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Institute of Teaching and Learning

**PROF. DAVID M. SCHULTZ
DESIGNING CHEAT-
PROOF EXAMS TO
IMPROVE STUDENTS'
HIGHER-LEVEL
THINKING SKILLS**

ITL FELLOWSHIP 2021/22

**PROJECT
REPORT**

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ITL Fellow 2021/22

DAVID SCHULTZ

David Schultz is a Professor of Synoptic Meteorology within the Department of Earth and Environmental Sciences. He is the author of the award-winning *Eloquent Science: A Practical Guide to Becoming a Better Writer, Speaker, and Atmospheric Scientist* and has published over 180 peer-reviewed journal articles on meteorological research, weather forecasting, scientific publishing, and education. David is a Senior Fellow of the Higher Education Academy (SFHEA) and twice winner of a University Teaching Excellence Award.

Fellowship Student Partner Intern

CHIAMAKA ANOLIEFO

DESIGNING CHEAT-PROOF EXAMS TO IMPROVE STUDENTS' HIGHER-LEVEL THINKING SKILLS

ITL Fellowship project

My project aimed to address concerns around the security of online assessment, make our assessment questions more sophisticated and reflective of situations students will encounter in the workplace, and improve understanding of where collaboration becomes collusion.

Context

“How old is the Earth?” “Define homeostasis.” “Derive the wave equation.” This type of question reflects the foundational content in science and engineering modules, and lends itself to **assessment at scale** through multiple-choice assessment where marking is easier, if not completely automated. These questions, however, are also prone to cheating by students, especially in an online exam format: Students can quickly google the answers or exchange answers via messaging apps.

Assessment security aside, the ease of writing such questions often leads instructors to aim too low on Bloom’s taxonomy, resulting in students simply regurgitating information. Here, the risk is depriving students of the opportunity to **learn the material at a deeper, more conceptual level**, as well as confirmation for the students that assessments are a barrier to overcome, rather than an opportunity for learning, or reflective of tasks and challenges that they will face later in the workplace.

As I embarked on the project, it became clear that another significant issue affecting the security of online examinations is that the boundary between **collusion** (which is against university policies) and **collaboration** (which should be encouraged for learning and for some assessments) is often unclear to academics and students. It was on this issue in particular that my Student Partner Intern, Chiamaka, contributed, as outlined below.

My fellowship follows from my experience of these issues in courses that I have taught at the university, as well as my membership (representing the Faculty of Science and Engineering) of the University’s Contract Cheating Task and Finish Group during 2019/20. This was essential to learn more about contract cheating and what the university could do to minimize it, as well as to hear **student perspectives on cheating**.

Objectives of the Fellowship project

The overall goal of this fellowship was to develop training materials aimed at rethinking undergraduate final exams to incorporate higher-level skills in Bloom's taxonomy, with an eye toward also reducing the incidence of malpractice that results from questions whose answers are easily searchable on the web or facilitate collusion. The anticipated benefits of this fellowship were to:

- improve **the student experience** through improved assessment
- encourage students to visit higher-level thinking skills earlier in their university careers, even on assessments that would otherwise not encourage such skills (i.e., multiple-choice tests), helping to develop their independent learning and crucial reasoning skills, skills necessary for **employability**
- lessen the burden of academic **malpractice** hearings
- **develop** colleagues' skills to support sound assessment

Project activities

1. Disseminate the results through generalizable training materials, for staff across the university to implement

- I delivered an online training webinar "How to Design Cheat-Proof Multiple-Choice Exams to Improve Higher-Level Thinking Skills" via the university's Institute of Teaching and Learning (ITL) open workshops programme (29 April 2022)
- I created a short training video for staff, based on the above workshop, for use by staff across the university and beyond (see Output 1, below)

2. Develop resources for students (working with student partners) giving examples of what is or is not collusion and collaboration in different settings, to include a coversheet preparing students for online exams

- Chiamaka Anoliefo (student partner) and I assisted Jennie Blake (ITL Academic Lead for Student Success) with creating collusion/collaboration resources for students that can be incorporated into the Library's My Learning Essentials resources, for example (see Output 4, below)
 - I was interviewed for a piece on the TEA: Teach, Explore, Apply blog about collaboration in written assignments (See Output 2, below)
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Challenges faced

The biggest challenge was finding time. I received buyout, but somehow was unable to devote as much time as I would have liked to the fellowship. I should say that this difficulty was a limitation for many of my activities that academic year.

Student partnership

Chiamaka Anoliefo was my student partner. She writes:

"My role was to develop resources for students giving examples of what is or is not collusion versus group work in different settings, and to include a coversheet preparing students for online exams. As part of my fellowship I:

- Created a survey aimed at current students to get an idea of students' views on methods of assessments, and if there are any suggestions they have to improve their assessment experience here at The University of Manchester.

- Developed a resource highlighting the difference between collaboration and collusion. This resource also provided some tips on how to avoid collusion, with specific examples of situations where collaboration is ok and can be successful. (See Output 4, below)
- Attended a training session on how to develop smarter assessments, which helped inform the resource I developed for helping students avoid academic malpractice.

I also worked with Jennie Blake and the Library's team to develop some transition resources for offer holders.”

Collaborative work

In addition to the work outlined above with **Jennie Blake** (Head of T&L Development at The University of Manchester Library and ITL Academic Lead for Student Success) and **Chiamaka** on co-developing guidance on collusion versus collaboration, **Lisa McDonagh** and **Emma Sanders** (Teaching and Learning Advisers from the ITL) provided feedback on early drafts of the workshop slides, ‘collusion versus collaboration’ documents, and final report. **Sally Hickson** (ITL Fellow and Lecturer in Academic Development) also provided feedback on the workshop slides. These feedbacks were critical to tailoring the message and tone to a broader audience.

Outputs

Staff-facing resources

1. Workshop “How to Design Cheat-Proof Multiple-Choice Exams to Improve Higher-Level Thinking Skills”- delivered online, 29 April 2022
 - Powerpoint slide presentation “[How to Design Cheat-Proof Multiple-Choice Exams to Improve Higher-Level Thinking Skills](#)” (pdf)
 - Narrated training video (c. 13 minutes) “[How to Design Cheat-Proof Multiple-Choice Exams to Improve Higher-Level Thinking Skills](#)”
2. An interview with the ITL for the TEA: Teach, Explore, Apply blog expanding on the motivation and improvements associated with developing high quality multiple choice questions: [Designing Better Assessments through Innovative Testing Methodology](#) (20 January 2023)
3. A blog piece for [TEA: Teach, Explore, Apply](#) discussing the benefits and boundaries of collaboration in written assessments, supplemented by 4. a two-page document “Collusion vs Collaboration for Academics: Written Assignments” with examples of how to encourage students to take a more collaborative approach to their learning.

Student-facing resources

Chiamaka used her lived experience as a student to help craft the messaging and materials intended for students around collusion, collaboration and academic integrity. Her work influenced the approach taken by other parts of the University, including the Library’s My Learning Essentials, on academic writing. This included producing a set of slides for students:

5. [What is collusion? A guide for students](#)” (pdf)
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Impact

The “Designing Cheat-Proof Multiple-Choice Exams” online training webinar attracted 30 participants, which was above average for ITL online workshops (especially one on a Friday afternoon)! There were lots of good questions and the session was described by attendees as really helpful, interesting and supportive; it showed that others were experiencing the same frustrations, and provided a welcome opportunity for discussion. There was a desire to have more training and webinars on writing questions for exams, which was a really positive outcome.

“What a great session that was! You’ve started a new movement! I hope you won’t mind coming back to do the “let’s workshop some questions” element?” –
Workshop participant

Reflection

There never seems to be enough time to do all that was intended. But, I received great assistance from others who have helped promote the work that I was doing. I believe with further help from the ITL and the Faculty there is the potential to reach a wider audience.

Next steps

I would like to continue to work on both strands of this project.

- I will deliver a follow-up session under the ITL Open Workshops programme in Spring 2023, focusing specifically on crafting better multiple-choice-type questions and allowing colleagues to workshop their own ideas, which will have a direct influence on this type of online assessment across the institution.

- Promotion of the project content on promoting collaboration while guarding against collusion by means of a piece for the ITL blog, TEA: Teach, Explore, Apply.
- I would like to work with Discipline Heads of Education in the Faculty and other leaders to identify candidate undergraduate courses exhibiting best practice. I would like to tell those case studies via videos and how-to guides.
- I would like to develop further videos and supporting documentation that show how to develop cheat-proof exams to test student higher-level thinking skills in different contexts (e.g. essay questions, traditional literature reviews).
- I would also like to continue to work with the Institute of Teaching and Learning on issues of cheating, collusion, and collaboration. I believe academics – who have often not reflected on ways to involve collaboration in their courses (outside of group projects) – would benefit from being shown how to encourage collaboration in their courses.

Prof. David Schultz

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