



THE UNIVERSITY  
of EDINBURGH



## Principal's Teaching Award Scheme (PTAS) Proposal Form Regular Grants

### Advice before starting this form:

- Read through the entire form and follow the proposal guidance provided on the PTAS website.
- Complete all sections and questions outlined in this form, including the equity impact statements. Incomplete forms will be returned to the applicants and not considered for this funding round
- Replace guidance text (*in italics*) with your own text.
- Follow the page and/or word limit. Proposals with sections over the page or word limit will be returned to the applicants and not considered for this funding round.
- Ensure all members of your team are eligible for the award before completing the application
- This form is for regular grants, and another form is available for small grants
- When you have completed the form, please email one signed PDF copy of your entire proposal to [iad.teach@ed.ac.uk](mailto:iad.teach@ed.ac.uk)

### Project team members

#### Principal applicant:

Full name and title: *Dr David Quinn*

School: School of Mathematics

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#### Co-applicants:

Full name and title: Dr Ross Galloway

School: School of Physics and Astronomy

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Full name and title: Dr John Loveday

School: School of Physics and Astronomy

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Full name and title: Dr Konstantina Zerva

School: School of Mathematics

Email: [k.zerva@ed.ac.uk](mailto:k.zerva@ed.ac.uk)

### Eligibility of Principal and team:

By submitting this proposal, you agree to the following statements.

- As Principal Applicant of this grant, I am employed at the University of Edinburgh from the proposed start date to end date described in this application form.
- As Principal Applicant, I can confirm that my team members and I are not currently named as the Principal Applicant of an existing and ongoing PTAS project

# Project Summary

**Project title:**

The impact of frequency and scale of coursework in STEM subjects on student learning and wellbeing

**Start date:**

*August 2023*

**End date:**

*September 2024*

**Project summary:**

Coursework is often used to assess learning outcomes, to create feedback opportunities and to motivate student engagement. There is evidence, from student feedback, that the level of coursework can create an excessive workload causing stress and limiting engagement with activities which are not assessed as students need to prioritise their time.

The project aims to explore how students in the School of Mathematics and the School of Physics and Astronomy manage their study time, with a particular focus on the impact of coursework. We will collect weekly timesheets from student volunteers including students from both prehonours and honours in each school. These timesheets will record time spent on different study activities for each course and include a short reflection. This will give an insight into how students have distributed their study time and identify which elements they feel have had the greatest benefit to their learning. Furthermore, this will identify when students have found workload to be excessive and show the impact on their learning and wellbeing.

This breakdown will be compared with how course organisers intend for students to engage, which will enable reflection on course design to enable students to engage fully and reduce stress caused by excess workload. Data from students and course organisers will inform the creation of advice on time management.

**Funding requested:**

**£ 17,465**

# Proposal

## Project title:

The impact of frequency and scale of coursework in STEM subjects on student learning and wellbeing.

## Project aims:

Students often raise concern that their coursework can lead to excess workload and limit their engagement with other aspects of their courses. The aim of this project is to assess the impact of our current coursework load on students' study behaviour, to inform decisions in course design which will better manage student workload and enable students to engage more fully.

We will try to address the following research questions:

**Question 1** How much time do students spend studying each week and how do they divide this across their courses and study activity type?

**Question 2** What are students' motivations for prioritising study time as they do, and are there any course activities which they choose not to engage in as a result?

**Question 3** What activities do students feel have best supported their learning? Are there aspects of course design which they identify as having a negative impact on their wellbeing?

**Question 4** How does student activity on a course relate to the course organisers' intended design?

## Background:

Summative coursework assessments, which students are asked to complete during the semester, are an important aspect in most courses. Though principally used to assess learning outcomes, it is common for course organisers to attach even a small amount of credit to an assessment to promote timely engagement and to create systematic opportunities to offer feedback on students' learning. In 2020-21 there was a move for courses to increase the weight of the coursework component, which often resulted in an increase in the frequency or scale of the assessments with the rationale being better coverage of the learning outcomes, reduced reliance on final exams and to promote regular engagement against the backdrop of hybrid and online teaching.

Formative coursework assessment often sits alongside summative assessments. These typically offer additional opportunities for students to receive feedback without having an impact on students' grades. In some cases, it is necessary for students to complete a formative assessment before they can attempt a summative assessment.

Students in the Schools of Mathematics (SoM) and the School of Physics and Astronomy (SoPA) commonly raise concern about 'overassessment', and this was common even before the shift in 2020-21. Part of students' concern is on competing deadlines and insufficient time to complete assessments to the best of their ability while keeping up the other aspects of their courses. Course organisers have designed their courses carefully, anticipating that students will learn more by engaging with all aspects. However, observed student practice leads to the sense that if an activity does not have a summative aspect, then many students will not engage. This leads to a so-called assessment arms race (Harland et al., 2015; Harland & Wald, 2021) as each course competes for students' time.

The feeling of being over-assessed is not unique to the University of Edinburgh students. Recent studies in the UK and Ireland (Howard et al., 2021; Tomas & Jessop, 2019) report high levels of continuous summative assessment in university undergraduate programmes. Excessive coursework can be de-motivating and stressful. Some students may be strategic regarding submissions and concentrate on assessments worth a substantial portion of their total mark or they may end up handing in sub-standard work (Lizzio et al., 2002). Time pressure and assessment weighting may also tempt students to plagiarise (Koh et al., 2011), work towards the assignment with the nearest deadline or skip lectures to complete another subject's assignment.

There is great variety in the nature of coursework. Many pre-honours courses use weekly automated assessment to offer the large and diverse cohort frequent immediate feedback. Longer form coursework, which needs to be reviewed by an instructor, can promote and assess skills in a way which is not possible with automated assessment or in an invigilated exam. Laboratory work gives the opportunity to students to try on various experimental techniques, test a physical theory, analyse data and present a complete, reproducible written or oral account of an experiment and the conclusions. Instructors can see students' submissions and performance but have little insight in how students manage their study time.

There are three main reasons why this project is necessary at this time:

1. Subject evaluations contain questions about the workload of individual subjects, but no data exist about the perceived overall workload. This project will help us to conduct a systematic investigation of perceived student workload.
2. Curriculum transformation will bring new courses and redesign of current courses. An understanding of how students manage their time will help colleagues structure their courses to better enable students to engage as intended. This presents an opportunity to examine a programmatic approach to assessment (de Paor, 2021).
3. The new model of student support continues to become established. An analysis of student activity, reflections and academic outcomes will help in creating advice on optimal time management which can inform Academic Cohort Leads and Student Advisers as they evolve their approach.

## **Evaluation or Methodology:**

We will use a mix of quantitative and qualitative methods to address this project.

**Study diaries.** We will recruit undergraduate students from prehonours and honours years in Mathematics and Physics. Students will be asked to completed weekly timesheets reporting how much time they spent on activities in their various courses and write a short reflection on what they learned and what, if anything, they neglected to attend / complete.

We want to capture the views of Year 1 students as they have just made a big transition from secondary education to university. We pick Year 3 students, from students in their critical honours years, because they have more common core credits so data will come from a more consistent cohort. Student support will be given access to the reflective reports each week in case students raise issues where they could benefit from additional support.

**Surveys.** To supplement the assessment diaries, and gain responses from a greater number of students across Y1-5, we will conduct 2 surveys, one at the end of each semester.

**Lecturer interview.** We will collect information about the course organisers' course designs and expectations on how students are expected to engage. This will be used to compare how student engagement compares to the expectations.

**Learning outcomes.** Determine if there is any correlation between students' time spent on different activities and final course grade (as a proxy for learning). Does more time spent on summative assessments correlate to better or worse outcomes in courses with a large exam? Do students reach a saturation point on large summative assessments where there are little or no gains in marks for additional time spent?

### Project plan:

Date-date	Activity	Description of activity
Aug 2023	Create timesheet template	Consult literature to create a template of the timesheet to be used by student volunteers
Aug 2023	Ethics	Develop a human ethics application with PTAS team. Get approved before end of September
Sept 2023	Recruit student volunteers	Reach out to students in specific years and programmes to encourage participation in completing weekly timesheets.
Sept – Dec 2023	Support student volunteers	Work with student volunteers as they complete timesheets so they can find it a positive experience, refine timesheet template, if necessary, based on the experiences in the first several weeks.
Dec 2023	Student survey	Develop and deploy the first student survey
Dec 2023 – Jan 2024	Initial data analysis	Review data from timesheets and survey and share initial finding internally (SoM / SoPA) and develop timesheets further if appropriate
Jan 2024 – April 2024	Support student volunteers	Recruit additional volunteers if needed, Work with student volunteers as they complete timesheets so they can find it a positive experience.
April 2024	Student survey	Develop and deploy the second student survey
June 2024	Recruit RA	
June 2024 – July 2024	Data Analysis	Support RA in conducting lecturer interviews, data analysis and visualisation leading, in the first instance, to dissemination of results within the university
Aug 2024 (and beyond)	Communication	Communicate results and outputs outwith the university, including at conferences and in academic journals

### Project outcomes & impact:

By building a real-world picture of how our students manage their study time we hope to inform course design and approaches to student guidance. In particular, the evidence gathered will be made available to course organisers as they review their courses with a better understanding of the impact the design of their course has on their students, and how their course fits in a student's overall workload. The same data will be of interest to year organisers and programme leads.

Similarly, the data will inform the creation of local, evidence-based advice for students on how to effectively manage their study time. This will be shared with Student Advisers and Academic Cohort Leads for dissemination to students.

The analysis, though based in Maths and Physics, is likely to be applicable more generally.

### Sharing your project:

- A report to Course and Year Organisers about how their students have documented their time in response to course design.
- Summary of advice on study time management for use by students.

- Presentation of preliminary results at the national CETL-MSOR 2024 conference in September 2024.
- A report of our findings to be submitted in the Teaching Matters blog.
- Presentation of the results at the University of Edinburgh Learning and Teaching Conference 2024.
- Publish results in appropriate research journal such as MSOR Connections.

## References

- de Paor, C. (2021). Credit allocation and programmes design: Insights from metaphor. *Journal of Further and Higher Education*, 45 (6), 836–844. <https://doi.org/10.1080/0309877X.2020.1826033>
- Harland, T., McLean, A., Wass, R., Miller, E., & Sim, K. N. (2015). An assessment arms race and its fallout: High-stakes grading and the case for slow scholarship. *Assessment & Evaluation in Higher Education*, 40 (4), 528–541. <https://doi.org/10.1080/02602938.2014.931927>
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- Howard, E., Meehan, M., & Cox, T. (2021). An exploration of the impact that continuous, summative assessment has on how university mathematics students spend their study time. *Eighth Conference on Research in Mathematics Education in Ireland MEI 8*.
- Koh, H. P., Scully, G., & Woodliff, D. R. (2011). The impact of cumulative pressure on accounting students' propensity to commit plagiarism: An experimental approach. *Accounting & Finance*, 51 (4), 985–1005. <https://doi.org/https://doi.org/10.1111/j.1467-629X.2010.00381.x>
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- Tomas, C., & Jessop, T. (2019). Struggling and juggling: A comparison of student assessment loads across research and teaching-intensive universities. *Assessment & Evaluation in Higher Education*, 44 (1), 1–10. <https://doi.org/10.1080/02602938.2018.1463355>

# Budget

## Financial years:

The project will take place over two financial years:

Year 1: August 2023 to July 2024; year 2: August to September 2024.

## Budget items:

Item	Description	Cost
Staff time and buy-out	Salary buy out + employment costs for 4 team members. Scale appropriate to team members levels XX-XX, X hrs total (X hrs for Author, etc.)	£4097
Research assistant	Student research assistant (30 days summer 2024) at level XX	£3868
Volunteer incentives	Student volunteer incentives for timesheets and survey completing	£8500
Conference fees and associated travel	Conference attendance for two researchers for dissemination	£1000

## Total cost:

**£17,465**

## Budget justification:

Staff time – staff will be involved in most aspects of the project but principally:

Dr David Quinn: overall project management, and lead on reporting and dissemination.

Dr Konstantina Zerva: overseeing student diaries/timesheets (as not teaching any in the cohort).

Dr Ross Galloway and Dr John Loveday: coordinate involvement of colleagues and students from SoPA.

The student research assistant will contribute to the analysis and visualisation of the data from anonymised student timesheets, collection of course organiser design intentions and comparisons with data. They will be supported in developing the necessary data analysis skills and will gain an understanding of pedagogical design used in SoM and SoPA.

We aim to recruit students to volunteer their time to complete timesheets. To gain a reasonable sample we hope to get data from 10 students in each of two years on a programme from SoM and a programme from SoPA – this is a total of 40 students. To respect their time, and encourage their continued participation, we will offer each student volunteer a £100 incentive for a semester of data (total  $40 \times 2 \times £100 = £8000$ ).

We request a further £500 to incentivise participation in surveys, offered to all UG student in SoM and SoPA. There will a draw attached to each survey.

To disseminate our results nationally we request £1000 to support conference fee and associated travel and accommodation for two of the researchers on the project, this will be in Financial Year 2.

## **Project Team Expertise**

### **Dr David Quinn**

I joined the University of Edinburgh in 2015 and have been teaching engineering and mathematics students in higher education in Scotland since 2012. I achieved fellowship of Higher Education Academy in 2019. I am currently the organiser of four non-specialist mathematics courses offered by the School of Mathematics and contribute to the teaching and assessment of mathematics courses in years 2 and 5. I participate in the Student Staff Liaison Committee meetings in three Schools and there is a common theme of limited feedback from students but some reporting stress from excessive coursework.

### **Dr Konstantina Zerva**

I am Facilitator in Technology Enhanced Mathematical Education at the School of Mathematics since 2017. My leading role is to design and develop online assessments for the undergraduate Mathematics courses and give practical support to colleagues about the best use of e-assessment in their courses. Alongside this, I tutor several prehonours Mathematics courses. I have a growing interest in scholarship of learning and teaching and how technology and e-learning can be used to support learners and educators. I am also a Fellow of the Higher Education Academy.

### **Dr Ross Galloway**

I am a member of the Edinburgh Physics Education Research group (EdPER) and my research activity is related to the learning and teaching of physics. I have interests in a wide range of pedagogic research areas, including the development of student problem solving skills, diagnostic testing, Peer Instruction, and flipped classroom pedagogies. I am currently the Director of Teaching in the School of Physics and Astronomy.

### **Dr John Loveday**

I am Reader at the School of Physics and Astronomy working for Centre for Sciences and Extreme Conditions. I am course organiser of the Y3 course "Experimental Physics" laboratory. I am interested on students' attitudes and beliefs towards physical experiments.



## Equality Impact Statement

The Equality Act 2010 and the Equality Act 2010 (Specific Duties) (Scotland) Regulations 2012 are anti-discrimination laws relevant to the University and our work in equality, diversity, and inclusion (EDI). EDI is of strategic importance to the University of Edinburgh and should be embedded in all of our activities. As a result of the above legislation, the University has a statutory duty to assess the equality impact of all of its policies, practices and procedures, including the development of new projects and initiatives. Further information about Equality Impact Assessments (EqIA) can be found here: <https://www.ed.ac.uk/equality-diversity/about/reports/impact-assessment>

### Project Team:

In this project we bring together researchers from two different disciplines to address questions of common concern around the impact of coursework load on students' study behaviour. Each researcher has an experience in creating / delivering different kind of coursework (hand-ins, electronic automated assessments, lab work).

### Participation and involvement:

It is important to us that student volunteers represent the diversity present in our student body, and we offer a meaningful incentive to student volunteers to respect their contribution and to enable participation from students who may need to take part time work to support their studies. We will be flexible about the timing of when timesheets are submitted and take a supportive approach so volunteers can feel encouraged to continue. It will be made clear that data collected by timesheets and reflections will only be identifiable by one of the researchers who is not involved in teaching any of the students' courses, and to student support.

### Methods or Evaluation:

We will include participants in two stages of our research: the study diaries and the surveys.

For the study diaries, we will try to recruit an evenly spread-out group, if possible. We will advertise the project by emailing Y1 and Y3 undergraduate students and by asking the student support and cohort leads to promote it amongst their cohorts. Regarding the recruitment process, we will try to ensure that we have a balanced group of participants. In the recruitment form we will have the option to disclose information about gender, disability, belonging in an ethnic minority or coming into university from a widening participation scheme. These will be optional questions, and if people decide to answer them, these answers will help us to choose a more representative sample of participants. If the participants have any kind of disability that prevents them from writing a timesheet, they could send their answers in an alternative format (e.g. record on their phone and send an audio file). To ensure continuation of participation, we will monitor the weekly timesheets, and send an email to people who have not responded for 2 consecutive weeks, investigate why they do not participate (workload, personal issues) and asking if there is a way we can support them. Participants will have the right to withdraw.

For the surveys, we will email all Y 1-5 students asking them to participate and we will also ask the student support and cohort leads to promote them amongst their cohorts. The surveys will be anonymous, and the participants will have the opportunity to declare if they want their answers to be used as part of the research project.

### Sharing your findings:

To make sure that written material meets accessibility requirements we will consult the University guidelines whenever documents are to be made public. We will use Microsoft Word to prepare documents, keep text layout simple, use alt-text definitions for text and format headings so that can

screen readers can read the document. If converted to PDF we will use Adobe Acrobat to optimise accessibility.

## Confirmation of consultations

**Please tick the boxes to confirm that required consultations have taken place, and ensure the Principal Applicant signs underneath.**

I confirm that all named Co-applicants have seen the final version of this proposal and are willing to be named as Co-applicants

Please tick to confirm ✓

I confirm that I, the Principal Applicant, have consulted with all named support services or individuals named in this proposal as offering support and that those individuals have agreed to offer the support outlined in the proposal

Please tick to confirm ✓

I confirm that I, the Principal Applicant, have consulted with my local School finance and HR professionals gaining advice and recommendations on how to recruit staff (if appropriate) and manage PTAS project budgets and funds successfully

Please tick to confirm ✓

I confirm that the Head of School or Head of Service for the Principal Applicant has seen a final version of this proposal and supports the proposal

Please tick to confirm ✓

David Quinn  
Name of Principal Applicant

\_\_\_\_\_  
Signature

09/03/2023  
Date

**Please email one signed PDF copy of your entire proposal to [iad.teach@ed.ac.uk](mailto:iad.teach@ed.ac.uk)**