Students' Feelings of Anxiety in Online Teaching and Learning

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Introduction

The transition from the usual on-campus teaching and learning to an online format affects students in different ways and could cause anxiety for them. Understanding the main triggers of this anxiety and the structure of it can help instructors in easing the process of online learning for students.
In this study, standard questionnaires are used to assess five relevant and different types of anxiety to determine whether/how they are related to the anxiety caused by online teaching and learning.

Sample: The data were collected at the School of Mathematics, the University of Edinburgh in the first semester of 2020-21. The studied population is 240 students who took a 10 credit (hybrid/online) course named Statistical Methodology, of these, 50 students (21%) completed the optional survey in week 9 of the semester. The course is compulsory for third-year students in Mathematics degrees involving Statistics and optional for MSc students and had a 70/30 balance of exam/coursework.

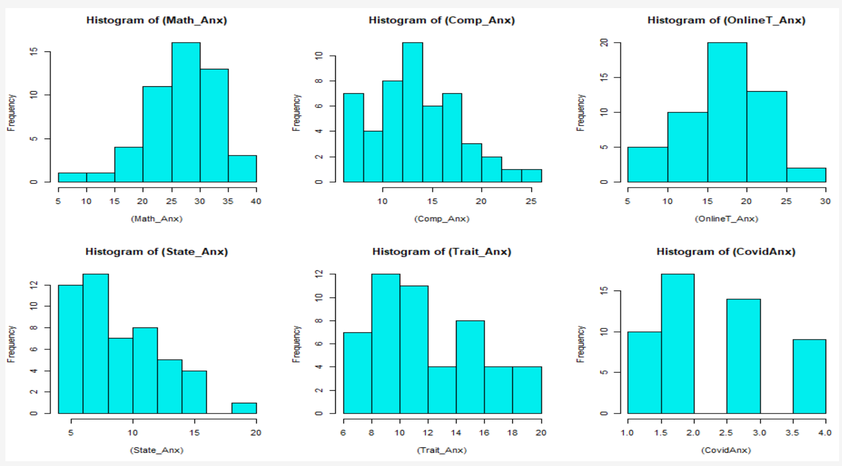

Fig 1. Distributions of different types of anxieties (Mathematics, Computer, Online Teaching, State, Trait, Covid-19 situation)

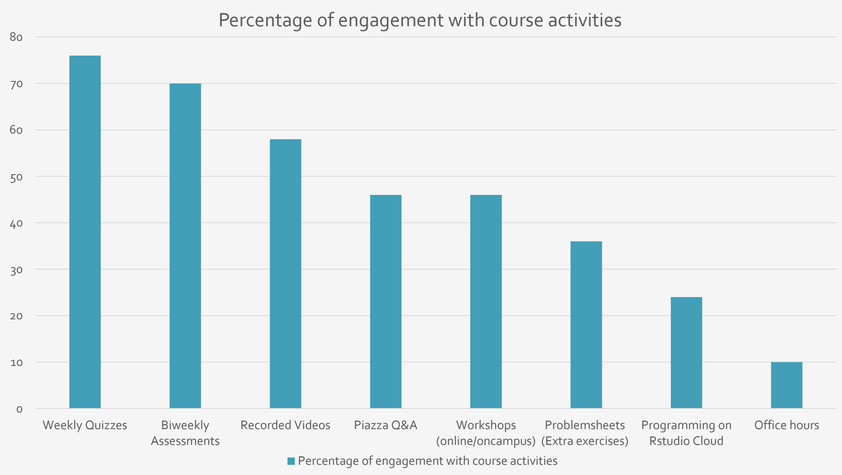

Fig 3. The course activities and the rate of students' engagement

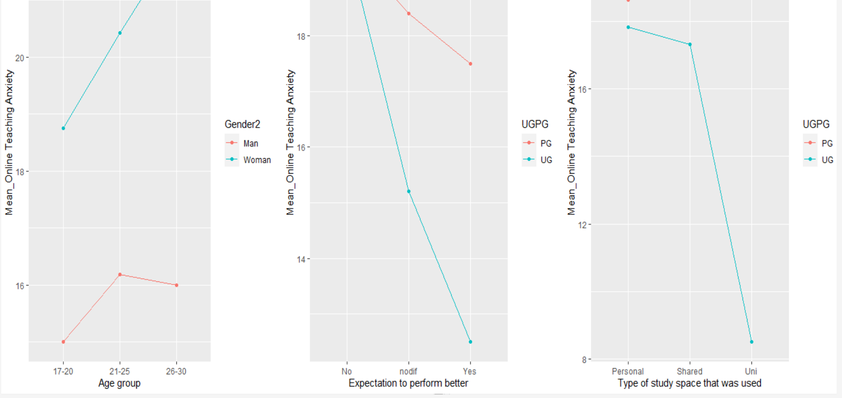

Fig 4. Gender, Expectation and Study space plotted against average values of Online Teaching Anxiety

Instruments

Questionnaires for measuring different types of anxiety:

- **Mathematics anxiety** questionnaire (AMAS) has 9-item Likert scale questions ranging from 1 (strongly disagree) to 5 (strongly agree) with two factors of "learning" and "evaluation" [1].
- **Anxiety in online teaching and learning (Online teaching Anxiety)** and **Computer anxiety** are measured using 6-item Likert scale questions for each, ranging from 1 (strongly disagree) to 5 (strongly agree) [2].
- **The State and Trait anxiety** questionnaire has 5-item questions for each type ranging from 1 (not at all) to 4 (very much so) [3].
- **Anxiety related to the Covid-19 situation** (self-isolation, lockdown, ...) is measured using one question on the same scale as the State-Trait anxiety.

The distribution of these types of anxieties and the correlation between them are given in Figures 1 and 2.

Triggers of anxiety: Students were asked to choose the main triggers of anxiety in taking this online course from a multi-choice list [4] given in Table 1.

Engagement: To study the possible link between engagement in the course and the level of experienced anxiety, students were asked which course activities they found engaging (Figure 3). They were also asked to rate their engagement level in the course on a scale of 1 (not engaged) to 4 (very engaged) [5].

Covariates: Participants were asked several demographic and course-related questions to study the potential links between those and the Online Teaching Anxiety. These variables are: gender, age group, degree level (UG/PG), study space (personal/shared/university), having a job, English as a native language, taking online or on-campus workshops, the number of previously taken online courses, and their expectation about their final performance in this online course (if they expected to perform better compared to an on-campus course, or not, or they didn't expect a difference).

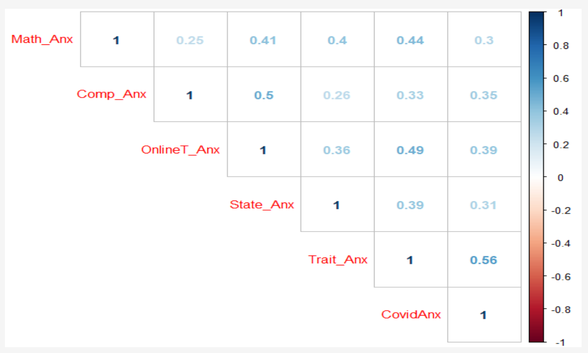

Fig 2. Pearson correlation between types of anxieties

Table 1. Triggers of anxiety in the course selected from a multi-choice list

Factors triggering anxiety in this online course	Selected Percentage
Risk of online distraction - for example, wasting time on social media	52%
Not having enough immediate classroom interaction with faculty and students	50%
Having to ask questions in online tutorials	48%
Not having enough clear explanations on what to do	48%
Lack of physical classroom environment	38%
Not having enough interaction with classmates	38%
Not having enough face-to-face time with faculty	30%
Not having enough feedback from faculty	26%
Technical difficulties	24%
Having to ask questions on the online text-based forum (Piazza)	24%
Other	10%

Results

Anxiety types correlations:
All the anxiety types Pearson correlations are positive with the strongest significant relations between Trait anxiety with Covid-19 anxiety; and Online Teaching anxiety with Computer anxiety and Trait anxiety. Online Teaching Anxiety has a positive and statistically significant correlation with all the other five types of anxieties indicating the strong connection of them with students' anxiety about taking this online course.

Engagement:
There were no significant differences in Online Teaching Anxiety across levels of engagement.

Covariates:
Statistical tests show that the following variables have a significant effect on Online Teaching Anxiety:
Gender; t-test $p < 0.01$; women (48% of participants) have reported a higher level of anxiety than men.
Study space; ANOVA $p < 0.05$; those who used the university's study space (only 4% of participants) reported a lower level of anxiety compared to those who used personal or shared study spaces.
Expectation; ANOVA $p < 0.05$; those who expected to perform better in the online course (16% of participants) reported a lower level of anxiety compared to those who expected to perform worse.
These significant effects are plotted in Figure 4.

Discussion

Triggers of anxiety in online teaching and learning in Table 1 introduce some of the main students' concerns. Online Teaching Anxiety in this course is highly and positively correlated to mathematics and computer anxieties, state-trait anxiety and the anxiety caused by the Covid-19 situation.
Figure 3 shows that the three activities which most students found engaging were individual ones, not those that include interaction with other students or staff. This could be an indication of an assessment orientated engagement in the course.

Future work: Statistical linear and nonlinear modelling will be applied to further investigate the relation of types of anxieties and independent covariates affecting Online Teaching Anxiety in this sample. Studying a larger sample size and including other related educational elements like performance, motivation and attitude will provide more in-depth information on the topic.

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