

## Case Study C: Identifying Resources that Best Assist Students to Reach Learning Outcomes

Paula Carroll

UCD

Email: [paula.carroll@ucd.ie](mailto:paula.carroll@ucd.ie)

**Module discipline:** Business Statistics & Data Analysis

**Approximate module size:** 550 students

**Level of module:** First year Undergraduate

### Reasons for using analytics in the module

Many business students are not interested in statistics or data analysis, and find it a challenging subject to engage with. As a result, student attendance at, and engagement with this core module is a challenge. We developed several online learning resources and wanted to know which resources (lecture and tutorial attendance, and/or online resources) best aided students in reaching the module learning outcomes.

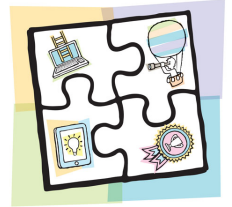
### Data sources/modelling approach

We track attendance at the face-to-face sessions using a barcode scanner to scan student Id cards. We also track the hits on the content areas of the university's virtual learning environment (Blackboard) and gather results of student assessment.

We performed initial exploratory data analysis in Excel drawing charts of lecture and tutorial attendance, and online activity per week of the teaching semester. We shared and discussed these graphs with students during in-class activities. We performed more detailed analysis in the open-source software package R to understand whether particular groups of students used the different learning resources in different ways, and whether we observed any difference in the academic grades of the different groups of students.

### Impact of using data

It is difficult to identify the needs and appropriate resources for students in large class sizes. We have a better understanding of how the different groups of students use the learning resources we've developed. We have used this insight to develop further resources such as online self-assessment practice exercises with feedback, short videos and lecture recordings. We know that not all resources are needed or used by all students. We understand that we need a variety of resources for the different groups of students. The battle to engage and motivate all students in relation to business statistics and data analysis is ongoing!



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## Case Studies of Data Use in Module Design/Delivery

### Gathering further data

We use an active learning approach for the face-to-face sessions. This year we trialled the use of some in-class activities using Google forms as a virtual clicker. Some students liked and engaged with these activities. We think we need to do some further work on the activity design.

A summary of our work to date will appear in INFORMS Transactions on Education:

Carroll, Paula; White, Arthur (2017) 'Identifying Patterns of Learner Behaviour: What Business Statistics Students do with Learning Resources'.

### Advice for colleagues interested in using a data-enhanced approach

Our advice is start small and low tech. We had previously run an online survey (in Blackboard) to get student input on which resources they felt best aided their learning. The results were interesting, but as not all students responded we didn't have any inputs or data on those students. The use of the barcode scanner allowed us get empirical evidence of attendance. The scanner puts the data into Excel, so it's ready for analysis once mapped to other student data. The use of the scanner had some unintended consequences; some students said it acted to motivate them to attend, even though no grades were awarded for in-class attendance or engagement.

We advise that anyone using these ideas put a clear data protection and privacy plan in place at the outset.

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