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Key Information Set design and evaluation

Missing data, part-time students and joint honours students

Report to HEFCE by Pure Usability

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Executive summary

The Higher Education Funding Council for England (HEFCE) and the Higher Education Statistics Agency (HESA) collates data and statistics about individual degree courses in England. Data collected at present includes student satisfaction ratings, graduate salaries and graduate employment rates. The aim of the Key Information Set (KIS) is to make such relevant course data available to students in an appropriate and easily understandable format. Pure Usability was previously contracted by HEFCE to carry out user-centred design activities in order to produce an evidence-based design vision for KISs. The design and research outputs from this research are outlined in the report ‘User-Centred Design of Key Information Sets (KISs)’, which can be found at http://www.hefce.ac.uk/pubs/rdreports/2011/rd06_11/

The design and research outlined in this report follows on directly from our previous KIS work, and aims to ‘fine-tune’ elements of the KIS. The specific aim of this project was to produce design solutions and get user feedback about three specific KIS questions:

1. How do students perceive the KIS when complete data are not available?
2. How can we best present data to joint honours students?
3. How can we best present data to part-time students?

To address this, we produced a series of alternative design mockups to address each question. Student attitudes and understanding of these mockups was evaluated using (i) a remote, moderated usability testing approach, and (ii) online, unmoderated ‘micro’ usability tests.

Our findings indicated that:

1. When complete data are not available, students are very wary and distrusting of any data which is aggregated (e.g. presenting averages from similar courses in lieu of available data for a specific course), because they fear that the data may be misleading in some way
2. Students dislike the idea of having no data more than they dislike the idea of having aggregated data
3. When complete data are not available, students prefer links to alternative, but similar un-aggregated KIS data (e.g. to specific courses within the same faculty or department, so that students can get a ‘flavour’ of the quality)
4. If data are aggregated in the absence of complete data, any aggregation should be hidden from the student until appropriate warnings and explanations have been provided (i.e. progressive disclosure)
5. Students like to see the source of any aggregated data provided in an explicit way
6. For Joint Honours degrees, providing a tabbed approach whereby all KIS data for contributing courses could be viewed in one place, appeared to be an effective approach
7. KIS data are of direct relevance to part-time applicants, but they have a different balance within their information needs (with an increased emphasis on the breakdown of teaching and learning activities).

1 Background

Pure Usability Ltd was previously contracted by the Higher Education Funding Council for England (HEFCE) to carry out user-centred design activities in order to produce an evidence-based design vision for Key Information Sets (KISs). The outputs from this research can be found at:

http://www.hefce.ac.uk/pubs/rdreports/2011/rd06_11/

The work reported here builds on the previous design and research in that it aims to produce design solutions and get user feedback about three specific questions:

- How students perceive the KIS when complete data are not available (e.g. via data aggregation)
- How to best present data to joint honours students
- How to best present data to part-time students

2 Methods

2.1 Design mockups

We produced a series of design mockups to test. These can be found at:

<http://test.pureusability.co.uk/kis/kis2>

For cases where incomplete data is present, the following mockups were used:

- Provide no data (<http://test.pureusability.co.uk/kis/kis2/6.html>); see 3.2.1
- Provide links and basic data for similar courses (<http://test.pureusability.co.uk/kis/kis2/3.html>); see 3.2.2
- Aggregate the past two years' data (<http://test.pureusability.co.uk/kis/kis2/2.html>); see 3.2.3
- Show aggregate scores, and link to contributing courses (<http://test.pureusability.co.uk/kis/kis2/4.html>); see 3.2.4
- Show aggregated scores with generic link to explain data sources (<http://test.pureusability.co.uk/kis/kis2/5.html>); see 3.2.5
- Progressive disclosure: reveal aggregated data after providing a sufficient alert (<http://test.pureusability.co.uk/kis/kis2/prg.html>); see 3.2.6

For joint honours students, we used:

- Aggregated data with links to individual KISs (<http://test.pureusability.co.uk/kis/kis2/jl.html>)
- Tabbed data for individual and combined scores (<http://test.pureusability.co.uk/kis/kis2/jt.html>)

For the teaching and assessment presentation of the KIS to part-time students, we tested an option whereby part-time information is provided on the university course page, which users could link back to as required (<http://test.pureusability.co.uk/kis/kis2/7.html>).

2.2 Usability feedback

We used two different *lightweight* usability methods to capture student feedback: *remote, moderated usability testing* and *remote, unmoderated usability testing*.

As with the original study, we used a variant of the Rapid Iterative Testing and Evaluation (RITE) method, whereby our prototype concepts evolved in response to user insights from different sources.

User feedback was collected in two different ways:

- The primary means was via remote, moderated usability testing sessions that allowed us to gain deeper insights into our designs
- We also used remote, unmoderated web-based tools that allowed us to create quick 'micro usability tests' to explore aspects of the KIS interface.

2.2.1 Unmoderated 'Micro' usability tests

We used Verify (www.verifyapp.com), a third party, web-based application to gather remote, unmoderated feedback about our designs.

This micro-test approach allows user feedback to be captured in a variety of different tests. The tests used in our studies were:

- Preference tests, in which users are asked to state which version of a design they prefer, and to give reasons for their preference.
- Annotate tests, in which users are allowed to freely annotate designs based on their understanding, likes and dislikes.

These micro tests were entirely anonymous, but since recruitment was aimed directly at potential undergraduate students, it is very likely that the vast majority of responses were from genuine potential students.

2.2.2 Remote usability testing

We carried out remote usability test sessions using Skype. By doing so, we could talk directly to students while simultaneously viewing their web browser as they interacted with the KIS design concepts.

Test sessions consisted of a brief, initial interview to establish situation and goals, followed by an exploration of the KIS prototypes using a Think Aloud protocol. Our aim was to generate *qualitative insights* that can be used to inspire and guide the design direction of the KISs, rather than a formal, summative evaluation of each (which was virtually impossible given the amount of time and number of variables involved).

2.2.3 Recruitment

To recruit student participants, we were assisted by UCAS's YouGo online community (www.yougo.co.uk).

For the remote, moderated testing, 11 potential students were interviewed in June 2011. The breakdown of these students was:

- 5 male / 3 female
- 1 in private school / 6 in state school / 1 mature student (leaving the Navy to enroll on a degree course)
- 8 interested in full time degrees / 2 in joint honours / 3 in part-time degrees

For the remote, unmoderated testing (Verify tests), there were 28 respondents for the joint honours design concepts, and 17 for the part-time honours.

2.2.4 A note on sample sizes

The sample sizes used in this study are necessarily small. It is common practice in the design world to take an iterative approach to design, testing with a small number of users at each stage. Furthermore, conventional wisdom suggests that 5 users are enough to identify the majority of key

usability issues with a design (see <http://www.measuringusability.com/five-users.php> and references therein).

Since most design gets done without *any* direct user feedback, our results should be considered to offer useful behavioural insights that can help to guide our thinking and choice of design decisions, rather than being treated as formal research findings in their own right.

3 Findings

3.1 General view of the KIS

General feedback on the KIS concept reinforced our previous findings that students find it a useful and well-designed resource. Specifically:

- It's 'really useful'
- It's a 'lovely balance' of information without being too heavy, and links to further information if needed
- It contains information that they have otherwise been unable to find, or that has taken a long time to track down.

However, the issue of ranking is still important to students:

- A ranking of all similar courses in the country would be 'really useful'
- Students want an interface allowing them to compare two or more courses 'like a *WhatCar* website' or 'when you compare mobile phones online'.

3.2 What to do when there isn't enough data?

For new courses, or courses with small student numbers, there are insufficient data to present meaningful KIS statistics. We explored design options for presenting data when these cases occur.

3.2.1 Show no graphs or other information

In this approach, no data was presented at all (Figure 1). An alert was provided, with a single line of text to explain why this was the case. This was found to be:

- Easy to understand, conceptually (students understood what “N/A” stood for)
- Perceived as an honest presentation of information
- Considered to be totally useless to the student (!)

Sample student quotes:

‘It’s more honest and accurate but (laughs) It doesn’t give you any information at all about the course other than the national average.’

‘... I would prefer to have this than one that is misleading and may cause me to make the wrong course decision.’

‘I would exit this page straight away if I saw there was no data or links.’

The screenshot shows the KIS page for BSc Health Studies (B900) at Newtown University. At the top, there's a red 'KIS KEY INFORMATION SET' logo and a blue 'Find another KIS' button. Below that is the university's logo and name. The main content area has several sections: 'LAST UPDATED 12 JAN 2011 (NEXT UPDATE DUE JAN 2012)', 'Awarding Body: University of Oxford', 'Accredited by the National Health Studies Body www.nhsb.org.uk/accreditation', 'STUDENT SATISFACTION', 'GRADUATE EMPLOYMENT', and 'Sections' (Student Satisfaction, Graduate Employment, Financial, Learning & Assessment, Student Union), 'Print', 'Download' (PDF 212kb, Raw data (.csv 78kb)), 'Share' (Twitter, Facebook, Email), 'Widget' (Add a KIS widget for this course to your site), and 'Choose a layout' (with a code snippet for embedding).

STUDENT SATISFACTION

New course - no data available
This is a new course. Data will be collected for the first time during the current academic year.

N/A Overall student satisfaction
Average for all Health Studies courses in England & Ireland is 77%

GRADUATE EMPLOYMENT

New course - no data available
This is a new course. Data will be collected for the first time during the current academic year.

N/A Average annual salary after 6 months
Average for all Health Studies courses in England & Ireland is £18,000

N/A Go on to work and/or study
Average for all Health Studies courses in England & Ireland is 84%

Figure 1. KIS design option: in the absence of course data, do not provide any alternative.

3.2.2 Do not show any data, but provide links to similar courses

In this design (Figure 2), data was not provided (as in 3.2.1), but additional links to similar courses were provided (e.g. those in the same faculty or department) so that students could at least get some idea of the teaching quality in that department.

This approach was:

- Considered to be an honest presentation of data
- Perceived as being helpful in that it “at least provides an idea of what the university and faculty is like”.
- Often described as honest and better than nothing.

Sample student quotes:

'If you were looking into a course you would know whether those comparable courses really were comparable to your interests. So it is still pretty helpful.'

'Similar courses would have similar variants – the same place, same lecturers and professors, so this is still useful.'

KIS KEY INFORMATION SET

Find another KIS

BSc Health Studies (B900)

Visit course website

LAST UPDATED 12 JAN 2011 (NEXT UPDATE DUE JAN 2012)

Awarding Body: University of Oxford

NHSB Accredited by the National Health Studies Body
www.nhsb.org.uk/accreditation

STUDENT SATISFACTION

New course - no data available

This is a new course. Data will be collected for the first time during the current academic year.

N/A Overall student satisfaction

Average for all Health Studies courses in England & Ireland is 77%

Satisfaction ratings for similar courses in this Faculty/Department:

Environmental Health (B901)	78%
Hygiene (B911)	82%

GRADUATE EMPLOYMENT

New course - no data available

This is a new course. Data will be collected for the first time during the current academic year.

N/A Average annual salary after 6 months

Average annual salary after 6 months for similar courses in this Faculty/Department:

Environmental Health (B901)	£19,000
Hygiene (B911)	£17,500

Go on to work and/or study

Average for all Health Studies courses in England & Ireland is 84%

Proportion of graduates going on to work and/or study for similar courses in this Faculty/Department

Environmental Health (B901)	89%
Hygiene (B911)	82%

Figure 2. KIS design option: in the absence of course data, provide links to similar courses.

3.2.3 Aggregate the last 2 years of data

In circumstances where not enough student data is available from the previous year to be statistically valid (e.g. low student numbers for a course), data were aggregated from National Student Survey (NSS) and Destinations of Leavers from Higher Education (DLHE) survey data from the past two years.

In this design (Figure 3), the wording confused most students. They were unsure what was meant by ‘two years’ and whether it referred to the past two academic years, the last two calendar years or the last two years of a cohort (i.e. the same students, say Year 1 and Year 2).

One student thought that combining data in this way would make it ‘better’:

‘I’m guessing this must therefore be more accurate as it’s taking 2 years of data not one.’

Most students worried about the validity of merging data, and felt that the combined data would not provide an ‘honest’ picture:

‘The averages in each year could be very different, then combining them makes no sense. What does combined mean? Is that standardised by number of people per year or an average per year and then added together... how could you combine over two years when fees, lecturers, course modules could have completely changed between those two years?’

‘I am put off. So much could have changed in two years especially salary. So it renders the information meaningless.’

KIS KEY INFORMATION SET

BSc Health Studies (B900)

[Visit course website](#)

LAST UPDATED 12 JAN 2011 (NEXT UPDATE DUE JAN 2012)

Awarding Body: University of Oxford

NHSB Accredited by the National Health Studies Body www.nhsb.org.uk/accreditation

STUDENT SATISFACTION

Survey data combined for the past two years
Because of small numbers of students taking this course (approx. 10 per year), the data presented here are for the past two annual student surveys combined.

Overall student satisfaction
Average for all Health Studies courses in England & Ireland is 77%

	% agreeing
Satisfied with quality of course ¹	71%
Able to access to IT resources ²	87%
Library resources are satisfactory ³	83%
Feedback on work has been helpful ⁴	67%
Feedback on work has been prompt ⁵	78%
Received detailed comments on work ⁶	77%
Staff are intellectually stimulating ⁷	84%
Staff are enthusiastic ⁸	81%
Staff are good at explaining things ⁹	83%
Received sufficient advice and support ¹⁰	71%

Source: National Student Survey

GRADUATE EMPLOYMENT

Comprehensive data for 2010/11 not available
Because of small numbers of students taking this course (approx. 10 per year), the data presented are for the past two years combined

Average annual salary after
£20,500 Interquartile range: £17,000 - £19,500
Average for all Health Studies courses in England & Northern Ireland after 6 months is £20,500², rising to £25,000³ after 40 months

Source: DLHE Survey

Go on to work and/or study
97%
Average for all Health Studies courses in England & Ireland is 84%

Destinations	Percentage
94% Working only	94%
2% Working & studying	2%
1% Studying only	1%
2% Not available for work	2%

Destinations from this course 6 months after graduating: 92% of those who work are in a graduate level job

Data from 31 students
31 Source: DLHE Survey

Figure 3. KIS design option: with small sample sizes, aggregate the past 2 years of data

3.2.4 Show the average for 'similar' courses, but list the course names as hyperlinks

In this approach (Figure 4), aggregated data for 'similar' courses were provided when there were no data available (e.g., in the case of a brand new course). To give students a sense of where the data had come from, explicit hyperlinks to the KISs of contributing courses were provided.

Students felt that:

- This approach was misleading because eyes scan to the graphs first and not the warning. It would be easy to interpret the graph without seeing that it has been calculated in a different way
- It was at least useful to know which courses have been used to calculate the graphs
- Merging data across two or more courses might be invalid; for example, if one course was really high-scoring and the other low-scoring, the average would be meaningless.

'This makes sense BUT this seems a bit misleading. I prefer the last one (3.2.2) because it immediately hits you that there isn't data for this course'

'I don't like this as much, with other one (3.2.2) straight away you could see that it was a new course as nothing available. With this one that information is masked as there is data there.'

'This is a new course and doesn't have any data, so this graph is misleading. It looks like the university is trying to get you to do the course with false information.'

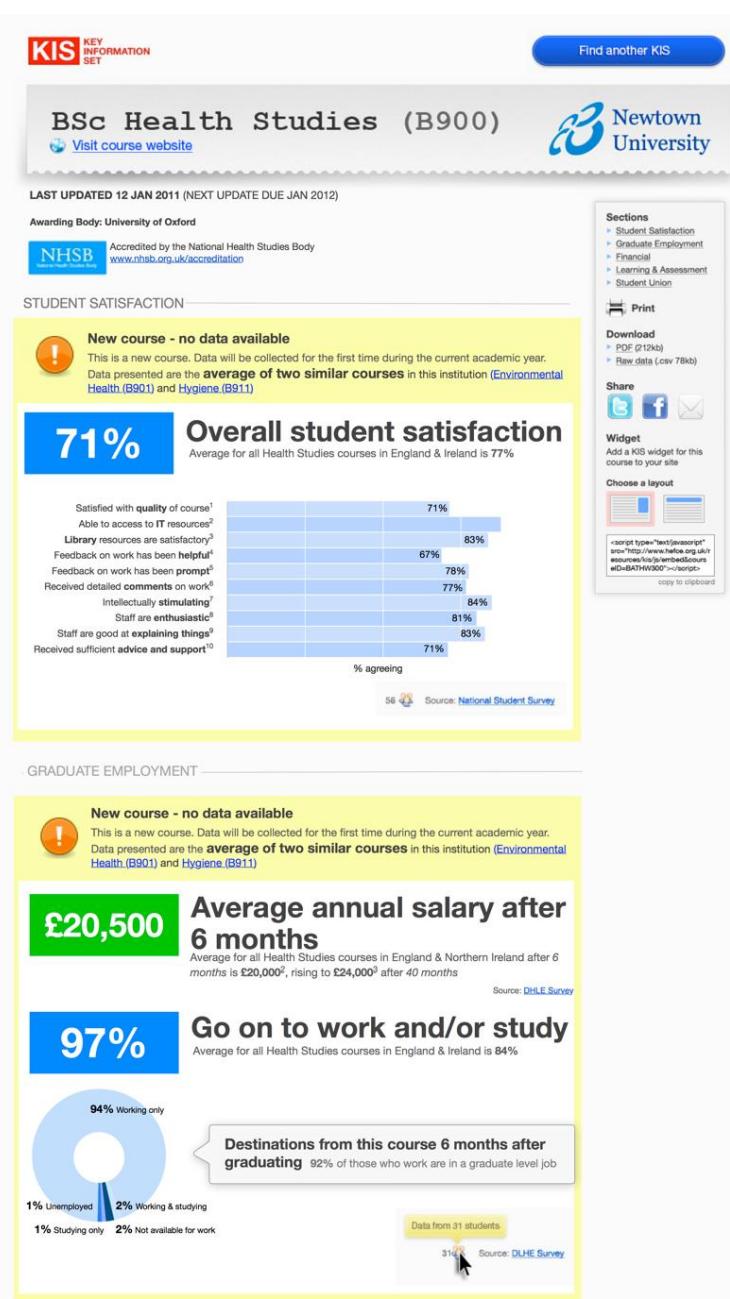


Figure 4. KIS design option: with small sample sizes, show the average for 'similar' courses and link to those courses

3.2.5 Show the average for similar courses, but do not explicitly list courses used

In this approach (Figure 5), aggregated data for ‘similar’ courses were again provided when there were no data available. In this case, though, no explicit contributing courses were given, to allow more complex aggregations to be used, and their explanation presented elsewhere. To this end, a hyperlink (“find out how these are calculated”) was provided.

- This was considered misleading because eyes scan to the data first and not the warning. It would be easy to interpret the graph without seeing that it has been calculated in a different way.
- It was considered ‘worse’ than 3.2.4 because this approach doesn’t explicitly tell you which courses have been used to calculate the data. You need to follow the link to find out, and this takes “extra time and effort”.
- Two students noticed the national average data for the first time, and misinterpreted the graph such that they thought it was for all courses nationally.
- There was concern that different courses would skew data – ‘similar courses may end up with very different annual salary information.’

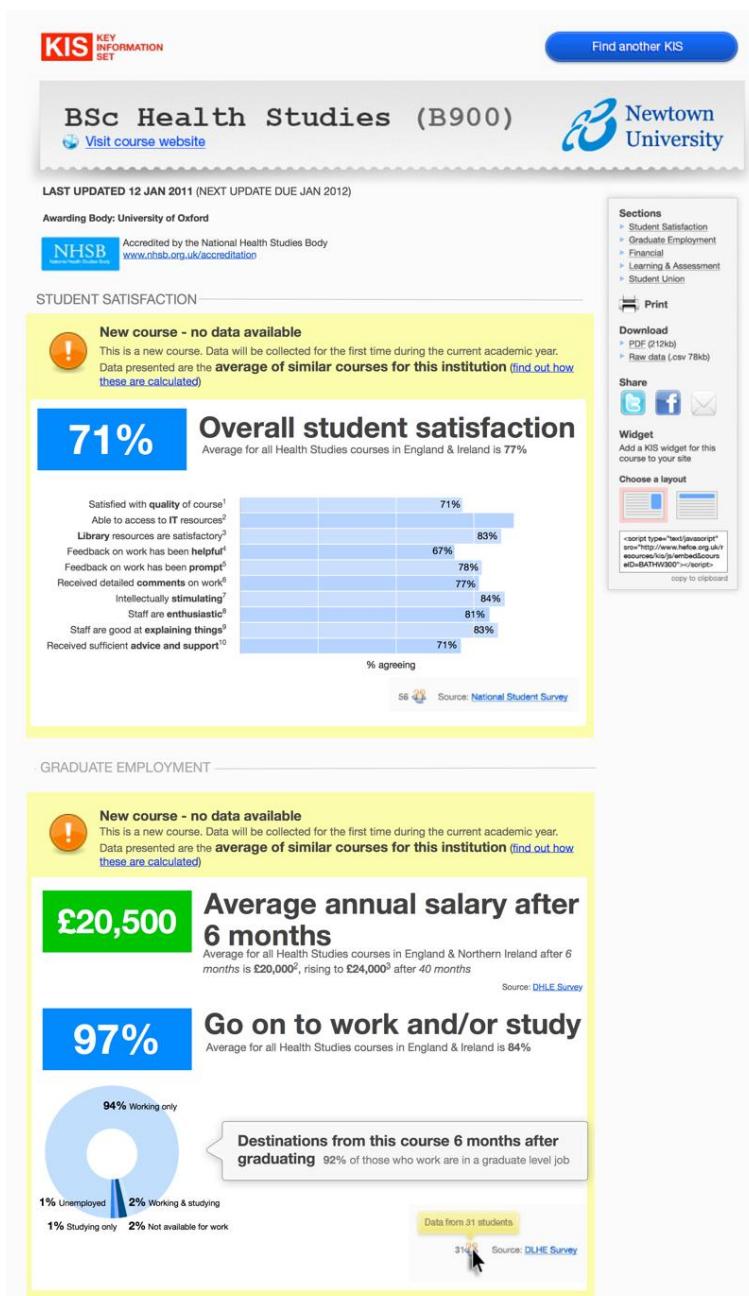


Figure 5. KIS design option: with small sample sizes, show the average for ‘similar’ courses but do not provide links

3.2.6 Progressive disclosure: hide aggregated data until users click to reveal it

This design (Figures 6 and 7) was created in response to the students' concerns that explicit statements of aggregated data were misleading. In this approach, the data were initially hidden until students clicked a link to reveal the aggregated data if they considered them to be potentially useful. The aggregated data were also 'greyed out' to visually reduce its impact.

Student feedback was that:

- They disliked it because it was much easier to miss. '*You probably wouldn't look at the data or click the link'*
- It made little difference, other than making you have to click.

One student liked it, feeling that clicking to expand '*shows that you've read it through*'. Another felt that this would be the best option if there are no data, so a graph is available but only after reading the warning and clicking to reveal it.

'This is too fancy - people just want the information in front of them straight away, otherwise they miss this and head straight to the green facts for tuition fees and ignore these sections.'

Figure 6. KIS design option: if data is aggregated, hide it until users click on an explicit link to reveal it. This mockup shows the 'hidden' state

Statement	% agreeing
Satisfied with quality of course ¹	71%
Able to access to IT resources ²	83%
Library resources are satisfactory ³	67%
Feedback on work has been helpful ⁴	78%
Feedback on work has been prompt ⁵	77%
Received detailed comments on work ⁶	84%
Staff are enthusiastic ⁷	81%
Staff are good at explaining things ⁸	83%
Received sufficient advice and support ¹⁰	71%

Figure 7. KIS design option: if data is aggregated, hide it until users click on an explicit link to reveal it. This mockup shows the 'revealed' state

3.2.7 Comparison of design approaches

Students were asked to score each design out of 10 (where 10 was considered to be the full KIS data for the course). The most popular approaches were either to provide links to similar courses (with no aggregated data), or to hide the aggregated data until the user chose to view it.

Providing no data at all was the least desired option of all.

Design	Description	Average / 10 (N=8)
3.2.2	List links and basic data for similar courses in that faculty	6.125
3.2.6	Progressive disclosure Hide the graph until users click to reveal it, greyed out	6.125 (n=4)
3.2.3	Aggregate last 2 years of data	5.75
3.2.4	Show the average for two similar courses in that faculty, listing the course names as links	5.25
3.2.5	Show the average for similar courses, but no list of names used. Instead a link showing how the information was calculated	5.25
3.2.1	Provide no data at all	2.875

3.3 How does the KIS meet the need of part-time students?

3.3.1 Overall perceptions

The perceptions of part-time students appeared to be quite different from full-time students. Part-time students will, broadly speaking, not want to move and will therefore be looking to local Universities to provide courses that they want to do ('I haven't looked anywhere else'). This immediately restricts the use of the KIS as a comparison tool. An additional corollary of this is that, unlike virtually all full-time applicants, none of the part-time students had referred to university league tables. They also seemed less knowledgeable about the terminology surrounding courses (e.g. bursaries).

Overall, though, the perceptions of the KIS by part-time applicants were positive:

- 'These are all really good'
- 'I find this information really useful'

Even one potential student who considered the KIS to be a '*bit dull*' found some the student finance information to be '*very helpful*'.

Much like full-time students, part-time students considered satisfaction scores to be particularly important. However, they seemed to have a greater interest in teaching and assessment methods, and less interest in accommodation costs and employment statistics.

3.3.2 Learning and assessment feedback

Users were very interested in the teaching breakdown to see how the course could fit into their busy lives. Fewer teaching commitments and more flexibility were seen as being particularly important ('*It needs to fit in with my lifestyle*', '*The reason we're part time is that we don't have time to be full time*')

The graphs for teaching and learning breakdown (Figure 8) were seen as being quite complex, but all part-time users were able to understand what they meant.

Although the presentation of data for a full-time course allowed applicants to get an '*overall flavour of course*', they naturally expressed a desire to see more tailored information ('*It's not helpful if it's not 4 years*').

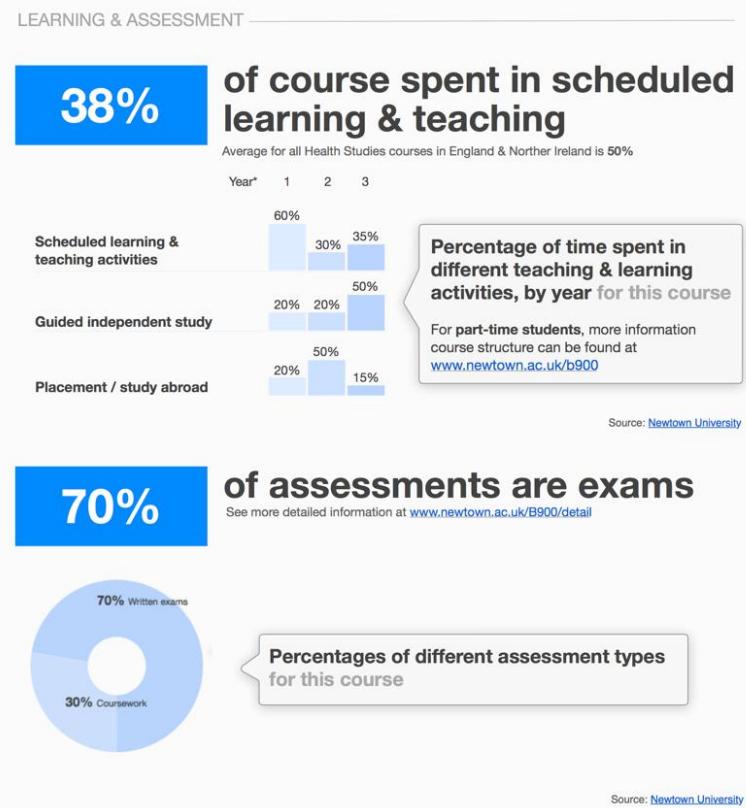


Figure 8. Learning and assessment section of the KIS

Interestingly, all 3 part-time student applicants overlooked the link to more information about the course for part-time students. This should therefore be much more prominent in the interface.

3.3.3 Proposed design

Based on our findings, we propose to improve the design (Figure 9) of the teaching breakdown section in 2 ways:

1. By providing an additional column for data for all years combined (which will be applicable to both full time and part-time students)
2. By making the link to part-time students more conspicuous by removing it and placing it above the title box.

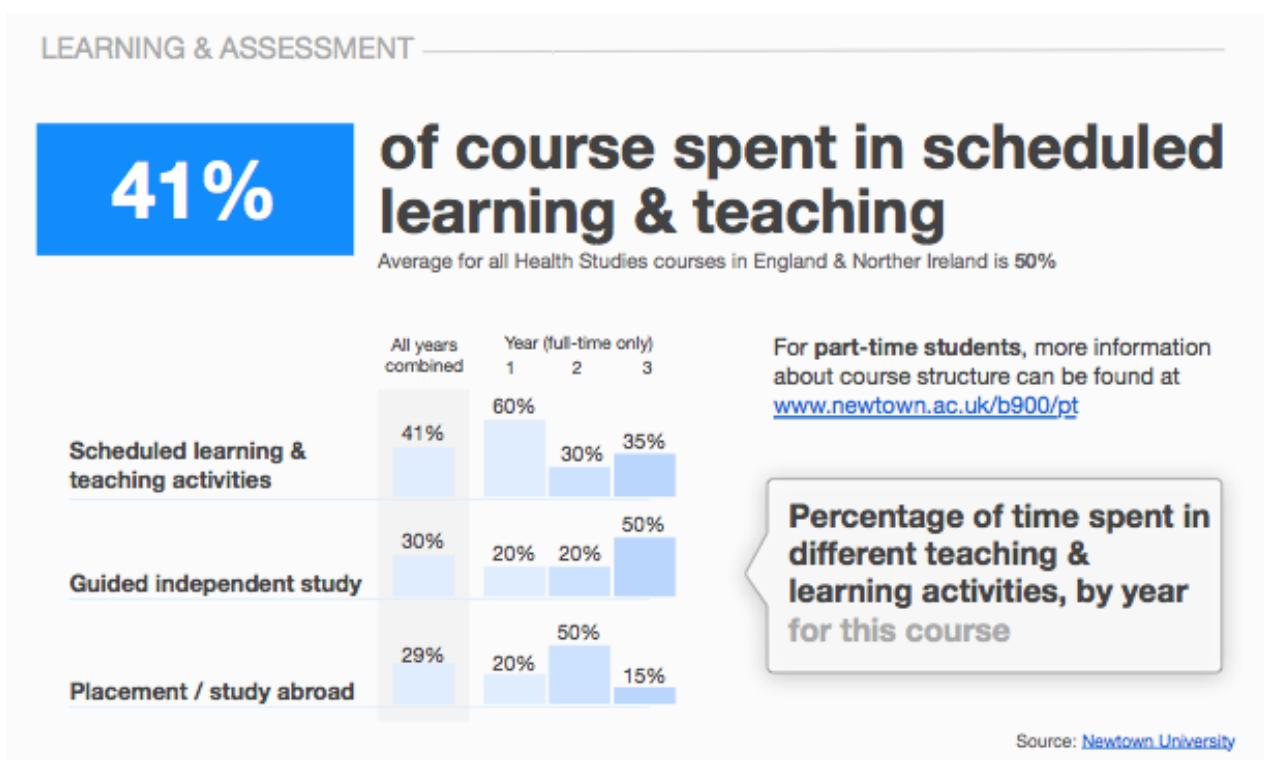


Figure 9. Proposed design solution to meet the information needs of both part-time and full-time students

3.4 How should we represent data for joint honours students?

We produce two design mockups (Figure 10) to present KIS data for joint honours students. In one, we presented the average data for the contributing honours courses, plus links to individual KIS pages. In the other, we provided a tabbed view of the data, so that students could select whether to view the average data or the data for each individual honours course.

In user testing sessions, the tabbed version was well received. As with data aggregation for the other designs, students are very wary of viewing only aggregated data.

In a remote, unmoderated usability test, the tabbed approach was also heavily preferred (86% preference, n=28). Feedback included:

'It gave satisfaction scores in both subjects individually as well as the two together, so prospective students can get a feel of how the two subjects are (statistically) both joint and separately'

'Tabs up top look more user friendly.'

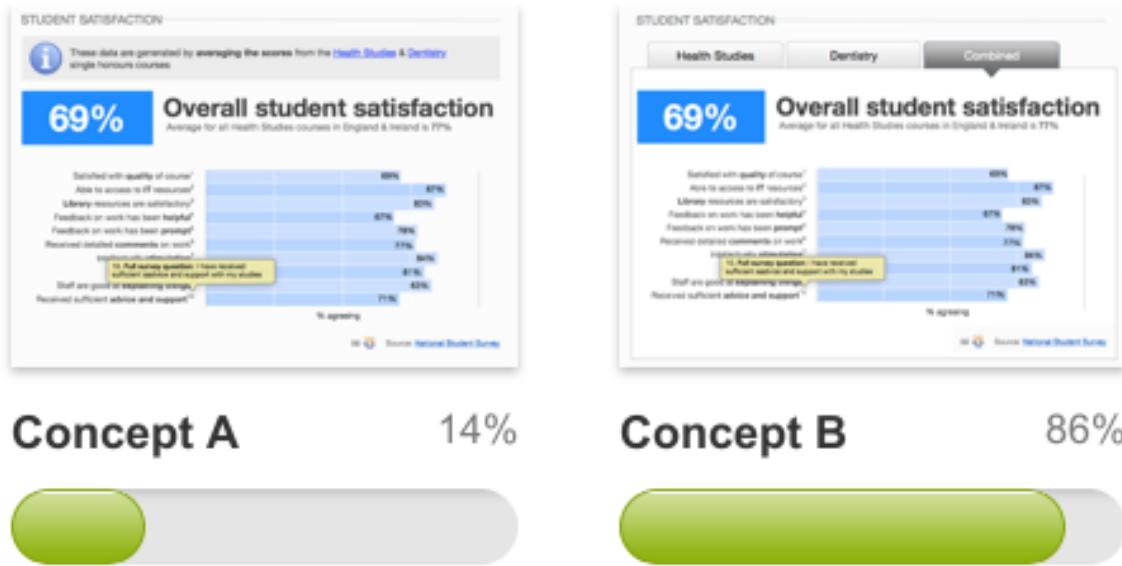


Figure 10. Comparison of designs and user preference for tabbed and non-tabbed approaches to presentation of joint honours data

4 Conclusions

- Students are very wary and distrusting of any data which are aggregated; they may fear that aggregation is being used to cover up less impressive data, or may simply provide misleading statistics.
- Students dislike the idea of having no data more than they dislike the idea of having aggregated data.
- Preferred approaches are to (i) provide links to alternative, but similar un-aggregated KIS data (e.g. to specific courses within the same faculty or department, so that students can get a ‘flavour’ of the quality) and (ii) to hide any aggregated data until appropriate warnings and explanations have been provided (i.e. progressive disclosure)
- Students like to explicitly see the source of aggregated data provided
- For Joint Honours degrees, providing a tabbed approach whereby all KIS data for contributing courses could be viewed in one place, appeared to be an effective approach
- Part-time applicants have different balance within their information needs, with an increased emphasis on teaching and learning breakdown. Providing an overall, combined teaching breakdown for all years will help these students, as will a more prominent link from within the KIS to more detailed information for part-time students on University course pages
- If two years of data are to be used for courses with small intakes, a very clear explanation of what this means is needed.

Abbreviations used

DLHE	Destinations of Leavers from Higher Education survey
HEFCE	Higher Education Funding Council for England
KIS	Key Information Set
NSS	National Student Survey
RITE	Rapid Iterative Testing and Evaluation