The Open University

Open Research Online

Citation

Rienties, Bart; Rogaten, Jekaterina; Nguyen, Quan; Edwards, Chris; Gaved, Mark; Holt, Deborah; Herodotou, Christothea; Clow, Doug; Cross, Simon; Coughlan, Tim; Jones, Jan and Ullmann, Thomas (2017). Scholarly insight Spring 2017: A Data Wrangler Perspective. Open University UK.

URL

https://oro.open.ac.uk/49648/

License

Policy

Versions

Scholarly insight Spring 2017: a Data wrangler perspective

Bart Rienties, Jekaterina Rogaten, Quan Nguyen, Chris Edwards, Mark Gaved, Deborah Holt, Christothea Herodotou, Doug Clow, Simon Cross, Tim Coughlan, Jan Jones, and Thomas Ullmann

The Open University

Dr Bart Rienties (Head Data wrangler and FBL Data wrangler)

Dr Jekaterina Rogaten Research associate LTI

Quan Nguyen Leverhulme PhD student

Chris Edwards (FASS Data wrangler)

Dr Mark Gaved (FASS Data wrangler)

Deborah Holt (FASS Data wrangler)

Dr Christothea Herodotou (FBL Data wrangler)

Dr Doug Clow (STEM Data wrangler)

Dr Simon Cross (STEM Data wrangler)

Dr Tim Coughlan (WELS Data wrangler)

Jan Jones (WELS Data wrangler)

Dr Thomas Ullmann (WELS Data wrangler)

Suggested citation:
Rienties, B., Rogaten, J., Nguyen, Q., Edwards, C., Gaved, M., Holt, D., Herodotou, C., Clow, D., Cross, S., Coughlan, T., Jones, J., Ullmann, T. (2016). *Scholarly insight Spring 2017: a Data wrangler perspective*. Open University: Milton Keynes.

Institute of Educational Technology/Learning and Teaching Innovation, The Open University UK,

Contents

FOREWORD

We are pleased to offer you our *Scholarly insight Spring 2017: a Data wrangler perspective*. The OU is going through several fundamental changes, whereby strategic, pedagogical informed research and insight what drives student learning and academic performance is essential. One of the strategic priorities of Students First (Open University UK, 2017b) and big shifts in OU Redesign (Open University UK, 2017a) is to "simplify and clarify choice for students based upon recommend learning and/or appropriate directed pathways". Making sense of Big Data in particular can be a challenge, especially students are following different pathways and qualification routes across the OU. Demand for actionable insights to help students make the best out of their OU experience and qualification in particular is currently strong (Open University UK, 2017a, 2017b), especially a desire for evidence of impact of "what works" (Ferguson & Clow, 2017). Furthermore, insights from big data and learning analytics in particular are now increasingly taken into consideration at the OU when designing, writing and revising modules, and in the evaluation of specific teaching approaches and technologies (Herodotou, Heiser, & Rienties, 2017; Herodotou, Rienties, et al., 2017; Rienties, Boroowa, et al., 2016).

With the new ways of working with Data Wrangling, first we have provided our basic statistical analyses in form of our [Key Metrics report](). Based upon three well-attended workshops to further improve our working with the Faculties in January/February 2017, for which we are forever grateful, we have further fine-tuned our ways of working, and Key Metrics report in particular (e.g., adding nations data). Second, the Datawrangler team has worked extensively with the Faculties on "bespoke requests" from Faculties, and where possible shared the insights across all Schools and Faculties. Some of this work is reflected in this report, while other insights will be shared in the next Autumn report. Third, the focus groups indicated that overall the Scholarly insight report was well received, but was rather lengthy and lacked specific input and recommendations for each Faculty.

Therefore, we have worked with key stakeholders to identify the top 10 big data and pedagogical "concerns and problems" in each Faculty, which we afterwards narrowed down to a top 5, and subsequently a top 3. Working organically in various Faculty sub-group meetings and in a google doc with various key stakeholders in the Faculties[1], we hope that our Scholarly Insights can help to inform and help first and foremost our students, but also spark some ideas how to further improve our module designs and qualification pathways. Some of the topics in this top 10 will be addressed in the next Autumn report, and we are of course keen to hear what other topics require Big Data and Scholarly insight.

Bart Rienties, Jekaterina Rogaten, Quan Nguyen, Chris Edwards, Mark Gaved, Deborah Holt, Christothea Herodotou, Doug Clow, Simon Cross, Tim Coughlan, Jan Jones, and Thomas Ullmann.

---

[1] We are very grateful for the extremely useful input from the following people: Gerry Bolton, Ben Duncan-Jones, Alison Kirkbright, Gary Kitchen, Lynda Prescott, and Jean McAvoy from FASS, Keith Honnor and Sam Thorne from FBL, Carlton Wood, Maria Kantirou, and Tom Olney from STEM, and Chris Kubiak and Tyrrell Golding from WELS

EXECUTIVE SUMMARY

1. Qualification progression, assessment alignment, and learning gains

With the introduction of the Teaching Excellence Framework (TEF) a lot of attention is focussed on measuring learning gains[2]. Although the specific details of the proposed measurements and metrics to be used for learning gains still have to be determined by the UK Government, the broad assumption of the TEF is that universities that provide students with excellent teaching and learning opportunities will lead to high learning gains and value added, which will be financially rewarded. In Chapter 1 we analysed students' progression through the OU degree using a so-called multi-level model techniques. In total 13,966 students were included in this analysis, whereby we selected several large qualifications for each Faculty. Students in this sample all have achieved minimum grade of "pass" on all modules they were enrolled in. **As such, this sample represents students who were continuously "successful".** One would assume that the selected student cohort therefore would continuously do well and perform with similar grades over time, ideally with a positive learning gains.

In contrast to our expectations, our analyses indicated that in eleven out of twelve large qualifications students on average developed negative learning gains over time. After students completed their first module, our modelling indicated that students were predicted to have high grades for the next module, with the average module grade of around 70. However, in contrast to our predictions the module grades dropped as students progressed from their first module to the next module. As visually illustrated in Figure 2, this negative trend continued for most qualifications. A large part of this trend seems to result from institutional (module and qualification) factors, in particular when comparing the same modelling exercise with data obtained from another "Traditional University X" where most students did obtain positive learning gains.

Our multi-level analysis indicated that 12% of variance was explained on a qualification level, whereby each qualification trajectory was quite independent from one another despite some groups of students taking the same modules for different qualifications. Depending on the selected qualification students' progression and learning gains in particular was significantly impacted. This is a relatively surprising finding, as in many qualifications students have substantial freedom to mix and match modules across the OU. Some qualifications seem to help students to obtain similar/comparable learning experiences and assessment outcomes, while more variation seems to be present in other qualifications. Our data wrangling Scholarly insight highlights a potential need to better align expectations and modules within a qualification across the OU, as students get substantially different experiences depending on the respective qualification they are enrolled into.

The largest portion of variance in this model was explained by individual student characteristics (e.g., effort, ability, socio-demographics). Given the widening access agenda of the OU one would hope that students from a widening access background, who might initially struggle on the first module, will become more successful over time. However, our multi-level

---

[2] See for example the government perspective on learning gains (Johnson, 2015), or the perspectives by HEFCE (HEFCE, 2017; McGrath, Guerin, Harte, Frearson, & Manville, 2015)

analyses indicated that students with below average achievements on their first module tended to have a steeper drop in their consequent module attainments. In contrast, students who obtained above average grades in their initial module had a lower drop in their subsequent module attainments. Again this is in sharp contrast with Traditional University X, whereby many of the students who initially performed below average were able to catch-up.

Lastly, another relatively surprising finding was that the students' journey from one module to another caused substantial transitional problems and imbalances in students' progression (43% of variance). If a student scored 70 on the first and 70 on the second module, one would expect that this student would also score around 70 on the third module, fourth module, etc. However, substantial variation in module scores were present while students were working through modules in all qualifications, which could be explained by inconsistent alignment of grade descriptors across a qualification and variations in marking within a module. Beyond the potentially negative impact on motivation, confidence and long-term retention when students get lower grades over time, there are financial implications if students who were initially on a first class degree outcome eventually have to settle for something lower. Reflections from the Faculties about these results indicated a myriad and complex mix of potential reasons, which we cluster under three main headings:

<u>Substantial freedom for students to select "unique" pathways</u>: as highlighted by the detailed pathways that students can choose to complete a qualification, some programmes and qualifications have relatively fixed and structured pathways, whereby the options to choose different electives are limited. In contrast, other programmes and qualifications offer OU students wide and far reaching freedom to choose (one qualification had 84 potential pathways to complete a degree). However, the OU provides limited to no structural support which pathways would fit students' needs and abilities, in contrast to other universities[3].

> Recommendation 1: The OU needs to improve how we communicate to our students which modules fit with their needs and abilities, and be more explicit about successful pathways for students to obtain a qualification.

<u>Alignment of modules within a qualification:</u> As also highlighted in Chapter 2, students experience substantially different learning designs, assessment practices, and workload fluctuations when transitioning from one module to another. Irrespective of actual marking practice, providing a consistent learning experience for students within and across a qualification will help students to adjust quickly and focus on their learning objectives, rather than spending a lot of time and effort trying to understand what is expected when a new module has a different design.

---

[3] For example, in a large-scale adoption of Degree Compass, a course recommendation system, across two universities and two colleges in the US involving 40,000 students, Denley (2014) reported that the recommender analytics system steered students towards modules in which they were more likely to succeed. Similarly, in a large scale-adoption of E-advisor at Arizona State University, freshmen to sophomore retention rates increased from 76 to 84% (Phillips, 2013). Likewise, Denley (2014) found that a "six-year graduation rate… increased from 33 to 37.4%" (p. 65).

Recommendation 2: The OU needs to improve how we communicate and manage the students' expectations of the learning designs and assessment practices from one module to another.

Recommendation 3: In the longer term, it would be beneficial to align the module designs across a qualification based upon evidence-based practice and what works, thereby allowing smooth transitions from one module to another in a qualification.

Alignment of marking within and across modules within and across qualifications: One potential explanation for the negative learning gains observed in the model is the effect of embedded expectations, norms and practice in relation to marking. Across some qualifications there appears to be a widespread deliberate approach of making early assessment relatively easy, both within modules (particularly the first TMA) and within qualifications (particularly the first module). This approach is intended to reduce drop-out, but may have unintended consequences. Furthermore, given that in most modules ALs are marking relatively small numbers of students, potential misalignments might be present which may not be immediately apparent when just looking at average grades and the normal distribution curves. Another potential explanation is the increasing difficulty of the material being assessed may not be completely accounted for in the marks awarded. Final-year-equivalent modules rightly contain much more difficult material than entry modules. Ensuring that this is properly accounted for in marking expectations and practice is challenging, even if there was consensus that it should be. Given that most variance in students' marks (55%) is explained by module and qualification characteristics (at Traditional University X this was only 33%), there is both a tendency of over-marking as well as a lack of alignment of marking within and across modules.

Recommendation 4: It is essential that grades are aligned not only within a module but also across a qualification. For exam boards we recommend to include cross-checks of previous performance of students (e.g., correlation analyses) and longitudinal analyses of historical data to determine whether previously successful students were again successful, and whether they maintained a successful learning journey after a respective module.

Recommendation 5: We recommend that clearer guidelines and grade descriptors across a qualification are developed, which are clearly communicated to staff and students.

Recommendation 6: Given that many students follow modules from different qualifications, it is important to develop coherent university-wide grade descriptors and align marking across qualifications.

2. A consistent learning design experience?

In Chapter 2, we digged deeper into the learning designs of "successful" and "less successful" modules in the first year in each of the four Faculties. Within the OU, there is an increased recognition that learning design is an essential driver for learning. In Chapter 2 we specifically looked at how large modules at the OU are designed, and whether we can find common design trends which would allow students to easily transition from one module to another. Across the four faculties, three main trends could be observed.

Workload balance: Even though on a surface level modules in level 1 within a qualification or Faculty seem fairly similar, when looking at the actual learning design activities that students are expected to do on a weekly based substantial differences become apparent. The workload in some modules fluctuates substantially, whereby some modules take a gentle approach at the beginning of the module, while others double or even triple the workload in the first two to three weeks. A wide body of research and practice has highlighted that balanced workloads lead to better student progression and retention[4].

> Recommendation 7: A balanced workload across level 1 with clear expectations what is expected across a module would help students to better plan their student journeys

Coherently mixing learning activities: The types of learning activities that are developed and used within modules substantially fluctuate. In some Faculties not all seven learning design activities are included in the learning design, which may be appropriate for a specific context or pedagogy. At the same time, even within a Faculty some modules use some learning design activities (e.g., communication, experiential) while in follow-up modules these activities are not used, or new learning design activities are introduced (e.g., interactivity, productive) which were not included in the first introductory module. As a wide body of literature and practice has found that students' expectations are mostly formed at the beginning of their learning journey, it is important to manage students' expectations and inform them specifically what beyond "content" is expected.

> Recommendation 8: A consistent and coherent mix of learning activities throughout a qualification is recommended, whereby students can develop effective coping and learning strategies over time.

Balancing assessment with workload: Given that assessments are stressful times for students, it is important to balance workload with the timing of assessments. In some modules assessments seem to be built on top of normal workload, whereby students in particular weeks have double or triple the average workload. In other modules, when assessment activities take place other learning activities are reduced to give students sufficient time to work on the assessments.

---

[4] See for example our work on workload (van Ameijde & Edwards, 2015; van Ameijde, Weller, & Cross, 2016) and longitudinal modelling of student engagement and retention (Nguyen, Rienties, Toetenel, Ferguson, & Whitelock, 2017; Rienties & Toetenel, 2016)

Recommendation 9: A balanced approach of assessment and the other learning design activities will help students to prepare effectively for assessments.

3. BME attainment

In Chapter 3 we focussed on the widening access group of Black, Minority and Ethnic (BME) students. The percentage of BME students varies between faculties and schools, with undergraduate programmes in FBL/OUBS having the highest percentages, and STEM and FASS Arts & Humanities. As previously found, pre-existing completion and attainment gaps continue with a completion rate of 67% for BME students compared to 72.3% for White students and a pass rate of 57% compared with 67% for White students. When broken down into 'good pass' (first or 2:1) and 'pass' the attainment gap is particularly large with fewer BME students achieving a good pass (-18% points). Further analysis of undergraduate pass rates on L1-L3 modules across the range of ethnicities in all Faculties and schools shows that in all but one school (OUBS Law), Black students have lower pass rates than all other students (excluding those whose ethnicity is unknown). In Chapter 3 several good-practice and guidelines are provided how Faculties and staff can help to address the attainment gap.

Recommendation 10: The OU needs to develop an inclusive strategy that allows each individual student to maximise its potential.

Note that each chapter can be read independently and in any particular order. We do not expect you to read each section, but hope that specific sections per Faculty provide useful insights. We are looking forward to your feedback.

---

1. QUALIFICATION PROGRESSION, ASSESSMENT ALIGNMENT AND LEARNING GAINS

Background of measuring learning gains across a qualification

With the introduction of the Teaching Excellence Framework (TEF) a lot of attention is focussed on measuring learning gains (Johnson, 2015; McGrath et al., 2015). Although the specific details of the proposed measurements and metrics to be used for learning gains still have to be determined by the UK Government, future government funding might become related to students' learning gains as part of the teaching excellence narrative (Johnson, 2015). The broad assumption of the TEF is that universities that provide students with excellent teaching and learning opportunities will lead to high learning gains and value added, which will be financially rewarded. In this Scholarly Insight report we will adopt the following definition of learning gains: growth or change in skills, abilities and knowledge that are related to the learning outcomes of the course (Rogaten, Rienties, & Whitelock, 2017). The OU is part of a range of 14 projects supported by HEFCE that aim to find appropriate methods to define and measure learning gains, and value-added of teaching and learning[5].

Over the years, researchers and practitioners have been developing and testing a range of measurement approaches aiming to capture relative improvements in student learning (e.g., Anderson, 2006; Hake, 1998)[6]. One approach that is currently developed across a number of HEFCE projects is to use students' academic performance as a proxy for estimating learning gains. This approach capitalises on the large quantities of student data routinely gathered by every university and enables comparisons between different subjects, or even across different universities. Furthermore, using students' academic performance as a measure of learning progress has other advantages; firstly, it is widely recognized as an appropriate measure of learning, secondly, it is relatively free from self-reported biases, and thirdly, using academic performance allows a direct comparison of research finding with the results from other studies (Anaya, 1999; Bowman, 2010; Gonyea, 2005).
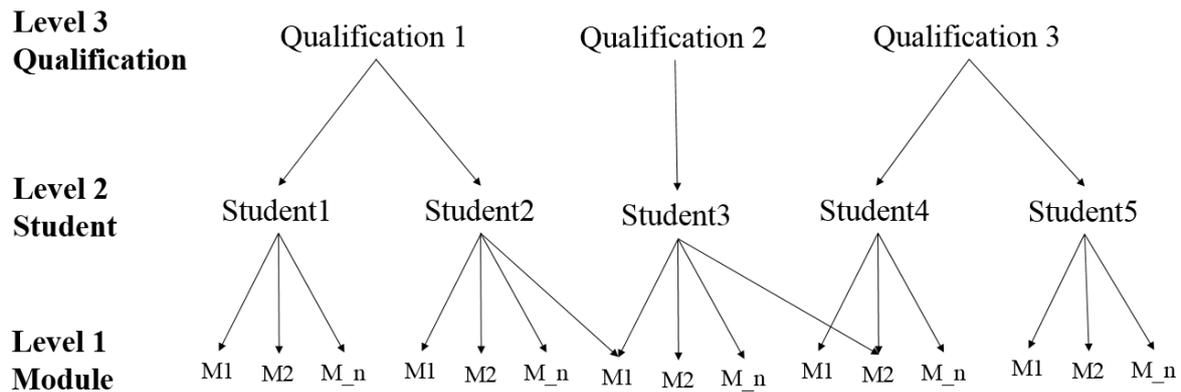
Although the use of grades as proxies for learning gains sounds attractive, it is important to recognise the potential limitations of using grades as proxies for learning gains. There may be a number of factors that might explain why learning gains in a qualification, and grades in particular, over time might go up or down. Within the TEF framework, an assumption is that as students develop knowledge and skills in a qualification, students will strengthen their abilities to interlink concepts, to master key skills, and to be able to solve increasingly complex problems (Higher Education Commission, 2016; Johnson, 2015; McGrath et al., 2015). If a qualification is well designed and assignments are aligned according to well-defined grade descriptors and/or rubrics (Bell, Mladenovic, & Price, 2013; O'donovan, Price, & Rust, 2004; Roblyer & Wiencke, 2003), it would be reasonable to assume that as the level of difficulty

---

[5] http://www.hefce.ac.uk/lt/lg/ provides a list of all learning gains projects. The OU is involved in the Affective, Behavioural and Cognitive learning gains project https://abclearninggains.com/

[6] The most common way of assessing learning gains is through use of pre-post testing (e.g., Dimitrov & Rumrill Jr, 2003; Lord, 1956). Although pre-post testing is considered as a standard and favourable approach for assessing learning gains, it can be a costly process, especially when measured across different modules.

increases the grading over time will be adjusted. If there is a lack of alignment in terms of grade descriptors between modules within a qualification, students might perform really well on one module, and underperform in a module that has relatively harsh grading policies. If we find large variations across modules or even "negative" learning gains across a qualification, this may imply that we may need to look at the potential alignments or misalignments between assessments within and across modules within a qualification[7].

Figure 1. Multi-level modelling: analysing students' progression on three levels

Level 3 Qualification — Qualification 1 — Qualification 2 — Qualification 3

Level 2 Student — Student1 — Student2 — Student3 — Student4 — Student5

Level 1 Module — M1 M2 M_n — M1 M2 M_n — M1 M2 M_n — M1 M2 M_n — M1 M2 M_n

In order to analyse students' progression through the OU degree, a so-called multi-level model technique called 3-level growth curve model (Rogaten et al., 2017) was fitted on student overall module grades taken each year starting from October 2013/2014 onwards[8]. One main benefit of using multi-level modelling is that it allows us distinguish *module characteristics* (Level 1: for example module structure, workload, complexity of assessments, alignment of assessments with previous and follow-up modules) from *individual student characteristics* (Level 2: for example effort, socio-demographics, gender, prior ability) from respective qualification characteristics (Level 3: for example qualification pathways, constructive alignment, employability focus) as illustrated in Figure 1. Moreover, using multilevel modelling it is possible to estimate what is the variance in students' initial achievements and their subsequent learning gains depending on what module they are enrolled in and whether students' initial achievements and learning gains depend on their individual differences and socio-demographic characteristics. While at the OU it seems to be common practice to compare average scores from one module to a next one, this of course ignores the fact that students following these modules might be different, the modules actually might be different (e.g., design, duration, complexity), and qualification characteristics might also have an impact on data. More importantly, by our multi-level analysis we followed the same students throughout their 13.966 unique learning journeys. In plain English, the advantage of multilevel models is in that simple models are not able to detect differences between modules when looking at qualification level performance, whereas multilevel modelling accounts for those differences.

---

[7] At present, we are in the process of interviewing 45 students who had low, medium to high learning gains over time across the Faculties to further understand the complexities of students' progression over time.
[8] Multilevel growth-curve modeling allows for estimating individual students' learning trajectories by fitting an overall average module curve and allowing each individual students' curve to depart from the average module curve.

This will allow us to see how well students are performing within each module, and over time. As students at the OU can choose different pathways and elective modules, not only can we compare how students progress within a qualification (e.g., Student 1 and Student 2) and which order of modules is most beneficial in terms of obtained grades, but we can also compare how students complete modules from other qualifications (e.g., Student 2 following Module 1 in Qualification 2; Student 3 following Module 2 in Qualification 3).

"Successful" OU participants included in the sample

In total 13,966 students were included in this analysis, whereby we selected several large qualifications for each Faculty. Students in this sample all have achieved minimum grade of "pass" on all modules they were enrolled in. **As such, this sample represents students who were continuously "successful".** For students who were enrolled from October 2013 onwards, this would in practice mean that they would have needed to pass 4-6 modules consecutively to be included, while students who were enrolled from October 2015 onwards they would only need to have passed at least two modules. This is a very important caveat, as OU research and practice has consistently shown that many students are not always successful in terms of completing consecutive modules (Calvert, 2014; Li, Marsh, & Rienties, 2016; Li, Marsh, Rienties, & Whitelock, 2017). Therefore, as a benchmark we would expect similar positive learning gains for these successful OU students as "Traditional university X" and University of East Anglia[9] as the selected cohort of OU students passed all the modules they were enrolled in. One would assume that the selected student cohort (who passed all modules they were enrolled in) would continuously do well and perform with similar grades over time, ideally with a positive learning gains. Note that we appreciate that some qualifications, codes and names have substantially altered over time, so some of the subtleties are not necessarily captured in this retrospective longitudinal analysis.

Given that sensitive and confidential data about individual modules and qualifications are provided, we are unable to share the results in a public manner like ORO. Please contact bart.rienties@open.ac.uk if you want to receive a full copy of the detailed report, and indicate specifically whether or not you are a member of the Open University UK.

---

[9] Traditional university X is part of the ABC learning gains project, and on average had a 5% learning gain across the three years, whereby 18 out of 20 qualifications had a positive learning gain. Similar calculations at University of East Anglia across 31 qualifications indicated an average learning gain across the three years of 1.49% (SD = 2.80, range – 4.58 to 5.52), as indicated at recent HEFCE event (HEFCE, 2017).

2 A CONSISTENT LEARNING DESIGN EXPERIENCE?

Background and approach

As highlighted by a wealth of literature on learning design at the OU (Conole, 2012; Conole et al., 2008; Nguyen, Rienties, & Toetenel, 2017b; Nguyen, Rienties, Toetenel, et al., 2017; Open University UK, 2016; Rienties & Toetenel, 2016; Rienties, Toetenel, & Bryan, 2015; Toetenel & Rienties, 2016a, 2016b), the Learning Design approach developed and used by the Open University is described as "a methodology for enabling teachers/designers to make more informed decisions in how they go about designing learning activities and interventions, which is pedagogically informed and makes effective use of appropriate resources and technologies" (Conole, 2012, p. 121). In other words, learning design is focused on 'what students do' as part of their learning, rather than on 'what teachers do' or on what will be taught. Within the OU, there is an increased recognition that learning design is an essential driver for learning (Nguyen, Rienties, Toetenel, et al., 2017; Rienties, Edwards, et al., 2016; Rienties & Toetenel, 2016; Toetenel & Rienties, 2016b; van Ameijde & Edwards, 2015; van Ameijde et al., 2016).

Table 10 *Learning design taxonomy adapted from Rienties and Toetenel (2016)*

Learning design activity	Details	Example
Assimilative	Attending to information	Read, Watch, Listen, Think about, Access.
Finding and handling information	Searching for and processing information	List, Analyse, Collate, Plot, Find, Discover, Access, Use, Gather.
Communication	Discussing module related content with at least one other person (student or tutor)	Communicate, Debate, Discuss, Argue, Share, Report, Collaborate, Present, Describe.
Productive	Actively constructing an artefact	Create, Build, Make, Design, Construct, Contribute, Complete,
Experiential	Applying learning in a real-world setting	Practice, Apply, Mimic, Experience, Explore, Investigate,
Interactive/adaptive	Applying learning in a simulated setting	Explore, Experiment, Trial, Improve, Model, Simulate.
Assessment	All forms of assessment (summative, formative and self-assessment)	Write, Present, Report, Demonstrate, Critique.

Learning activities at the OU have been consistently categorized based on the learning design taxonomy (Table 10), and measured as the number of hours that are allocated for each type of learning activities. For more details of the learning design mapping process, we refer readers to the prior report (Rienties, Edwards, et al., 2016). In this report, we took a further step to explore the relation between learning design and module pass rates. Pass rates are defined as the percentage of registered students at 25% fee liability that completed the course and passed the final exam (grade above 40%). This section is structured as follows.

As highlighted in Chapter 1, OU students experienced substantially different modules and routes within qualifications, which may negatively influence their success in terms of grades over time. One of the strategic priorities of Students First (Open University UK, 2017b) and big shifts in OU Redesign (Open University UK, 2017a) is to "simplify and clarify choice for students based upon recommend learning and/or appropriate directed pathways, enabling us to reduce module count and increase student students… We will have a single design authority to ensure that high quality and consistent user experience across the end-to-end student journey". Therefore, in this Chapter 2 we specifically aim to look at how large modules at the OU are designed, and whether we can find common design trends which would allow students to easily transition from one module to another. Therefore, firstly we compared and contrasted the learning designs of two modules with highest pass rates versus two modules with lowest pass rates for each of the four Faculties. In order to produce meaningful comparisons, it was crucial to "control" for modules' characteristics that could influence their pass rates. Therefore, the modules were selected based on their learning design data availability, same number of credits, same level, same presentation, and relatively same size. For each selected module, we visualised (1) the aggregate learning design, (2) the longitudinal learning design at weekly level, and (3) the inter-relationships of different types of learning design activities.

Given that sensitive and confidential data about individual modules and qualifications are provided, we are unable to share the results in a public manner like ORO. Please contact bart.rienties@open.ac.uk if you want to receive a full copy of the detailed report, and indicate specifically whether or not you are a member of the Open University UK.

3 WIDENING PARTICIPATION ACCESS AND SUCCESS FOR BME STUDENTS

A key aspect of the OU's mission is to support students, whatever their backgrounds, to reach their potential and fulfil their ambitions. In the UK, The Office for Fair Access (2016) has set targets for all Higher Education Institutions through an Access Agreement and monitors their progress towards targets. Latest data show that 91% of targets relating to ethnicity were met in 2013-14 compared with 79% in 2012-13 (Office for Fair Access, 2016). Seven student characteristics/groups are currently monitored by Widening Access and Success (WAS) Team to address widening participation at the OU[10]:

- Students with a Low Socio-Economic Status (SES) (18.4%)[11]
- Black and Minority and Ethnic (BME) Students (12.5%)
- Carers (4.1%)
- Students with Disabilities (16.5%)
- Students in Secure Environments (0.9%)
- Low Occupational Status (11.2%)
- Low Previous Educational Qualifications (PEQs) (35.3%)[12]

The emphasis in this Scholarly Insight Report will be issues concerning Black, Minority and Ethnic (BME) students and how they compound with other WAS categories, such as Low SES and Low PEQ. Accessibility, or issues concerning students with disabilities, was discussed in the Scholarly Insight Autumn 2016 report (Rienties, Edwards, et al., 2016). Tolley and Rundle (2006) suggested there is a strong research and policy profile to develop the attainment of BME students in UK Higher Education. Recent work at the OU is currently focusing on the 'attainment gap' between WP and other students. For example, there is a gap of varying percentages between each group and other students in terms of module completion, ranging from the smallest gap being students in a secure environment (-0%) and the largest being students with low occupational status (-9 to -16%). There are gaps ranging from -1% to -10% in the attainment between each group and other students, but when considering this data in terms of good passes the gaps increase from -4% to -19% (WAS Annual Report 2015-16).

---

[10] The Widening Access and Success (WAS) Team in Learning and Teaching Innovation (LTI) have a central role in developing and supporting research and scholarship into widening participation and inclusion in higher education. They publish the Journal of Widening Participation and Lifelong Learning and administer the WAS portal which has been developed specifically to support faculty planning and curriculum design in terms of widening access and success. Three Access modules, specially designed to encourage widening participation, i.e. students who may not have had the opportunity to study higher education are presented. For example, on the 2016B presentations an average of 60% students had low Prior Educational Qualifications (PEQs).

[11] The percentages in brackets represent the percentage of students in each group (academic year 2015/16)

[12] Data from WAS Steering Group, Jan 2017. To meet their Access Agreement the OU has targets to increase the number of WP registrations by 2019/20. These vary by region, and efforts are focused on Wales where there is a target to increase the percentage from 17.1 to 22.3%, and in England the target is to move from 13.3% to 17.7%. NB: In early 2016 CICP (now part of LTI) and the Information Office conducted a review of the exact specification for all data used in WAS reporting and a number of changes in reporting and definitions were made. These changes are outlined in the WAS data update July 2016.

Given that sensitive and confidential data about individual modules and qualifications are provided, we are unable to share the results in a public manner like ORO. Please contact bart.rienties@open.ac.uk if you want to receive a full copy of the detailed report, and indicate specifically whether or not you are a member of the Open University UK.

Useful websites

Office of Fair Access: information and reports on widening participation at all UK based HEIs: https://www.offa.org.uk/wp-content/uploads/2016/05/2016.04-Outcomes-of-access-agreements-monitoring-1.pdf

Widening Access and Success A new WAS Portal to support faculties in terms of:
data on registrations, completions and attainment and curriculum design. All WAS reports including focus reports on WP target groups can be found here:
http://intranet6.open.ac.uk/teaching/widening-access-and-success-curriculum-design-support/

Widening Access and Success at the OU: http://www.open.ac.uk/about/wideningparticipation/
This website brings together WP policy and practice at the OU across the four nations, including events

Good Reads

Sanders, John and Rose-Adams, John (2014) Black and minority ethnic student attainment: A survey of research and exploration of the importance of teacher and student expectations, Widening Participation and Lifelong Learning, Vol. 16, Number 2. http://open.library.ingentaconnect.com.libezproxy.open.ac.uk/content/openu/jwpll/2014/00000016/00000002 accessed 22.3.17

Singh, G. (2011) Black and minority ethnic (BME) students' participation in higher education: improving retention and success. A synthesis of research evidence. York: HEA.

Stevenson, J. (2012) Black and minority ethnic student degree retention and attainment. York, HEA. https://www.heacademy.ac.uk/system/files/bme_summit_final_report.pdf

REFERENCES

Anaya, G. (1999). College impact on student learning: comparing the use of self-reported gains, standardized test scores, and college grades. *Research in Higher Education, 40*(5), 499-526. doi: 10.1023/a:1018744326915

Anderson, A. K. (2006). An Assessment of the Perception of Learning Gains of Freshmen Students in an Introductory Course in Nutrition and Food Science. *Journal of Food Science Education, 5*(2), 25-30. doi: 10.1111/j.1541-4329.2006.tb00078.x

Beard, J. (2017). Progression Contacts by Tutors Project 2016B Evaluation Report (Student Support Centre for Excellence, Trans.). Milton Keynes: Open University.

Bell, A., Mladenovic, R., & Price, M. (2013). Students' perceptions of the usefulness of marking guides, grade descriptors and annotated exemplars. *Assessment & Evaluation in Higher Education, 38*(7), 769-788. doi: 10.1080/02602938.2012.714738

Bowman, N. A. (2010). Can 1st-Year College Students Accurately Report Their Learning and Development? *American Educational Research Journal, 47*(2), 466-496. doi: 10.3102/0002831209353595

Calvert, C. (2014). Developing a model and applications for probabilities of student success: a case study of predictive analytics. *Open Learning: The Journal of Open, Distance and e-Learning, 29*(2), 160-173. doi: 10.1080/02680513.2014.931805

Conole, G. (2012). *Designing for Learning in an Open World*. Dordrecht: Springer.

Conole, G., Brasher, A., Cross, S., Weller, M., Clark, P., & Culver, J. (2008). Visualising learning design to foster and support good practice and creativity. *Educational Media International, 45*(3), 177-194. doi: 10.1080/09523980802284168

Coughlan, T., & Perryman, L.-A. (2011). Something for everyone? The different approaches of academic disciplines to Open Educational Resources and the effect on widening participation. *Journal of Open, Flexible and Distance Learning, 15*(2), 11-27.

Dimitrov, D. M., & Rumrill Jr, P. D. (2003). Pretest-posttest designs and measurement of change. *Work, 20*(2), 159-165.

Equality Challenge Unit. (2017). Equality in higher education: statistical report 2016. London: Equality Challenge Unit,.

Ferguson, R., & Clow, D. (2017). *Where is the evidence? A call to action for learning analytics.* Paper presented at the Proceedings of the 6th Learning Analytics Knowledge Conference, Vancouver.

Foley, P., Daniels, H., Hughes, J., & Hughes, N. (2013). FHSC K101 and low socio-economic group (SEG) student withdrawal report for LTQSC. Milton Keynes: Open University.

Gonyea, R. M. (2005). Self-reported data in institutional research: Review and recommendations. *New directions for institutional research, 127*, 73.

Gray, L., Simpson, J., Daniels, H. A., & Hickman, R. (2016). Stories of study: An investigation into the experience of BME students at studying at level 2 in the Faculty of Health and Social care in order to understand the discrepancy in attainment between BME and non BME students. Milton Keynes: Open University.

Hake, R. R. (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics, 66*(1), 64-74. doi: 10.1119/1.18809

HEFCE. (2017). *Learning gain – pilot projects event* London.

Herodotou, C., Heiser, S., & Rienties, B. (2017). Implementing randomised control trials in open and distance learning: a feasibility study. *Open Learning: The Journal of Open, Distance and e-Learning, 32*(2), 147-162. doi: 10.1080/02680513.2017.1316188

Herodotou, C., Rienties, B., Boroowa, A., Zdrahal, Z., Hlosta, M., & Naydenova, G. (2017). *Implementing predictive learning analytics on a large scale: the teacher's perspective*. Paper presented at the Proceedings of the Seventh International Learning Analytics & Knowledge Conference, Vancouver, British Columbia, Canada.

Higher Education Commission. (2016). From bricks to clicks. In X. Shacklock (Ed.). London: Higher Education Commission.

Hughes, J., & Peasgood, A. (2014). *Developing a theoretical framework to explore what widening participation has done for 'non-traditional students ' and what it has done to them*. Paper presented at the Widening Participation Conference 2014: Widening Participation through Curriculum, Milton Keynes, UK. http://oro.open.ac.uk/42375/

Johnson, J. (2015). *Fulfilling our potential: Teaching Excellence, Social Mobility and Student Choice*. (Cm9141). London: Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/474266/BIS-15-623-fulfilling-our-potential-teaching-excellence-social-mobility-and-student-choice-accessible.pdf.

Jordan, S. (2014). *E-assessment for learning? Exploring the potential of computer-marked assessment and computer-generated feedback, from short-answer questions to assessment analytics*. (PhD), The Open University. Retrieved from http://oro.open.ac.uk/41115/

Kirkup, G., & Jones, J. (2010). The Experience of Widening Participation Students on FELS Foundation Courses 2009-2010. Milton Keynes: Open University.

Li, N., Marsh, V., & Rienties, B. (2016). Modeling and managing learner satisfaction: use of learner feedback to enhance blended and online learning experience. *Decision Sciences Journal of Innovative Education, 14*(2), 216-242. doi: 10.1111/dsji.12096

Li, N., Marsh, V., Rienties, B., & Whitelock, D. (2017). Online learning experiences of new versus continuing learners: a large scale replication study. *Assessment & Evaluation in Higher Education, 42*(4), 657-672. doi: 10.1080/02602938.2016.1176989

Lord, F. M. (1956). The measurement of growth. *ETS Research Bulletin Series, 1956*(1), i-22. doi: 10.1002/j.2333-8504.1956.tb00058.x

McGrath, C. H., Guerin, B., Harte, E., Frearson, M., & Manville, C. (2015). Learning gain in higher education. Cambridge: HEFCE/RAND.

Nguyen, Q., Rienties, B., & Toetenel, L. (2017a). *Mixing and matching learning design and learning analytics*. Paper presented at the HCI 2017, Vancouver.

Nguyen, Q., Rienties, B., & Toetenel, L. (2017b). *Unravelling the dynamics of instructional practice: A longitudinal study on learning design and VLE activities*. Paper presented at the Proceedings of the Seventh International Learning Analytics & Knowledge Conference, Vancouver, Canada.

Nguyen, Q., Rienties, B., Toetenel, L., Ferguson, F., & Whitelock, D. (2017). Examining the designs of computer-based assessment and its impact on student engagement, satisfaction, and pass rates. *Computers in Human Behavior*. doi: 10.1016/j.chb.2017.03.028

O'donovan, B., Price, M., & Rust, C. (2004). Know what I mean? Enhancing student understanding of assessment standards and criteria. *Teaching in Higher Education, 9*(3), 325-335. doi: 10.1080/1356251042000216642

Office for Fair Access. (2016). Outcomes of access agreement monitoring for 2014-15. Bristol: Office for Fair Access.

Open University UK. (2016). The learning design word wheel. Retrieved 10 April 2017, from http://www.open.edu/openlearn/wordwheel

Open University UK. (2017a). OU Redesign (OUR). Retrieved 30 May 2017, from http://intranet6.open.ac.uk/strategy/students-first/strategic-objectives/adaptive-organisation-and-culture/ou-redesign-our

Open University UK. (2017b). Students First: Strategy for Growth. Retrieved 30 May 2017, from http://intranet6.open.ac.uk/strategy/students-first/

Richardson, J. T. E. (2008). Degree attainment, ethnicity and gender: a literature review. York, UK: Higher Education Academy.

Richardson, J. T. E. (2015). The under-attainment of ethnic minority students in UK higher education: what we know and what we don't know. *Journal of Further and Higher Education, 39*, 278-291. doi: 10.1080/0309877X.2013.858680

Richardson, J. T. E., Alden Rivers, B., & Whitelock, D. (2015). The role of feedback in the under-attainment of ethnic minority students: evidence from distance education. *Assessment & Evaluation in Higher Education, 40*(4), 557-573. doi: 10.1080/02602938.2014.938317

Rienties, B., Boroowa, A., Cross, S., Kubiak, C., Mayles, K., & Murphy, S. (2016). Analytics4Action Evaluation Framework: a review of evidence-based learning analytics interventions at Open University UK. *Journal of Interactive Media in Education, 1*(2), 1-12. doi: 10.5334/jime.394

Rienties, B., Edwards, C., Gaved, M., Marsh, V., Herodotou, C., Clow, D., . . . Ullmann, T. (2016). Scholarly insight 2016: a Data wrangler perspective. Milton Keynes: Open University UK.

Rienties, B., Lewis, T., McFarlane, R., Nguyen, Q., & Toetenel, L. (Submitted). Analytics in online and offline language learning environments: the role of learning design to understand student online engagement. *Journal of Computer-Assisted Language Learning*.

Rienties, B., & Toetenel, L. (2016). The impact of learning design on student behaviour, satisfaction and performance: a cross-institutional comparison across 151 modules. *Computers in Human Behavior, 60*, 333-341. doi: 10.1016/j.chb.2016.02.074

Rienties, B., Toetenel, L., & Bryan, A. (2015). "Scaling up" learning design: impact of learning design activities on LMS behavior and performance *5th Learning Analytics Knowledge conference* (pp. 315-319). New York: ACM.

Roblyer, M., & Wiencke, W. (2003). Design and use of a rubric to assess and encourage interactive qualities in distance courses. *American Journal of Distance Education, 17*(2), 77-98.

Rogaten, J., Rienties, B., & Whitelock, D. (2017). Assessing Learning Gains. In D. Joosten-ten Brinke & M. Laanpere (Eds.), *Technology Enhanced Assessment. TEA 2016. Communications in Computer and Information Science* (Vol. 653, pp. 117-132). Cham: Springer.

Sanders, J., & Rose-Adams, J. (2014). Black and minority ethnic student attainment: A survey of research and exploration of the importance of teacher and student expectations. *Widening Participation and Lifelong Learning, 16*(2), 5-27. doi: 10.5456/WPLL.16.2.5

Singh, G. (2011). Black and minority ethnic (BME) students' participation in higher education: Improving retention and success – a synthesis of research evidence. York, UK.: Higher Education Academy.

Stevenson, J. (2012). Black and minority ethnic student degree retention and attainment. . York: Higher Education Academy.

Toetenel, L., & Rienties, B. (2016a). Analysing 157 Learning Designs using Learning Analytic approaches as a means to evaluate the impact of pedagogical decision-making. *British Journal of Educational Technology, 47*(5), 981–992. doi: 10.1111/bjet.12423

Toetenel, L., & Rienties, B. (2016b). Learning Design – creative design to visualise learning activities. *Open Learning, 31*(3), 233-244. doi: 10.1080/02680513.2016.1213626

Tolley, J., & Rundle, J. (2006). A Review of Black and Minority Ethnic Participation in Higher Education. London: Aim higher National Project.

van Ameijde, J., & Edwards, C. (2015). Student Workload Evaluation Project - End of Stage 2 Interim Report. Milton Keynes: The Open University.

van Ameijde, J., Weller, M., & Cross, S. (2016). Designing for Student Retention. Milton Keynes: The Open University.