Internal Periodic Review
Year on response report

Internal Periodic Review of: Data Science, Technology and Innovation programme
Date of review: 22 & 23 March 2022
Date of 14 week response: 16 September 2022
Date of year on response: 16 June 2023

The School/Subject Area is responsible for reporting on progress with all recommendations, including those remitted to other areas of the University for action.
 If any recommendation has been fully addressed please record the action taken and date completed.   Any barriers to progress should be highlighted on this report.

Recommendation no	Recommendation	Timescale for completion	Comment on progress towards completion and/or identify barriers to completion	Completion date
1	**Business model** The review team **recommends** that the Bayes Executive Team look at ways resourcing can be related to capacity in considering appropriate business models. The Bayes Executive Team should consider how revenues can be related more clearly to costs and expenditure and capacity (academic and professional support staff).	Jun 23	The Bayes Executive have reviewed the current resourcing model and concluded that it remains sufficient at this time. It is monitoring proposed updates to the resourcing model within the University and will continually review the business planning as required.	May 23
2.1	The review team **recommends** that the programme team considers providing more guidance and signposting through the curriculum to address this. This could also involve creating distinctive pathways by selection from specified bundling of options.	Sep 22	We have compiled a list of six possible pathways through the programme. We shared this with students during a Course Choices online session which ran for the first time in August 2022. The six suggested pathways were presented to the Programme Oversight Committee in August 2022 where the overall structure was approved. Following this some members indicated they would like further opportunity to consider the pathways in more detail, further work was done, and feedback was collected before the document was finalised in April 2023. The document will be reviewed annually to ensure it remains up-to-date. Further work is planned to use data on previous students' routes through the programme in order to inform future updates.

The Bayes Communications and Marketing team have produced a webpage showcasing the various suggested pathways through the programme which will be published for the benefit of prospective students by September 2023. Additionally, we are in the process of producing promotional material to share at conferences and student Open Days. These materials will outline the different | Sep 22 |

				pathways while still highlighting the flexible nature of the programme.	
2.2	The review team **recommends** the programme undertakes an ELDeR (Edinburgh Learning Design Roadmap) workshop to help in reviewing the curriculum and considering pathways through the curriculum.	Jul 23		An ELDeR has been scheduled for 11th and 12th July 2023, with academic representatives from each College and a student representative in attendance.	Jul 23
2.3	The review team **recommends** that the programme team offer data science ethics education to all students.	Aug 23		We added two new courses to the 22/23 DPT: "Data Ethics in Health and Social Care and Data Security and Protection in Health and Social Care. These courses are relevant to people working in fields outwith Health and Social Care and are available to all students on the programme. There were 13 and 14 enrolments respectively from the programme. We recognise that there are broader ethics considerations that are not necessarily all covered by these courses. We still plan to incorporate some additional ethics material in the compulsory Practical Introduction to Data Science course (possibly taking material from the existing Data Ethics, AI and Responsible Innovation MOOC). In practice, this material will not be fully incorporated until the 2023/24 run of the course, so in the meantime we have signposted the existing MOOC to our students as an optional additional component to their programme. If, during the ELDeR, it is decided that a larger ethics component is required, we will consider adding this to the programme.	Aug 22
2.4	The review team **recommends** that the programme consider new options for advanced data science courses for data scientists who want to enhance their existing skills.	Sep 24		Discussions have taken place with the School of Informatics in relation to additional advanced courses becoming available to DSTI from the School. The School of Informatics have indicated that they plan to introduce a new online course *Frontiers in Informatics* (or similar) which will address key topics that students have expressed an interest in, such as the recent explosion in the use of transformer models in tools like ChatGPT. Internal plans for the delivery of this course are still at an early stage, but it is hoped that it could be launched in time for the 2023/24 academic year. We have considered input from students during Cohort Workshops and in informal discussions with the Programme Director and have concluded that for *most* students, it is more important for the	

			programme to include courses like this, that would discuss and explain multiple advanced topics at a more general (but still postgraduate) level rather than including more advanced technical courses (such as some of those already offered to on-campus Informatics Data Science students) which would require more significant prerequisites in terms of a formal Computer Science or Informatics background. Having said this, there appears to be a smaller number of students who are interested in (and who would have the background to thrive in) more technically advanced courses. This is one of the topics that we will look at the ELDeR in order to ascertain whether there remains additional scope for broadening the course offering in this area over time. In terms of future outlook, there are also plans for EPCC to launch a new course in Machine Learning at Scale which would be more technical and could allow students to build on learning from Introductory Applied Machine Learning. This course is expected to launch on-campus in 2023/24 but it is expected that this course will also be offered online from 2024/25.	
3.1	The review team **recommends** that the programme find ways to analyse existing student data, (some of which is currently hard to interrogate) and develop key performance indicators (KPIs).	Mar 24	We have established a number of reports to support both the administrative management of the programme and the student journey e.g. students taking courses not specifically listed on the DPT, students taking a dissertation preparation course, students enrolled on a dissertation course. For the current session, we also have a report of all fully matriculated and interrupted students, and a report of all course enrolments, with credits, to measure student numbers in different ways. We know from the interrogation of historic and current course enrolment data (to create programme pathways) that most students select courses from a variety of Schools to create a multidisciplinary programme for themselves, but we also feel that the ability of students to choose courses from a smaller pool of Schools in line with their interests and ambitions is also a strength of the programme. We have not made progress on the recommendation to develop KPIs or review non-completion or 'drop-out' rates for the reasons outlined below. We also note that we consider the ability of	

			students to move from one programme stream to another, and to exit early with an alternative award if they choose to do so, a valuable feature for students, and therefore we would be unlikely to place importance on non-completion or 'drop-out' rates during decision-making. There is possibly scope to learn more about students' behaviour here, however, so we *will* look at ways that this can be monitored. We are keen, however, to avoid a situation where we set a KPI that does not capture the potential benefits for a student in being able to leave the programme earlier than originally planned. The main barriers to progress are lack of expertise in SAP BusinessObjects within the programme team (there has been no resource available within the wider Bayes Centre team to support this), and the absence of any centrally-provided training in this software. Competing priorities in relation to other areas of work for the programme have also delayed progress. To determine what we would want to measure and track here in more detail (and thus set specific KPIs) we feel that we need to spend more time analysing what data is *readily* available from central reporting teams so that it can be tracked with sufficiently low administrative overhead. We have considered the kind of things that we might want to look at (for example, how course choice relates to attainment, how entry qualifications/experience relate to attainment, and how course choice relates to student satisfaction). Our approach in the immediate future is first to continue to look for ways to support existing professional services staff to obtain and process relevant data, and then to undertake exploratory data analysis to obtain baseline information on which to base KPIs in future.	
3.2	The review team **recommends** that the programme team analyses available course data to help in understanding the student experience.	Dec 23	Historic and current course enrolment data has been interrogated to create six programme pathways to support student course choices. We have not been able to compare course outcomes for DSTI students with those of other students on other programmes taking the same courses. The main barriers to progress are lack of expertise in SAP BusinessObjects within the programme team (there has been no resource available within the wider Bayes	

		Centre team to support this), and the absence of any centrally-provided training in this software. Competing priorities for other areas of work in relation to the programme have also delayed progress.	
3.3	The review team **recommends** that the programme set KPIs on Equality Diversity and Inclusion and establish means to analyse data.	Mar 24	The Programme Director met with the CSE Dean of Systematic Inclusion who advised starting with KPIs relating to age, gender, ethnicity and disability. We have met with colleagues from the School of Informatics working on an Athena Swan submission to discuss best practice in this area, and with the Head of Student Insights, Analytics and Modelling in Registry Services to discuss centrally-held data that might assist with either benchmarking and/or monitoring. Finally, we have reviewed publicly-available HESA data on gender ratios across various subject areas to start to establish appropriate benchmarks for this category. We recognise the importance of EDI and we want to make sure that any KPIs we set in this area are meaningful and useful. One of the issues raised in discussion with the parties mentioned above is the issue of small datasets. Although our programme is now of a reasonable size, population and sample sizes are considerably smaller than those of full Schools and Colleges where these indicators are often tracked. The main barriers to progress are a lack of expertise in SAP BusinessObjects within the programme team (there has been no resource available to support this elsewhere in the Bayes Centre), and the absence of any centrally-provided training in this software. As a multidisciplinary programme with multiple routes through the course offerings, it is not easy to establish appropriate benchmarks for DSTI because the HESA benchmarking data (at least in relation to gender) varies quite considerably by subject area and the fact that Data Science is very interdisciplinary makes it harder to determine what subject areas to benchmark ourselves against. We are aware that Strategic Planning are currently consulting on this, and it would seem prudent to wait until this work is complete so that we can align plans in order to minimise duplication of effort, given the very complex and time-consuming nature of the task. While we await the outcome of this work, we will continue to explore what data can be extracted from central student systems to support the establishment of KPIs. We will also consider other	

			approaches (such as more open-ended questions to students in questionnaires) to monitor our students' perceptions of the extent to which they feel supported (or discriminated against) on the programme as a result of their ethnicity, gender or any other relevant characteristic.	
4	**Student Support** The review team **recommends** that the programme considers developing the DSTI portal to be more integrated.	Sep 23	All students were surveyed via an MS Form to try to better understand where they feel improvements could be made to the current DSTI programme Learn site and the DSTI MS Teams channel. The feedback collected helped to identify key areas of improvement, with students suggesting simplification of the programme Learn site and some clear navigational guidance. Additionally, students recommended using the forum section on Learn in addition to the discussion board on MS Teams to facilitate easier interactions among the cohort. Students expressed satisfaction with the use of MS Teams by the programme team but asked for further integration with the programme Learn site - unfortunately this does not appear possible due to systems limitations. Students are happy with the frequency and content of emails sent via the mailing list but again expressed the need for improved integration across all communication platforms. The programme team has initiated a project to revamp the programme Learn site, incorporating all feedback received, and we will seek input from the Staff Student Liaison Committee regarding any proposed changes. The main barrier to progress is the integration of MS Teams with other platforms since this is an institutional systems issue outwith our control, but we will raise this as an issue with Information Systems and ask them to advise on a practical solution. We aim to implement changes to the Learn site and any feasible integration with Teams by the start of the 23/24 session.	
5	**Dissertation** The review team **recommends** that the programme team consider how more (dissertation) support can be provided. There may be potential for a series of pathways to help identify which courses are relevant to the dissertation.	Review by 2022-12	This remains ongoing work. To date, we have taken the following steps: - We have made changes to our processes for allocation of dissertation School, so that we have more visibility of the School that each student will take their dissertation in. We hope that this will help both in terms of planning for the contributing Schools, and to make sure that our	

			- programme team and the students have a common understanding of students' plans - We are hoping to hold an additional dissertation workshop in addition to the annual workshop so that students are better prepared for the dissertation allocation process. A date for this is still to be fixed. - We have contacted Schools to seek input on recommended pathways for dissertations in each School. At this stage, this information still needs to be collated and published to students in an appropriate form	
6	**Lifelong learning** There was appetite from the programme for a University level strategy in relation to lifelong learning. The programme team felt this would support getting buy-in from Schools to build capacity. The review team commends the programme for identifying this as a gap and recommends the programme team and Bayes Centre advocate for this through the Data Driven Innovation hubs and the College of Science and Engineering.		The Bayes Centre continues to advocate for a strategy in relation to lifelong learning and the Bayes Director of Data Science has been working with colleagues across Colleges to support this development at College level, which is then being discussed at University committees. The College of Arts, Humanities and Social Sciences (CAHSS) has developed a strategy for non-traditional learning which the Bayes Centre has input into and some of the strategy documentation has been positively influenced by the work within Bayes Education (the Data Science, Technology and Innovation programme as well as the Data Upskilling Short Courses portfolio led by the Bayes Centre). We will continue to work on leading the way by example and by providing evidenced success for lifelong learning to ensure high-level strategic discussions continue to take place within the Data Driven Innovation Hubs (as they do now through the Data Science Education Centre of Excellence led by the Bayes Centre) and through participation and updates at committees such as College of Science and Engineering Learning and Teaching Committee and Senate Education Committee.	
	Please report on steps taken to feedback to students on the outcomes of the review	We have updated students on the relevant recommendations (curriculum and student experience) and actions taken to address these by email. We will pick up on any responses via the SSLC.	
For Year on response only	Any examples of a positive change as a result of the review	- The IPR has prompted us to arrange the programme ELDeR which will take place next month. This will provide a good opportunity to ensure that we are delivering the programme that we want to deliver. - The School of Informatics has agreed to offer an additional course to our students - The IPR has focused our efforts to make better use of data to understand students' progress through the programme and in particular to reflect more on EDI	