Advancing digital exams: evaluating a BYOD digital assessment pilot

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Context and Rationale

Secure, invigilated, closed-book exams remain essential for academic integrity.

Handwritten exams present challenges: illegibility, logistics, sustainability.

Secure digital assessments provide an authentic alternative.

Handwritten vs. Digital Exams

Challenges of Handwritten Exams:

- Difficulty reading handwriting.
- Logistical burden - printing, transport, storage, distribution, storage, security.
- Inclusivity and accessibility.
- Inauthentic in digital age.
- Environmentally unsustainable and resource-intensive

Benefits of Digital Exams:

- Typed text clearer and easier to mark.
- Streamlined workflows for marking and moderation. Improved analytics and feedback mechanisms.
- Inclusivity - better accessibility tools and options.
- Students prefer typing/editing over handwriting – more authentic.
- Reduced administrative and environmental burden

Why Trial a Secure Digital Exam in the School of Biological Sciences?

Post-COVID: Return to in-person exams + rising AI concerns.

Desire to retain digital exam benefits with secure conditions.

Cadmus + Respondus Lockdown Browser = controlled, authentic format.

Pilot explores operational feasibility, student experience and performance.

Cadmus

Digital-first platform for written assessments.

Integration with **Respondus LockDown Browser** enabling use of **students' own devices**.

Used at Manchester for coursework and remote digital exams since 2022.

Reduces **logistical burden**: no file uploads or printed scripts.

Streamlined student experience: instructions, writing space, resources all in one place, cloud-based auto-save, auto-submission, timer.

Instructor tools: real-time analytics, word count control, marking groups, provision of extra time

Supports accessibility: compatible with screen readers, keyboard navigation, scalable fonts.

Bring Your Own Device (BYOD) Exam Pilot

BIOL21432 Animal Behaviour

Medium sized unit (100-120 students)

Cadmus used for coursework assignment

Simple exam format (1 essay from choice of 4 questions)

90-minute exam (+ extra time)

Cadmus Exam with LockDown Browser

EXAM DETAILS

Exam start	Thursday 31st August 2023 at 12:00 AM GMT+1
Reading time	10 minutes
Writing time	60 minutes
Exam end	Thursday 31st August 2023 at 1:10 AM GMT+1
Auto submission	Students' work will be auto submitted at the end of the exam

Additional settings not visible to students

Marking Tool	Turnitin Feedback Studio
Points	The assessment is out of 100 points

Set requirements, grading options and settings

RESOURCES

CASE STUDY - Question 3
PDF · 41.04KB

Attach from computer Link to website

TASK

Purpose 🎯

As you prepare to work in your chosen field, it is important that you know how to apply the concepts you have learnt at university to solve real-world problems. Through this *Take Home Exam* you will **evaluate information**, **apply** the concepts you have learned, and demonstrate your **problem-solving skills**.

Problem-Based Questions 📝

Question 1

Here is the code for a Supply plot we created in tutorials using R. How would you alter the code to suit the supply equation: $S = \ln(p) - 20$? Plot the graph of this curve in R and include it as an image.

JavaScript

```
supply(ncurves = 1,            # Number of supply curves to be plotted
       type = "line",          # Type of the curve ("line" or "convex")
       x = c(3, 5, 6),         # Y-axis values where to create intersections
       linecol = 4,            # Color of the curves
       generic = TRUE,         # Intersection labels are in a generic form
       main = "Supply curve")  # Title of the plot
```

Student Preparation

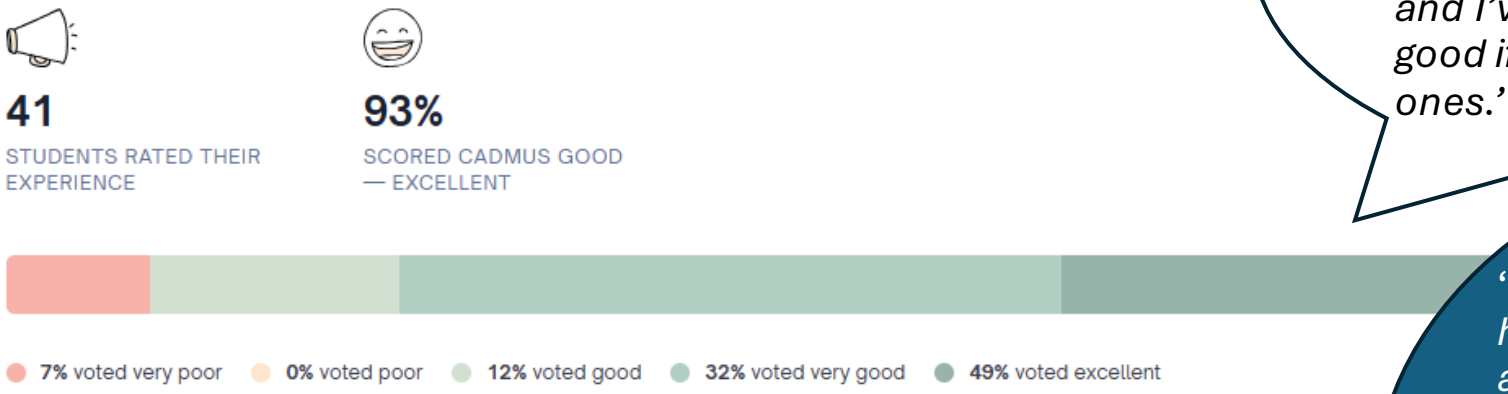
Early comms, device survey, Padlet for questions

Guidance on Cadmus, practice exam, exam prep session

Device survey, option to borrow UoM laptops, compatibility advice

In-room setup time, backup laptops, invigilator tech support

Student Experience



'I was worried typing with computer before the exam, as I usually uses pen and paper. However the experience was surprisingly good and smooth, and I've been able to perform just as good if not better than hand written ones.'

'byod was a much better alternative to handwriting. i didnt have to worry about legibility, so i could write quicker and more efficiently as well as being able to edit my work. in handwritten exams i rarely edit my work because im too worried about losing marks for legibility. overall 10/10 much preferred, and i left the exam feeling more confident'

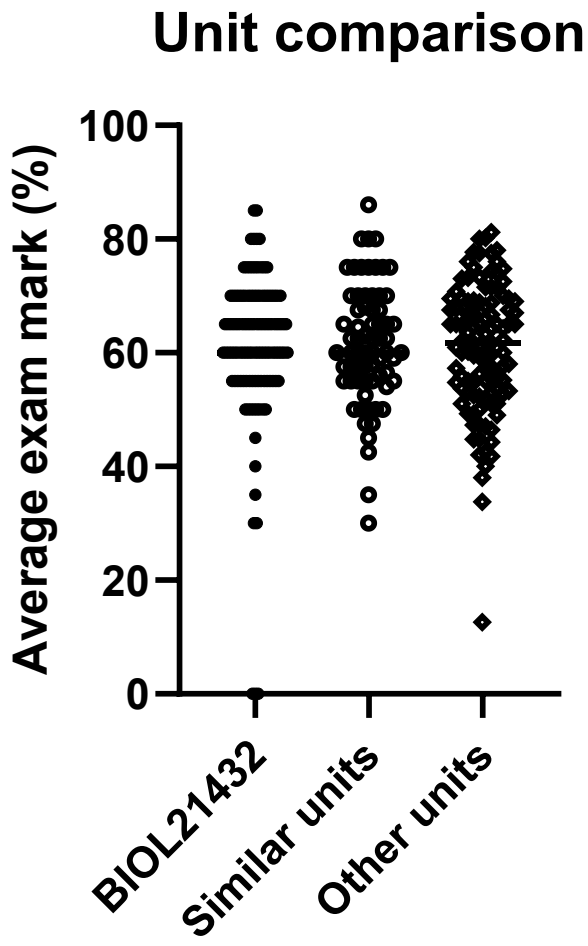
93% pre-exam support good/ very good
82% Cadmus usability good/ very good
74% Prefer BYOD to handwritten exams

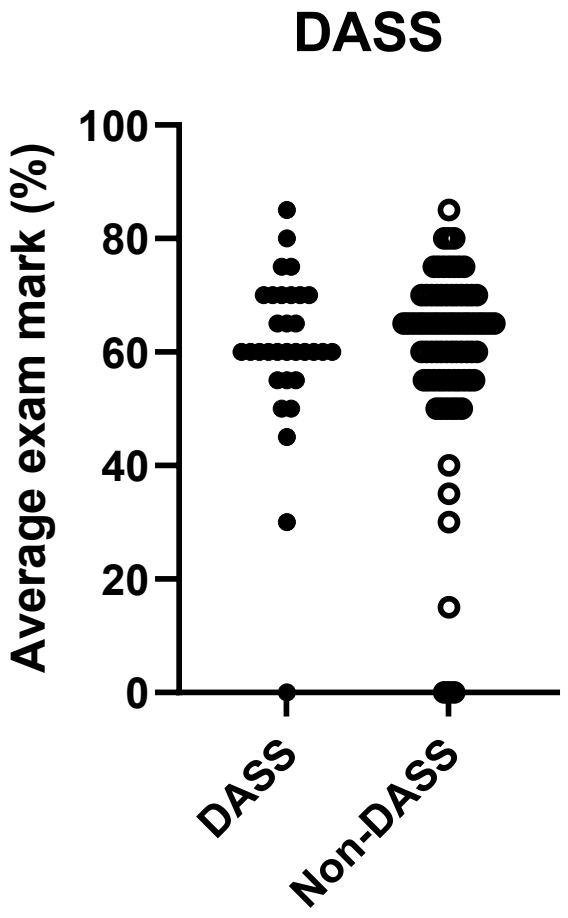
Typing helped with speed and editing

One reported struggle with focus as it '*felt less like a real exam*'

Importance of device quality noted

Student Performance in BYOD Exam



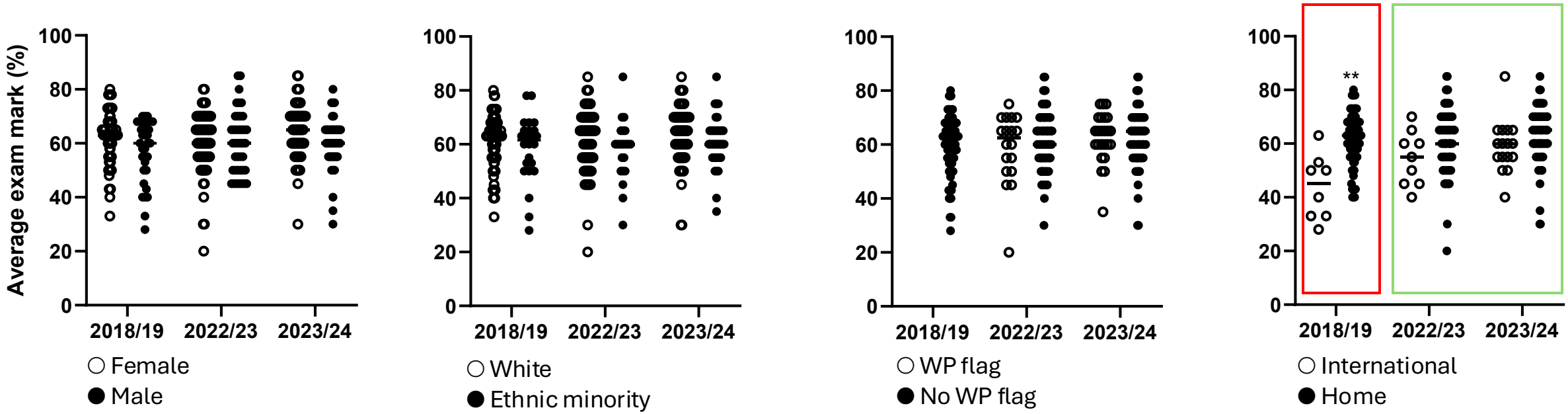


No differences in average exam mark between BIOL21342 vs. similar units or vs. all other lecture units

No differences in average exam mark for DASS registered students

Student Performance in Handwritten vs. Digital Exams

2018/19 – Handwritten
2022/23 – Remote digital
2023/24 – On campus BYOD digital



Whole cohort average exam mark not significantly different
No differences in average exam mark depending on gender, WP flag and ethnicity in any year
Significant difference between home and international students ($p<0.0005$) in 18/19, but not in 22/23 or 23/24

Staff Perspectives

- Easier marking, moderation and provision of feedback
- Benefits of Cadmus, including analytics
- Better sustainability
- Important to address DASS provisions and student device concerns
- Limitations of Cadmus – diagrams, equations
- Admin heavy – School A&P team, e-learning

Key Conclusions and Future Directions

- Strong student preference for digital exams
- No attainment gaps across student groups - DASS status, gender, WP flag, ethnicity, fee status
- Collaboration, early comms and student preparation critical to success
- Requires backup devices, robust local infrastructure and planning
- Scalability depends on centralised support and resourcing

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