



**Flexible
Assessment
with Integrity**

CASE STUDY

University of Bath

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Introduction

About this document

The purpose of this document is to document Inspera's capabilities in delivering digital examinations software and support for Higher Education institutions as well as exemplifying how universities approach the implementation of digital examinations across the institution.

Who should use this document?

This document should be used by:

- Sales at Inspera
- Customers

Summary of change

This section records the history of significant changes to this document. Only the most significant changes are described here.

Version	Date	Author	Description of change
0.1	19.09.2019	Anja Sisarica	Initial release
0.2	30.09.2019	Anja Sisarica	Implemented suggestions in review
1.0	04.10.2019	Rowan Cranwell, Donald Lancaster	Approval by the University of Bath

Where significant changes are made to this document, the version number will be incremented by 1.0. Where changes are made for clarity and reading ease only and no change is made to the meaning or intention of this document, the version number will be increased by 0.1.

1 About the University of Bath

The University of Bath, founded in 1966, is nationally and internationally recognised for its reputation in research and teaching excellence (ranked 6th in the UK by The Guardian University Guide 2020 and in the top 300 universities by THE World University Rankings 2020; awarded Gold in TEF 2017). There are over 18 000 students enrolled in its graduate and post-graduate programs, 30% of which are international students, representing 130 nationalities. The university employs over 5 000 faculty staff, across four faculties: Faculty of Engineering & Design; School of Management; Faculty of Humanities & Social Sciences and Faculty of Science. The University of Bath is renowned for its strengths in the fields of engineering, mathematics, and technology, and in recent years, also in management, humanities and architecture. Furthermore, the university has nurtured strong connections with the relevant industries, and their alumni are among the most in-demand professionals.

In order to assist and encourage faculty staff to deliver teaching excellence, the University of Bath established Centre for Learning & Teaching (CLT). Within that unit operates a dedicated Technology Enhanced Learning (TEL) team, who support staff in making the most out of educational technology. The team selects and provides the right training and tools to the faculty staff and students, with an aim to enhance learning and innovate teaching. To that end, one of the initiatives, promoted by the TEL team is the introduction of digital examinations at the University of Bath.



Left: The university's main campus, Claverton Down, in Bath, United Kingdom; right: one of the classrooms equipped for Bring-Your-Own-Device (BYOD) exams in Inspera Assessment in May 2019.

The successful collaboration with Inspera began in December 2017 as a trial at the School of Management and was then followed by one year digital assessment pilot in 2019. For the purpose of reporting on that experience in this case study, we interviewed Rowan Cranwell, Solutions and Projects Manager at CLT; and Dr Donald Lancaster, Teaching Fellow in Marketing and Director of Studies for Executive MBA at Bath University's School of Management. Both Cranwell and Lancaster have been digital examination champions from the start, supporting internal stakeholders from their administrative and academic perspectives, respectively.

2 Motivation & objectives

The University of Bath started considering digital examinations solutions in 2016, when it was awarded funding for this purpose under the COBWEB scheme, under the leadership of Prof Andrew Heath. While some testing was completed previously using MCQ quizzes within the VLE (Moodle), it was determined that there was a need to utilise the funding to trial a more robust, efficient purpose-built solution for the high-stakes, large-scale examination conditions, in order to understand the future considerations for scaling the initiative. Inspera Assessment was the chosen provider for the first trial in December 2017.

The first trial involved 70 masters students at the School of Management and took form as an essay-based formative exam, with Bring-Your-Own-Device (BYOD) mode of delivery. Students were given an option to choose whether they want to hand in their exam digitally or on paper, with 70% opting in for the digital exam. Lancaster as the course leader of this exam reflects: *“From an academic’s perspective, my marking was much quicker with digital exams, so I was satisfied. Some students didn’t want to do it online simply because they were nervous. Talking to them afterwards to get informal feedback, all of the students who did it online, reported great satisfaction. All of the students who didn’t do it online, later said they wish they had done it. That is really interesting, when you think about it.”*

Following the success of that first trial, the collaboration between the University of Bath and Inspera continued as a one-year project in 2018/19. The overall aim of the project was to trial and evaluate the digital examination solution across different University departments, including the support requirements, user experience and the capabilities of technology, in a variety of examination conditions. The VLE and SIS integrations were considered out of scope of this pilot. However, SSO (single sign-on) integration was enabled. Student participation was voluntary and included students with learning support needs.

The pilot project tested the new processes required and investigated how the logistics of digital examinations fit with the University of Bath’s requirements across a range of areas, such as user experience and preferences, technology (software and hardware), support and training as well as policy issues. To achieve the overall aim of the project, the objectives were set out as below:

- Testing the system in terms of **coping with larger student cohorts**;
- Testing **different modes of delivery infrastructure** (BYOD; on-site; home exams);
- Testing the **impact of various different question types on authoring, marking and student experience**;
- Testing different modes of access to online resources (**closed book, open book**);
- Testing online exams in **formative and summative assessment scenarios**;
- Testing online exams **across different faculties and in a variety of subjects**, on both graduate and postgraduate levels.

- Testing the possibilities of the **hybrid digital solution with scanning** papers (Inspera Scan).

The main purpose of the one-year trial was to investigate whether e-examinations would bring any of the below key benefits for students, academics and the administration.

Benefits for Students:

- Aligning exam conditions with the everyday conditions students face in the classroom (e.g. submitting coursework in the VLE, taking notes) and later in the workplace;
- More accessibility for students with learning support needs

Benefits for Academics:

- Increasing marking efficiency;
- Improving fairness of the assessment, by removing the bias caused by the students' illegible handwriting.

Benefits for Administration:

- More time-efficient operations;
- More cost-effective operations.

3 Planning and development

The planning and development phase took place between February and October 2018, and it required efforts in communication, coordination, and stakeholder management. These efforts were principally led by Cranwell from the TEL team, who explains: *"We recognised the importance of planning and development prior to the trial going live, and we needed to secure a buy-in from all stakeholders. People are not necessarily willing to try something new before they see it works, and therefore some time investment is needed in communications in the beginning"*. In addition to students, in total 36 stakeholders were identified across Computing Services (Networks, Security, Applications, Procurement); Registry & Exams Office; Faculties (Academic and Professional Services) Students' Union and CTL.

Inspera supported these efforts by: allocating a dedicated Account Manager; providing access to an online Service Desk and training materials; providing on-site training; introducing University of Bath's team to its Strategic User Forum in Higher Education, in other words a community of peers.

The following activities were part of the preparations for the exam day:

- Manual data transfer from SIS to CSV files, which were then imported to Inspera Assessment;
- Preparing backup paper copies of fully digital exams, testing Scantron option, and the paper alternative;

- Training the TEL team;
- Consultations with the Registry and Students' Union;
- Infrastructure preparations (wifi check, Safe Exam Browser (SEB) installation on on-site devices);
- Training and online monitoring trials for exam invigilators;
- Preparing students with: 4 laptop clinics; 3 mock online exams; 2 lectures to introduce students to the platform;
- Student survey prior to the exam via VLE (Moodle) to gather information about their preparedness and preferences.

The survey showed that most students were familiar with connecting their own device to university's Eduroam wifi (93% responded positively); that the majority own Mac devices (67%) whereas only a third had Windows devices (33%); and that, while the majority of students' devices had battery that would last more than 3 hours, there was still a significant number of students, who were worried that they'd need to depend on university's power infrastructure. In response to the survey results, the following actions were taken:

- Power extenders were placed at every candidate seat;
- On-site PC room was prepared as an alternative to BYOD, if needed on the exam day;
- Computer Services and TEL teams were on standby;
- Additional network checks were made;
- Additional mock online exam trials were conducted.

Your online exam - resources to read / tasks to do beforehand

Online Exam Drop - in sessions.

These sessions are to address any problems with Safe Exam Browser, or familiarity with the software. They are not intended to take you through the content of the exam itself.

Thursday 2nd May 2019, 12:15 - 13:05, BW 2.21
 Tuesday, 4th May, 09:15 - 10:05, BW 2.21
 Wednesday, 8th May, 12:15 - 13:05, BW 2.21
 Thursday 9th May, 11:15 - 12:05, BW 2.11

Information for candidates - this document contains important notes

Inspera - Online Exam System link - opens in a new window

Safe Exam Browser download link - required for the exam - opens in new window

(Please do not run SEB as you would other programs, once downloaded, it needs to be run from within Inspira.

1. Log in to <https://web.inspera.com>
2. Locate the test and access it
3. Launch Safe Exam Browser when prompted

Please find more information in the 'Information for candidates' sheet above.

18/04/2019 update:

Another test set has been released on the online exam platform.

*Management Demonstration 2019 is now available. If you don't press the submission, you will be able to review the 'test' and get used to opening safe exam browser a number of times, you can find instructions for Safe Exam Browser / Candidates above.

In preparation for the exam day, students were sent links to resources and How-to guides, and invited to mock online exam trials and laptop clinics, organised by the TEL team.

4 Implementation

The following exams were conducted within this pilot project, where the rows in darker grey represent summative assessments, and in lighter grey, formative assessments:

Subject area	Date	Student numbers	Onsite / Offsite
Management	January 2018	70 (70% Online)	Onsite - 2 rooms
Electrical Engineering	October 2018	6	Onsite – PC Room
Chemical Engineering	October 2018	140	Onsite – PC Room
Biology & Biochemistry	November 2018	182	Offsite – 3 Assessments
Exercise Science	December 2018	68	Offsite – 2 Assessments
Biology & Biochemistry	January 2019	268	Onsite – PC Rooms
Electrical Engineering	April 2019	15	Onsite – PC Room
Management	May 2019	193	Onsite – PC Room, 5 BYOD Rooms

The exam with the largest cohort in the trial was again affiliated with Lancaster’s teaching, assessing first-year bachelor students in *Principles of Marketing*. The course was chosen for the pilot because of its wide scope, making it suitable for experimenting with the various question types, beyond the usual essay response. The question types used included multiple choice, multiple response, drag-n-drop, missing words, click select, graphic gap match, graphic text entry, and text area.

Students had a choice of how they wanted to take the exam: 129 opted for fully digital exam, 60 opted for a hybrid solution where one part was handed in either for scanning (e.g. drawing as an attachment) or as written essay answers (50% of the exam was essay-based). The rest delivered fully digitally. Only 2 students decided to submit fully on paper due to their typing speed concerns. Scanning in Scantron solution performed well, and took about 15 minutes of administrator’s time for the entire exam, with only about 10% of the sketch sheets needing some manual adjustment (e.g. codes not shaded correctly). The exam was delivered in 6 locations, each with two invigilators, and a support member of staff (TEL or Computing Services) to make sure invigilators could quickly react to any potential incidents, and to respond to student questions.

The exams in the pilot were conducted without incidents, and “overall, it was a very positive experience”, reports Lancaster. Cranwell agrees, and adds: “The majority of students with special needs and learning disabilities said they much preferred digital exams to pen and paper”. Even though there was no formal evaluation of the student experience, they believe that the targeted benefits were felt among all of the relevant stakeholders, and hence learning objectives of the pilot were achieved.

5 Reflections & lessons learned

Stakeholders at the University of Bath are satisfied with the outcomes of this pilot project, as it has confirmed the value of digital examinations, and met the key objectives in the form of numerous insights that emerged from the hands-on experience. As Lancaster reflects: *“Philosophically, everybody appreciates that this is the way the world is going, and that there are many advantages of the system: in security, in authoring, in lower paper and production costs or costs to the environment, and with very few disadvantages. We recognised the potential from the beginning, but actually going through the motions ourselves gives us a clearer idea of what is needed going forward. Now we must take stock of what we’ve got, what we need to do, and how to best position ourselves if we want this to work on a larger scale.”*

Furthermore, teamwork was considered another important factor in the success, as Cranwell reflects. *“I relied on a lot of good will, and it is a brilliant community”*, she says, and feels positively inspired by the resulting collaborations and cross-functional exchanges she initiated at the university.

Some key lessons learned from the administrative perspective

- SSO integration improved efficiency;
- Some students preferred this service to Moodle (VLE);
- Reliable, robust, easy-to-use system;
- Extra time allocation, pausing, and messaging were very useful on the exam day;
- More integrations are needed to optimise efficiency, especially with SIS;
- Challenges of physical requirements to rooms when scheduling digital exams;
- Challenges with infrastructure (e.g. power, hardware);
- More planning is needed to understand how this will work on scale;
- There are more common workflows across faculties than people may realise, and digital exams present opportunities for better synchronisation of administrative processes.

Some key lessons learned from the academic perspective

- In order to make the most out of the pedagogical benefits of digital exams, it is important for the academic staff to take time to learn the system and get comfortable with using it;
- Administering a proper trial of the semi-final paper through to marking would be a real help in spotting traps and improvements;
- There were some concerns about negative marking and the visibility of this setting to students during the exam;
- Grading scale needs to be normalised in multiple-part tests in authoring, so that the reporting of grades can be done according to standard formats.

- When students are given the option to choose the mode of delivery, two or more modes need to run in parallel. That impacts exam author's choices, because not all digital questions can easily transfer to paper, and are not designed to.
- It is worth exploring multimedia and attachment options in question design, as that could add to the assessment's authenticity (e.g. case studies, videos).
- Different question types could be particularly suitable for different subject areas (e.g. MCQ and essay for Law; equation question type for Accountancy; advanced essay for Strategy and Entrepreneurship).

6 Future work

The University of Bath is among the pioneers in digital assessment practice in the UK Higher Education. In order to grow the community of peers, and disseminate the knowledge gained in the project with Inspera Assessment, the university hosted its first Digital Examinations Forum (DEF) in June 2019¹. The forum gathered over 100 academics from the UK and abroad to discuss recent advances in the field and share best practices on how to innovate with digital assessment. Due to the success of the event and positive feedback received, the university plans to continue with this initiative. The collaboration with Inspera will continue in the future as well. *"Eventually, digital exams will become a norm. I think it will happen, the only question is when."*, as Lancaster concludes.

¹ <https://www.bath.ac.uk/events/digital-examinations-forum-2019/>