam. It appears the semi-tailored emails are driving this result, as untailored emails are not significantly associated with performance, consistent with the importance of feedback aligned with each student's self-regulatory learning needs (Butler & Winne, 1995; Hattie, 2007; Vosniadou, 2020). There is a marginal association between emails read before the mid-semester exam and performance in the practical section of the mid-semester exam. When breaking the sample down based on the extent of quiz attempts and focusing on students who did not attempt any quiz during the semester (Table 4, Panel C), it appears the *Email_Read* variables are once again associated with financial accounting final exam performance, however only marginal so. This association again appears to be driven by the percentage of semi-tailored emails read, even though these students did not attempt any of the online learning quizzes during the semester. Interestingly, the results for students who attempted at least some of the quizzes (Table 4, Panel B) during the semester differ, with significant associations noted with the practical component of the mid-semester exam. There is no doubt there are some significant results and positive associations between emails read and examination performance across the full sample and associated sub-samples based on quiz attempts, providing support for the hypothesis. However, the results are by no means consistent across different *Exam_Performance* variables. This suggests the associations are moderated by other factors beyond whether or not students attempt the learning quizzes related to the diverse cohort (Jackling et al., 2012; Pardo et al., 2017). Accordingly, we next present the results based on the sensitivity testing and, accordingly, the moderators. The moderators, as previously discussed, capture diversity in the cohort. We discuss the notable results observed across the sub-samples.

Table 3
Percentage emails read

Email types >	Sample size	All emails	Read up to mid-semester exam	Semi-tailored read up to mid-semester exam	Untailored read up to mid-semester exam	Financial accounting emails read	Semi-tailored financial accounting emails read	Untailored financial accounting emails read	Semi-tailored emails management accounting
All students	1218	76.245	78.797	76.259	86.412	77.463	75.381	82.321	70.156
No quiz attempts	692	72.712	75.578	72.567	84.610	74.176	71.718	79.913	65.390
Quiz attempts	526	80.894	83.032	81.115	88.783	81.787	80.201	85.488	76.426
Commitment and interest moderation									
Option A	347	71.710	73.883	71.134	82.133	72.882	70.317	78.866	65.850
Option B	871	78.052	80.755	78.301	88.117	79.288	77.399	83.697	71.871
Accounting major	96	76.736	78.906	77.083	84.375	77.917	76.786	80.556	70.833
Non-accounting major	1122	76.203	78.788	76.188	86.586	77.424	75.261	82.472	70.098
Low WAM	579	74.669	77.116	74.640	84.542	75.993	73.896	80.887	68.048
High WAM	591	77.961	80.711	78.032	88.748	79.137	77.012	84.095	72.081
Background moderation									
NESB	451	75.185	76.940	74.575	84.035	76.053	73.994	80.857	70.843
English-speaking background	767	76.869	79.889	77.249	87.810	78.292	76.197	83.181	69.752
Chinese home language	155	75.484	77.661	75.269	84.839	76.387	74.194	81.505	70.968
Local student	1085	76.121	78.940	76.068	87.558	77.401	75.128	82.704	69.724
International student	133	77.256	77.632	77.820	77.068	77.970	77.444	79.198	73.684
Demographic moderation									
Female	558	80.750	83.289	81.452	88.799	81.864	80.492	85.066	75.179
Male	660	72.437	75.000	71.869	84.394	73.742	71.061	80.000	65.909
Age less than 20	1038	75.859	78.540	75.771	86.850	77.129	74.855	82.434	69.509
Age equal to or greater than 20	180	78.472	80.278	79.074	83.889	79.389	74.413	81.667	73.889
Low SES	110	77.197	80.682	78.030	88.636	78.727	76.364	84.242	69.545
Medium to high SES	1066	76.188	78.717	76.126	86.492	77.383	75.315	82.208	70.216
Studied HSC business (local students only)	700	75.845	78.464	75.333	87.857	77.186	74.469	83.524	69.143
Low ATAR	528	76.389	79.545	76.736	87.973	77.614	75.541	82.449	70.265
High ATAR	684	76.267	78.235	75.902	85.234	77.412	75.334	82.261	70.541

Table 4

Panel A – Main results: Performance implications (N = 1,218)

Regression model no.	1			2			3			4
Dependent variable	Mid-semester – practical			Mid-semester – theory			Final exam – financial accounting			Final exam – management accounting
Email_Read explained	% read up to mid-semester exam	% semi-tailored read up to mid-semester exam	% untailored read up to mid-semester exam	% read up to mid-semester exam	% semi-tailored read up to mid-semester exam	% untailored read up to mid-semester exam	% financial accounting emails read	% semi-tailored financial accounting emails read	% untailored financial accounting emails read	% semi-tailored emails management accounting
	Coefficient (*t* stat)									
Email_Read	0.040*	0.037	0.037	-0.005	-0.005	-0.007	0.063***	0.064***	0.029	0.013
	(1.675)	(1.526)	(1.567)	(0.821)	(-0.197)	(-0.308)	(2.779)	(2.815)	(0.201)	(0.515)
Accounting_ major_dummy	0.032	0.031	0.033	0.006	0.007	0.006	0.039*	0.039*	0.040*	0.041*
	(1.340)	(1.329)	(1.373)	(0.272)	(0.273)	(0.790)	(1.737)	(1.713)	(1.787)	(0.099)
Age	0.042*	0.041*	0.045*	-0.032	-0.032	-0.032	-0.004	-0.005	0.001	0.099***
	(1.713)	(1.691)	(1.842)	(-1.285)	(-1.281)	(-1.306)	(-0.161)	(-0.212)	(0.030)	(3.810)
Gender_dummy	-0.062**	-0.062**	-0.058**	0.037	0.036	0.036	0.002	0.001	0.010	-0.115***
	(-2.549)	(-2.536)	(-2.417)	(1.491)	(1.487)	(1.491)	(0.086)	(0.046)	(0.419)	(-4.502)
WAM	0.574***	0.575***	0.573***	0.531***	0.531***	0.532***	0.607***	0.608***	0.609***	0.481***
	(23.636)	(23.699)	(23.579)	(21.689)	(21.711)	(21.668)	(26.314)	(26.385)	(26.289)	(18.666)
NESB_dummy	0.008	0.008	0.007	-0.093***	-0.093***	-0.093***	-0.046**	-0.046**	-0.048**	-0.055**
	(0.734)	(0.326)	(0.294)	(-3.794)	(-3.792)	(-3.797)	(-2.011)	(-1.998)	(-2.101)	(-2.138)
Adjusted R^2	0.324	0.323	0.323	0.311	0.311	0.311	0.389	0.389	0.386	0.240
F statistic	97.999***	97.881***	97.913***	92.670***	92.667***	92.680***	129.963***	130.018***	128.306***	65.095***

*Significant at the 0.10 level (2-tailed). **Significant at the 0.05 level. ***Significant at the 0.01 level.

Table 4

Panel B – Quiz attempts: Performance implications (n = 525)

Regression model no.	1			2			3			4
Dependent variable	Mid-semester – practical			Mid-semester – theory			Final exam – financial accounting			Final exam – management accounting
Email_Read explained	% read up to mid-semester exam	% semi-tailored read up to mid-semester exam	% untailored read up to mid-semester exam	% read up to mid-semester exam	% semi-tailored read up to mid-semester exam	% untailored read up to mid-semester exam	% financial accounting emails read	% semi-tailored financial accounting emails read	% untailored financial accounting emails read	% semi-tailored emails management accounting
	Coefficient (*t* stat)									
Email_Read	0.078**	0.070*	0.086**	-0.038	-0.042	0.009	0.056	0.059	0.031	-0.009
	(2.131)	(1.895)	(2.349)	(-1.011)	(-1.136)	(0.249)	(1.580)	(1.644)	(0.873)	(-0.251)
Accounting_ major_dummy	0.044	0.043	0.045	0.052	0.052	0.053	0.043	0.043	0.043	0.065*
	(1.202)	(1.184)	(1.235)	(1.422)	(1.427)	(1.449)	(1.213)	(1.218)	(1.213)	(1.722)
Age	0.106***	0.106***	0.109***	0.045	0.046	0.044	0.034	0.033	0.036	0.123***
	(2.839)	(2.812)	(2.913)	(1.189)	(1.211)	(1.156)	(0.937)	(0.910)	(0.984)	(3.171)
Gender_ dummy	-0.075**	-0.074**	-0.068*	0.079**	0.080**	0.072*	-0.033	-0.034	-0.027	-0.142***
	(-2.029)	(-2.008)	(-1.869)	(2.106)	(2.135)	(1.952)	(-0.919)	(-0.948)	(-0.755)	(-3.755)
WAM	0.553***	0.555***	0.550***	0.529***	0.528***	0.526***	0.574***	0.575***	0.575***	0.499***
	(14.701)	(14.751)	(14.593)	(13.881)	(13.884)	(13.751)	(15.705)	(15.764)	(15.649)	(12.836)
NESB_dummy	-0.038	-0.039	-0.039	-0.086	-0.087**	-0.083**	-0.083**	-0.082**	-0.086**	-0.045
	(-1.013)	(-1.040)	(-1.052)	(-2.287)	(-2.293)	(-2.197)	(-2.292)	(-2.275)	(-2.367)	(-1.184)
Adjusted R^2	0.313	0.312	0.314	0.295	0.295	0.294	0.352	0.352	0.350	0.267
F statistic	40.867***	40.637***	41.105***	37.609***	37.673***	37.380***	48.489***	48.543***	48.041***	32.855***

*Significant at the 0.10 level (2-tailed). **Significant at the 0.05 level. ***Significant at the 0.01 level.

Table 4

Panel C – No quiz attempts: Performance implications (n = 690)

Regression model no.	1			2			3			4
Dependent variable	Mid-semester – practical			Mid-semester – theory			Final exam – financial accounting			Final exam – management accounting
Email_Read explained	% read up to mid-semester exam	% semi-tailored read up to mid-semester exam	% untailored read up to mid-semester exam	% read up to mid-semester exam	% semi-tailored read up to mid-semester exam	% untailored read up to mid-semester exam	% financial accounting emails read	% semi-tailored financial accounting emails read	% untailored financial accounting emails read	% semi-tailored emails management accounting
	Coefficient (*t* stat)									
Email_Read	0.003	0.001	0.004	-0.001	0.002	-0.026	0.054*	0.054*	0.049	0.007
	(0.101)	(0.045)	(0.121)	(-0.028)	(0.073)	(-0.790)	(1.781)	(1.780)	(1.618)	(0.212)
Accounting_ major_dummy	0.016	0.017	0.017	-0.030	-0.030	-0.030	0.031	0.030	0.034	0.012
	(0.512)	(0.512)	(0.514)	(-0.916)	(-0.918)	(-0.921)	(1.022)	(0.992)	(1.100)	(0.350)
Age	-0.009	-0.009	-0.009	-0.096***	-0.096***	-0.097***	-0.038	-0.039	-0.034	0.079**
	(-0.279)	(-0.276)	(-0.268)	(-2.883)	(-2.886)	(2.921)	(-1.206)	(-1.237)	(-1.078)	(2.227)
Gender_dummy	-0.106***	-0.105***	-0.105***	-0.027	-0.028	-0.026	-0.011	-0.012	-0.008	-0.137***
	(-3.199)	(-3.190)	(-3.212)	(-0.828)	(-0.840)	(-0.798)	(-0.354)	(-0.371)	(-0.247)	(-3.916)
WAM	0.547***	0.548***	0.547***	0.503***	0.503***	0.506***	0.595***	0.596***	0.595***	0.446***
	(16.781)	(16.802)	(16.746)	(15.357)	(15.366)	(15.407)	(19.250)	(19.283)	(19.234)	(12.851)
NESB_dummy	0.050	0.050	0.050	-0.082**	-0.082**	-0.083**	-0.018	-0.018	-0.019	-1.124
	(1.525)	(1.522)	(1.525)	(-2.465)	(-2.460)	(-2.490)	(-0.564)	(-0.559)	(-0.596)	(0.261)
Adjusted R^2	0.297	0.297	0.297	0.291	0.291	0.292	0.367	0.367	0.367	0.207
F statistic	49.640***	49.638***	49.641***	48.186***	48.187***	48.334***	67.813***	67.812***	67.666***	31.042***

*Significant at the 0.10 level (2-tailed). **Significant at the 0.05 level. ***Significant at the 0.01 level.

Sensitivity testing

We discuss the results illustrating significant differences in this section. In the interests of conserving the paper length, the tabled sensitivity results are available upon request. We first discuss the impact of student commitment and interest. Non-accounting major students appear to benefit in terms of final exam financial accounting performance, suggesting students who are less interested in specialising in the course benefit. In particular, they benefit from semi-tailored emails rather than untailored emails. In contrast, when focusing on students who have attempted quizzes, we see non-accounting major students only benefit significantly from untailored emails in terms of practical mid-semester exam performance. The results indicate that non-accounting major students take note of general untailored emails earlier in the semester leading up to the mid-semester exam, and then non-accounting major students in general (regardless of quiz attempts) take note of the semi-tailored emails leading up to the final exam. This difference for non-accounting major students could be explained by how seriously they focus on their studies, with increasing seriousness, and thereby self-regulatory learning efforts as the semester progresses.

There are positive implications of reading emails for low WAM students attempting quizzes, with significant associations noted across semi-tailored and untailored emails relating to both the mid-semester exam practical and final exam financial accounting component. This result suggests students who are typically lower performers in their courses, who do something to achieve higher results and read the emails, achieve better outcomes in the practical financial accounting content. This is consistent with literature suggestions to provide students with discreet and actionable guidance (Price et al., 2011; Winstone et al., 2017). Students who do not attempt the quizzes but read untailored emails realise significantly higher financial accounting final exam performance. The impact of reading semi-tailored emails is insignificant for students who do not attempt the quizzes.

Next, we consider background moderators. English-speaking backgrounds and local students benefit from reading emails. While encouraging for local and English-speaking students, this is concerning for NESB students (Yang & Farley, 2019). The results for the NESB sub-sample indicate that reading emails semi-tailored up to the mid-semester exam is negatively and significantly associated with the mid-semester exam theory component. The emails largely focused on encouraging students to complete the online learning quizzes relating to practically focused questions rather than theory questions. Generally, the implications of this focus across the results we present appears related to positive associations with the practical and financial accounting sections of the mid and final exams and no significant association with the mid-semester exam theory component. However, for NESB students who tend to struggle with theory questions (Hartnett et al., 2004), it may provide the impression the theory component of the course is less important, thereby discouraging efforts. Such an assertion appears supported by the fact that the significant negative association between reading semi-tailored emails and the mid-semester exam theory question is only maintained in the quiz attempts and not the no quiz attempt sub-sample.

Finally, several interesting results emerge relating to demographic moderation. The results indicate medium to high SES students who read the emails achieve significantly higher performance in the final exam financial accounting component. It appears that the semi-tailored emails drive this significant effect, with no significant results observed for untailored emails. The result is consistently observed regardless of whether students attempt or do not attempt quizzes throughout the semester. While the result is encouraging for medium to high SES students, it is very concerning for low SES students. Given that low SES students are less likely to have consistent and reliable access to the internet, the results suggest that where they read the emails, they may not be in a position to take advantage of the advice in terms of completing the online quizzes and accessing other course resources.

Gender is a significant moderator. Males benefit significantly from reading semi-tailored emails related to final exam financial accounting content, while females only benefit marginally. This is unsurprising given that females typically illustrate greater motivation and drive when studying accounting (de Lange & Mavondo, 2004). Results consistent with the male sub-sample are also observed for students aged 20 or less and those who studied HSC Business Studies. It appears, unsurprisingly, those attempting the quizzes

drive these results to some extent. This is observed across the mid-semester exam practical and final exam financial accounting components for students aged 20 or less, and students who studied HSC Business achieved significantly higher mid-semester exam practical performance where they read the emails.
We also observe ATAR moderates the results. Students achieving a higher ATAR appear to drive the results regarding both mid-semester exam practical and final exam financial accounting performance. Interestingly, it appears that high ATAR students who do not attempt quizzes gain much of the benefit, with no significant results observed for students who do attempt quizzes. This indicates that high ATAR students who read the emails but do not take the advice through quiz attempts must take other initiatives and a self-regulatory approach. We also observe significant implications for low ATAR students who attempt quizzes in terms of mid-semester exam practical performance based on untailored emails, although the results are not as consistent as the high ATAR students.

Conclusion

There are a series of findings contributing to literature and providing practice implications. First, contrary to anecdotal evidence, we find the majority of students read emails, suggesting they are a useful device. Second, our findings indicate instructors need to write emails that are specific and encourage students to undertake activities aligning with examination content to have any significant impact on student performance. This is consistent with literature indicating that messaging feedback must be discreet and actionable (Price et al., 2011; Winstone et al., 2017). By extension, this indicates our results do not simply reflect that students who typically perform better read emails. If this were the case, the emails read would be significantly related to all examination performance variables, which is not the case.

Third, and encouragingly, the results indicate that students who typically achieve lower grades across their studies benefit from reading emails. In particular, this appears to be the case for students who follow email advice and attempt the recommended online learning quizzes. Positive results are also observed for a number of other sub-samples, including English-speaking backgrounds and medium to high SES, high performers at high school, younger students aged 20 or less and those who have completed Business Studies for their HSC. While positive effects are encouraging for this group, what is not encouraging is the lack of significant effects for low SES students and negative effects in some cases for NESB students (Hartnett et al., 2004). As with any intervention, particularly one tailored in some way to individual student needs, the hope is that all students will benefit. However, other than students who are lower performing across their university studies, it appears that students who find it more challenging for economic and language-related reasons (Al-Nimer & Mustafa, 2022; Jackling et al., 2012; Phang et al., 2014) do not gain materially. Perhaps if the emails were part of larger-scale interventions, these students would benefit, however, the email intervention alone is insufficient.

The lack of email impact for NESB and low SES background students is very concerning. Labour shortages across numerous professions may only be addressed by recruiting a more diverse cohort of students (Wells et al., 2009; Wilkerson, 2010). Emails are one of the more limited means of communicating with NESB students who may be studying at a distance and low SES students who may live further away and may be unable to travel to campus regularly. If instructors cannot effectively use semi-tailored emails to enhance the learning experience, other options need to be investigated.

A limitation of this research is that data were only available on student engagement with the emails via tracking of students opening each message. No data were available on the time taken to read or comprehend emails. Future research could investigate how reading tailored emails affects students' study habits and motivation, including an analysis of how students use formative online quizzes. It would be interesting to know if the weekly emails result in students feeling increased pressure or fear of failure, particularly considering that many students studying introductory courses are in their first semester, and related to this, whether the emails have any impact on student retention, noted as very important in transition literature (Briggs et al., 2012; Kift, 2015).

Acknowledgements

This research was supported by grants from the UTS Business School and the UTS First Year Transition Fund. We gratefully acknowledge the support and suggestions from our UTS colleagues and the RMIT Accounting Educators' Conference.

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Please cite as: Reynolds, M., Tyler, J., Wakefield, J., & Wight, R. (2024). Students got mail: Do students read semi-tailored emails and what is the impact? *Australasian Journal of Educational Technology*, *40*(1), 57–77. https://doi.org/10.14742/ajet.8812

Appendix

Semi-tailored email example

This *TEXT* indicates the email tailoring.

Email subject: Accounting A – Week 3

Dear *<FIRST NAME>,*

STUDENTS RECEIVE ONE OF THE THREE SECTIONS BELOW BASED ON THEIR QUIZ ATTEMPT:

1. NO ATTEMPT:
The Accounting Team have reviewed your performance and realise you have not yet completed any of the learning quizzes from last week.

- **Topic of Quizzes:** The Financial Statements
- **Why Complete?** Accounting A builds upon the information from each week, so it is important you keep up to date with the work. They can be completed as many times as you like.
- **Benefits:** quizzes provide immediate feedback and an explanation of the correct solution.
- **Struggling with Content?** Attend U:PASS sessions, complete the quizzes before your next lecture and attend HELPS classes

2. AVERAGE PERFORMANCE ATTEMPT:
Congratulations on completing the learning quizzes last week. Whilst your performance was satisfactory, we know you are capable of improving your results!

- **How to Improve?** Retake the quizzes as many times as you need, attend lectures/tutorials, complete the homework, post questions on the discussion board and attend U:PASS classes for extra assistance
- **Benefits:** quizzes provide immediate feedback and an explanation of the correct solutions.

3. HIGH PERFORMANCE ATTEMPT:
Congratulations on completing the learning quizzes available last week on the topic of 'The Financial Statement'. Your marks demonstrate a high level of understanding, and we strongly encourage you to continue your efforts throughout the semester!

STANDARD TEXT DISTRIBUTED TO ALL STUDENTS:
<u>Reminders for this week:</u>

1. **Homework assessment enrolment:** takes place next week in your tutorials. Submit the homework detailed in the course outline if you'd like to enrol in assessment option B (10% class mark as part of your assessment). Please make sure your homework is stapled together (your tutor will not have a stapler). To register for option A, simply don't submit your homework (although you are still strongly encouraged to attend and participate in tutorials).
2. **Screencast assignment:** details are now available in the Assessments folder. Please read the assignment briefing carefully and take note of all requirements and deadlines. Whilst the screencast assignment is optional, you have the opportunity to earn up to 10 bonus marks. We strongly encourage you to complete the assignment.

Kind regards,
The Accounting A Team

Non-tailored email example

Email Subject: Accounting A – Week 2

Dear *<FIRST NAME>,*

We hope you enjoyed your first week of classes!

For this week:

- **Lecture Topic:** Financial Statements – we will be discussing concepts needed for the remainder of the topics covered this semester, so PLEASE ATTEND CLASS AS ALWAYS!!!
- **Tutorial:** the tutorial homework based on last week's lecture content will be discussed in tutorials this week. Please thoroughly attempt all homework questions and then come to class to check how you went.

NEED HELP? – USE THESE!

1. **Learning Quizzes:** do the 3 learning quizzes to help you classify accounts and understand the layout of the financial statements. You need to remember these by next week.
    - **Why Complete?** whilst these quizzes are NOT assessable, we will be monitoring your progress and success. Accounting is a course best learnt by practicing questions, so please PRACTICE PRACTICE PRACTICE!!!
2. **U:PASS Sessions:** voluntary classes run by student mentors who previously succeeded in Accounting A. We highly recommend attending if you are struggling with the content or are a student just looking for some additional practice questions.

We hope you have a great week and look forward to seeing you all in class!

Kind regards,
The Accounting A Team