



UKES 2015

Students' perceptions of skills development

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Executive summary

Context

The UK Engagement Survey (UKES) is an undergraduate survey that focuses on:

- > (a) the amount and quality of effort that they have invested in their studies, and (b) the extent to which their institution and course have supported and encouraged them to engage;
- > 2015 marks the third year of UKES and its first as a full-scale undertaking;
- > it is firmly designed for enhancement; institutional results are not made public, and results are provided to institutions to aid reflection on the quality of teaching and the level of student learning within the institution;
- > the survey is based on the National Survey of Student Engagement (NSSE), a well-established US survey now in use all over the world. Following NSSE, UKES draws on decades of research into student learning and focuses on those educational activities known to contribute to effective learning;
- > UKES includes 22 core items (used by all participating institutions) and 26 optional items for institutions to use if they wish. Both core and optional items focus on educational activities that are central to higher education (HE), including critical thinking, collaborative learning, interaction with staff and engagement with research;
- > as well as items exploring students' engagement with important educational practices, UKES also includes items asking students to rate their development of a range of skills and abilities, in addition to the amount of time that they spend on different kinds of activities;
- > twenty-four institutions took part in UKES 2015, down from 32 in 2014. However, the number of student responses has remained largely the same: 24,387 in 2015, compared to 25,533 in 2014. The overall response rate has increased from 13% in 2014 to 17% in 2015;
- > UKES 2015 comprised a broadly representative cross-section of students, including students from a range of different kinds of institution;
- > this report is designed to provide the sector with an insight into UK students' engagement with their studies. HEA also provides tailored benchmarking reports to participating institutions to enable them to explore and interpret their own results.

Key findings

- > in terms of overall results, students reported the highest level of engagement in those activities standardly taken to be core to a truly 'higher' education: taking responsibility for their own learning, being challenged to do their best work, and learning things that change the way they think about issues;
- > conversely, students reported the lowest level of engagement for activities that are less core, and would be expected to be less widespread: talking to staff about their career plans, working with staff on activities other than coursework, contributing to a staff–student community, and working with staff to evaluate teaching and assessment practices;
- > beyond the overall engagement findings highlighted above, this report focuses in detail on one aspect of the UKES questionnaire: students' reported development of a range of skills and abilities;

- > UKES includes 12 items asking about skills development, encompassing core academic skills (e.g. critical thinking, writing clearly and effectively, and analysing numerical information) and wider aspects of personal development (e.g. understanding people of other backgrounds, being an informed and active citizen, and developing personal values);
- > students reported the most development for two fundamental skills in HE: becoming an independent learner and thinking critically and analytically. Fifty per cent of students reported a very high level of development towards becoming an independent learner, the figure was 43% for thinking critically. The lowest development was reported for acquiring employability skills and being an informed and active citizen (with 25% and 23%, respectively, reporting a very high level of growth);
- > analysis showed that the 12 skills items fall into two distinct groups: those focused on harder, more traditional academic abilities (such as analysing numerical information), and broader, softer skills (such as understanding people of other backgrounds);
- > Science, Technology, Engineering and Mathematics (STEM) students report much higher development of hard skills than soft skills. They also report much lower development of soft skills than other students. For example, for the item on understanding people of other backgrounds, 49% of STEM students selected 'very much' or 'quite a bit' compared with 80% of health students;
- > there is remarkably little variation between the different disciplines for the items addressing the fundamental skills of critical thinking and becoming an independent learner. However, there are predictably large differences between disciplines for the item on analysing numerical and statistical information;
- > students perceive greater development of hard skills as they progress through their course. However, for the softer skills, only STEM students reported greater growth in later years; for other students, the reported growth in the final year was no stronger than that reported in the first year;
- > women report greater skills development for soft skills, across all discipline clusters, while Black students report higher development of both hard and soft skills than the other ethnic groups (White, Asian, Chinese, Mixed and Other);
- > students at post-1992 institutions report a markedly higher level of soft skills development than those at pre-1992 institutions;
- > all of the engagement scales covered by the UKES questionnaire make significant contributions to students' perceived skills development, indicating that students' perceptions of their skill development is related to their sense of engagement. For the development of both hard and soft skills, the biggest contribution was made by the engagement scales focused on critical thinking and course challenge, engagement with research, and reflective and integrative learning;
- > for the four skills development items that address particularly 'broad' skills (developing personal values, understanding people of other backgrounds, exploring real-world problems, and being an informed and active citizen) the relationship is strongest with the scales covering engagement in reflective and integrative learning;
- > for all twelve of the skills development areas, students who participate in extra-curricular or co-curricular activities report stronger growth than those who do not; the difference is particularly large for developing the ability to analyse numerical information;
- > students who reported working for pay reported only slightly greater growth in employability skills than those who did not;
- > students who spend time volunteering are more positive about becoming an informed and active citizen.

Introduction

Background to UKES 2015

The UK Engagement Survey (UKES) started life in 2013 as a small-scale project to allow a handful of institutions to share and compare their students' engagement. Most of those institutions were already well along the path to developing engagement surveys, and the Higher Education Academy (HEA) initiative (not yet called UKES) was simply to pool those efforts and make sure that institutions would be able to benchmark their results within the UK. That UKES now reaches 25,000 students is testament both to the profile of student engagement, and to the desire for more detailed feedback from students about their learning and teaching experiences than are offered by the National Student Survey (NSS).

Current signs suggest that the NSS will change in the future to encompass more questions about students' learning experiences, but it will always focus on quality assurance: ensuring that students receive the basic elements of a good customer experience. UKES comes from a different tradition. It is based on the National Survey of Student Engagement (NSSE), a North American survey that was designed to be more ambitious; to represent a particular positive picture of an engaged learning experience. UKES thus does not just give more detail, but focuses attention on the kinds of activities and behaviours that are not necessarily central to a students' customer experience, but are key to the transformational aspect of higher education (HE).

A fuller background to UKES can be found in the annual reports from 2013 and 2014.¹ There have been a small number of changes to the UKES questionnaire since 2014, responding in part to the cognitive interviewing undertaken with students last year.² A new pilot scale has been developed that focuses on a relatively new priority in the UK: engaging students as partners in their learning experiences. Drawing on the HEA's work in that area, the three items in the scale ask students about contributing to a wider learning community, working with staff to improve courses, and working with staff to evaluate learning and teaching.³

The items about students' engagement in, and with, the process of research and inquiry have been modified. Based on the cognitive interviewing the two scales from 2014 have been combined and condensed into a single four-item scale asking about the emphasis in the course on the methods and outcomes of research, formulating and exploring lines of inquiry, and doing research.

For 2015, UKES was run exclusively on the Bristol Online Surveys (BOS) platform, bringing it into line with the HEA's other surveys of taught and research postgraduate students. This means that there was greater consistency in how students were presented with the questionnaire, as well as facilitating the data collection process. As in previous years, there was considerable flexibility in how institutions could choose to use UKES; they could choose from four optional scales in addition to the four core scales, as well as being able to add their own questions.

Students' development of skills and abilities

This report explores in detail the results from one particular aspect of this year's UKES: students' feedback on how their skills and abilities have developed. UKES includes 12 items that ask students to reflect on how much their overall student experience has contributed to their knowledge, skills and personal development in a range of different areas, from core academic skills like writing clearly and thinking critically, to broader skills like being an informed and active citizen. They allow us to collect data on students' own sense that they have grown and developed over the course of their studies.

Ten of the skills development items come from the National Survey of Student Engagement. The remaining two – on being innovative and creative, and becoming an independent learner – were developed specifically for UKES and came out of the cognitive interviewing undertaken in 2013 (Kandiko Howson and Matos 2013).

¹ Buckley (2013) and Buckley (2014).

² Kandiko Howson and Matos (2014).

³ Healey *et al.* (2014).

Including the skills development items in UKES allows us to explore the relationship between perceived development and various student and institutional characteristics (gender, institution size, etc.). This can illuminate unexpected ways in which different groups of students rate their progress. We can see whether disciplines differ in expected ways, whether students at pre-1992 and post-1992 institutions feel any different, and we can explore how (and whether) students perceive higher levels of growth as they proceed through their programmes.

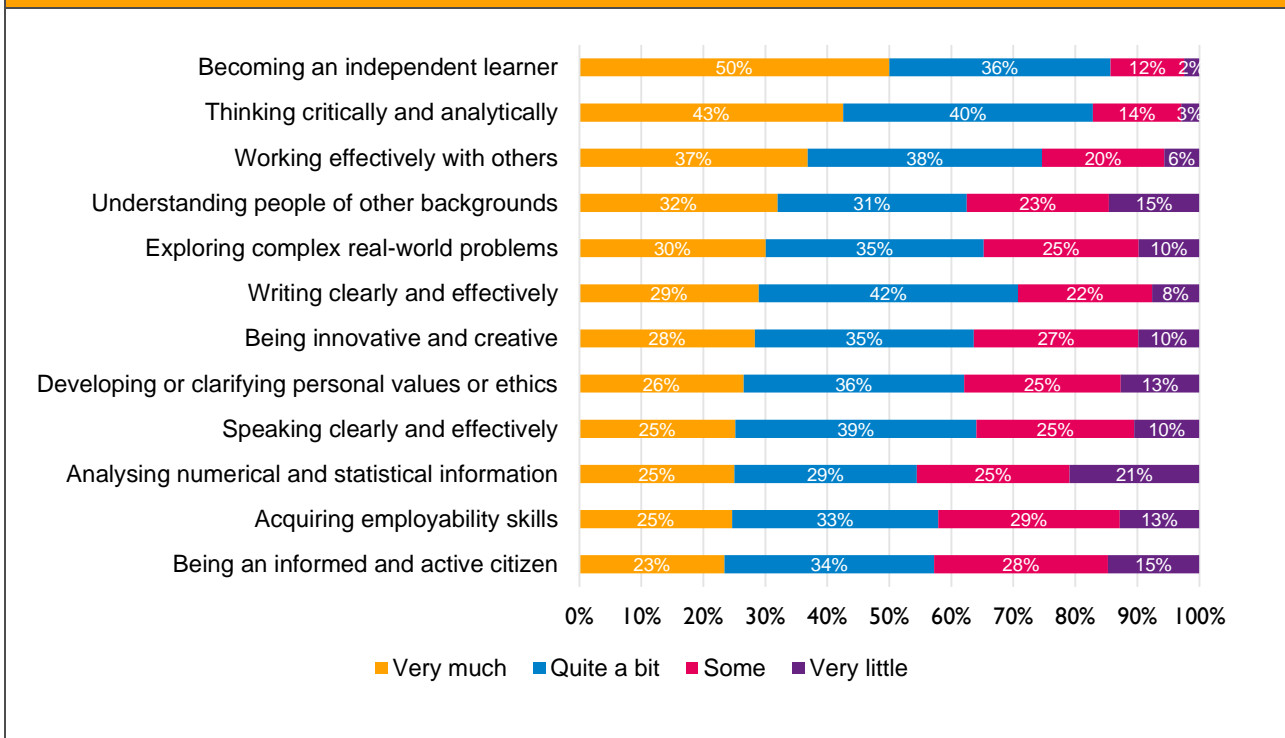
We can also investigate the relationship between perceived development and student engagement. There has been much previous work in the US on how subjective measures of learning relate to the kinds of learning activities that students engage in.⁴ The bulk of UKES is focused on student engagement: engagement in critical thinking, collaborative learning, staff–student interaction, staff–student partnerships, reflective and integrative learning, and engagement with research. This allows us to explore how the perceived development of particular kinds of skills and abilities correlates with particular kinds of engagement. Student engagement has become a priority in the UK over the last few years, but what is the relationship between engagement and students’ sense of how they have benefitted from their course? By exploring the links between engagement and perceived growth we can develop a better sense of the impact and value of engagement.

⁴ See for example Kuh *et al.* (1997) and Pike (2006).

Students' perceptions of skills development

Overall results for skills development items

Figure 1: How much has your overall student experience contributed to your knowledge, skills and personal development in the following areas?



(n = 19,746)

Figure 1 shows the extent to which students feel their knowledge, skills and personal attributes have developed as a result of their experience. The two areas where students perceive the most development align with what many would perceive as the hallmarks of a truly 'higher' education: becoming an independent learner, and thinking critically. Half of all students reported a very high level of development in becoming an independent learner, with a further 36% reporting a reasonable level of development. Only 2% felt that they had developed very little. Over 80% of students reported development of critical thinking skills. Cognitive interviews with students undertaken last year confirmed that these two areas are seen by them as the core outcomes of study at HE level (Kandiko Howson and Matos 2014). At the other end of the spectrum, only around a quarter of students perceived a high level of development in 'softer' skills around citizenship, employability, communication and personal values.

The weak development reported for the analysis of numerical information, when it is a core aspect of many programmes, is largely due to disciplinary differences. This is discussed below.

Factor analysis

Factor analysis was undertaken to explore the structure of the 12 skills development items. Factor analysis uses patterns in the correlations between items to reveal particular elements of students' experiences, or 'constructs', that the items express.

The factor analysis showed that the 12 skills development items fell into two distinct groups, as shown by the table below⁵. The values indicate the influence that the results for each item has on each of the two constructs.

Table 1: Factor analysis of skills development items

	Component	
	1	2
Understanding people of other backgrounds (economic, racial/ethnic, political, religious, nationality, etc.)	0.908	-0.140
Developing or clarifying personal values or ethics	0.846	-0.012
Being an informed and active citizen	0.807	0.035
Exploring complex real-world problems	0.718	0.104
Working effectively with others	0.493	0.283
Being innovative and creative	0.442	0.351
Analysing numerical and statistical information	-0.259	0.800
Thinking critically and analytically	0.137	0.704
Writing clearly and effectively	0.222	0.580
Becoming an independent learner	0.210	0.553
Acquiring employability skills	0.248	0.529
Speaking clearly and effectively	0.405	0.446

0.20 – 0.29	0.30 – 0.39	0.40 – 0.49	0.50 – 0.59	0.60 – 0.69	0.70+
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The results show that students' perceptions of skills development, as measured by the 12 items in UKES, fall into two distinct elements.

The first element covers the skills focused on values, interpersonal relationships, emotional intelligence and other areas that, while of fundamental importance, are often seen as less 'academic' in nature, and rarely receive explicit focus within programmes. There is evidence from student interviews that some students felt these items to cover secondary outcomes of a university experience. The strongest loading item (which has the strongest influence on the factor) asks about students' improvements in understanding people of other backgrounds (economic, ethnic, etc.).

The second component encompasses skills traditionally deemed more 'academic', in the sense of receiving explicit focus within programmes: speaking and writing clearly, thinking critically, etc. The item on analysing numerical and statistical information has the strongest influence on the factor. The item on speaking clearly and effectively also loads moderately on to the first component, but will be used to form the second component in the analyses that follow. Together these two components explained 56% of the total variation in the results for the 12 skills development items.

There were some differences in the way these items were grouped when the factor analysis was performed for different discipline areas. For instance, while employability skills fell into the more narrowly academic skills group when all students were included, for students in Health Sciences and Science, Technology, Engineering and

⁵ Principal Components Analysis was used, with Direct Oblimin rotation. Parallel analysis was used to determine the number of components to extract, and only values above 0.4 have been included.

Mathematics (STEM) subjects this item formed part of the set of softer skills. Similarly, while becoming more innovative and creative constitutes an aspect of the softer skills overall, for students in Health Sciences and the Arts and Humanities this was part of the more academic skills set. Individual discipline also stood out individually: for STEM students, verbal communication fell into the softer skills; for Health Sciences students, becoming an independent learner similarly fell into the softer skills; and, perhaps predictably, for students in the Arts and Humanities the analysis of numerical information formed part of the softer skills.

In the analyses that follow, we will use the two skills factors derived from all student responses, putting aside these differences between the discipline clusters. The reliabilities for the two components within each cluster were above acceptable levels.⁶ For ease of use we will call the set of six items that contribute to the interpersonal and values-focused factor the 'soft skills' scale.⁷ We will refer to the set of six items that contribute to the other component focused on more narrowly academic skills as the 'hard skills' scale. However, these labels are simply used for convenience, and the two components are defined by the items that contribute to each of them.

Differences by student characteristics

In this section we look at how perceptions of skills development differ when broken down by a range of important student characteristics. For many facets of students' engagement and experience, their subjects of study have a powerful impact. Differing study environments, pedagogic traditions and academic values can dramatically affect responses to surveys like UKES. The first student characteristic we look at, therefore, is discipline.

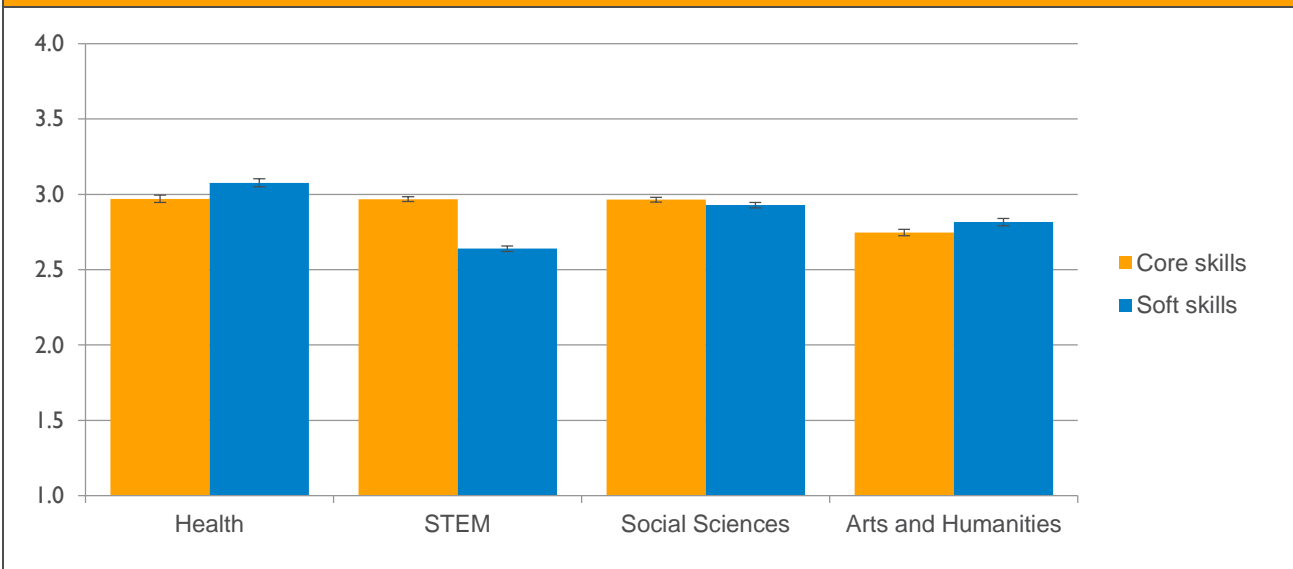
Discipline

The chart shows the mean average score on the two skills scales for the students in the four different discipline clusters. The score is created by treating the responses in the items numerically (with one being 'very little' and four being 'very much') and averaging the values for the six items in each of the skills scales. Error bars have been applied where these mean scores are used; error bars are a statistical device to show the range within which the true value can be expected to fall, with a confidence level of 95% (i.e. 19 times out of 20). An overlap of error bars indicates that the difference is not statistically significant, and could be due to chance.

⁶ The Cronbach's alpha values for the hard skills scale were between 0.77 and 0.83. For the soft skills scale they were between 0.84 and 0.88.

⁷ A 'scale' is a technical term for a group of survey items that address a particular construct or dimension (of students' experiences, in this case).

Figure 2: Mean scores for skills scales, by discipline cluster

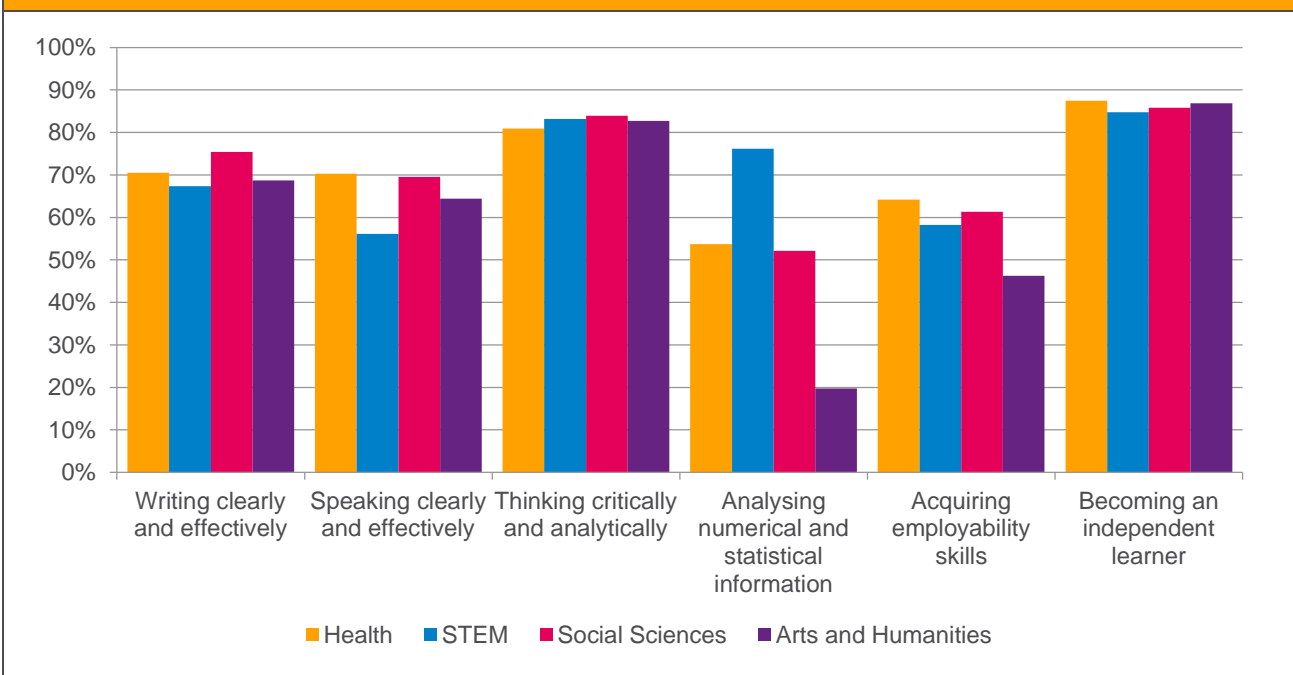


(n = 19,070)

For students in STEM disciplines, there is a significant difference between their perceived development of hard and soft skills. The chart also shows that there is a reasonable amount of variation in soft skills development across the discipline clusters. The hard skills scale is comparatively consistent: only Arts and Humanities have a distinctive perception of the development of core skills (hard skills), being significantly lower than for the other discipline clusters.

The chart below presents these results in more detail, by showing the percentage of students in each discipline cluster who felt that their experiences had improved their skills 'very much' or 'quite a lot' – the two most positive of the four response options – for the individual items in the hard skills scale. For some skills there is a wide variation between the clusters. Unsurprisingly, the biggest difference is for analysing numerical and statistical information, with 20% of Arts and Humanities students reporting strong growth, compared to 75% of STEM students. For other items, there is remarkable consistency: for both critical thinking and becoming an independent learner, the clusters are separated by less than 5%.

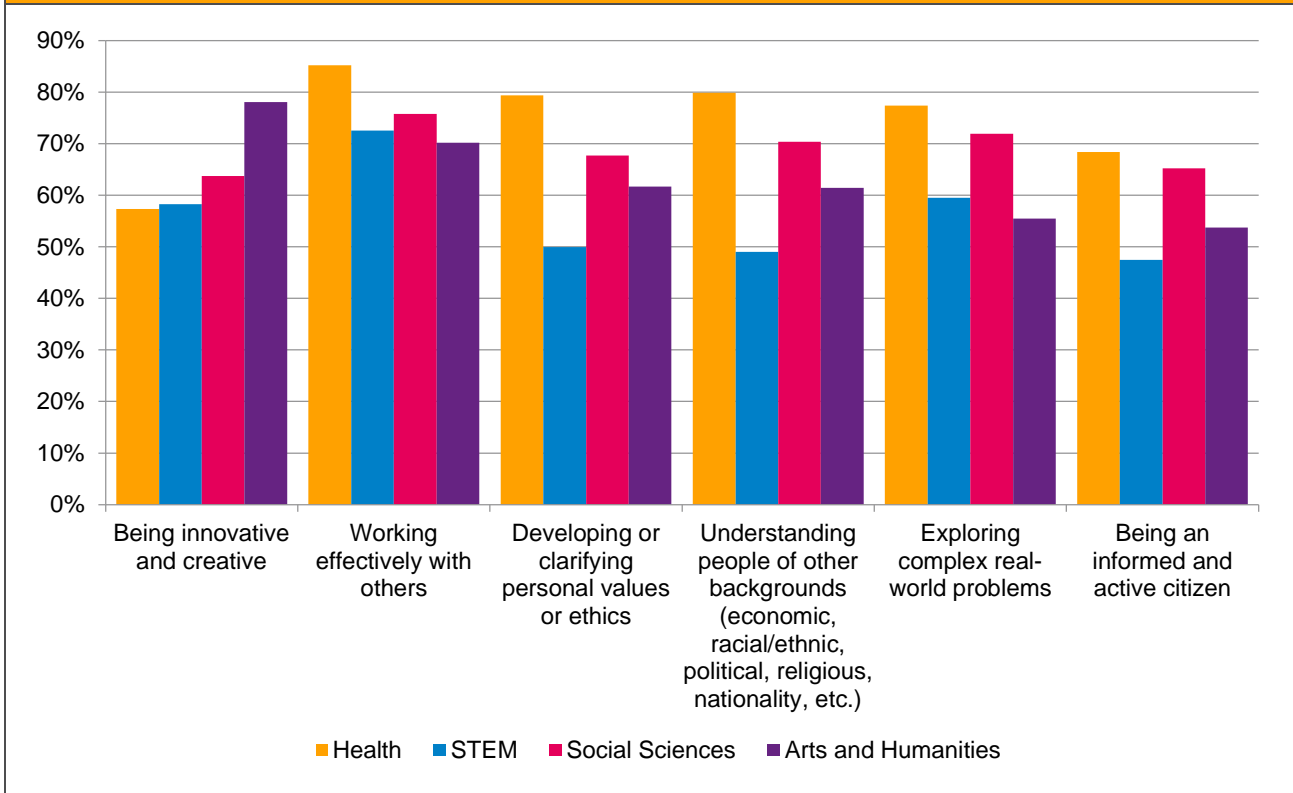
Figure 3: Percentage positivity for hard skills items, by discipline cluster



(n = 19,232)

Figure 4 again shows a breakdown by discipline cluster, but for the six items in the soft skills scale. The low proportion of students in STEM subjects reporting the development of these broader, less narrowly 'academic' skills is particularly apparent. Students in Health Disciplines are most likely to report strong growth for all items except the item relating to being innovative and creative. For that item Arts and Humanities students are markedly more positive than those from other discipline areas.

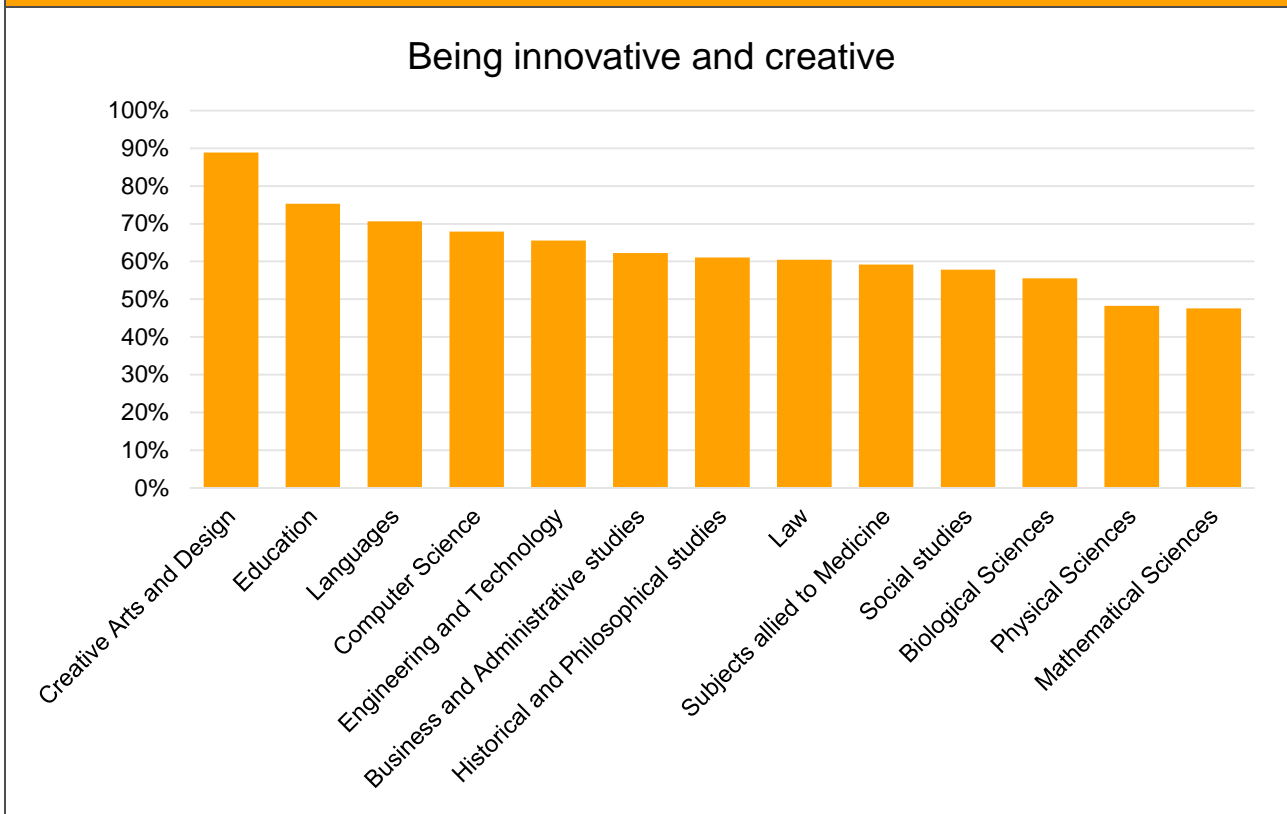
Figure 4: Percentage positivity for soft skills items, by discipline cluster



(n = 19,232)

Combining a wide range of diverse disciplines into four clusters allows us to paint a broad picture, but disguises the differences that exist between individual disciplines, even when they are reasonably similar. The following chart shows the proportion of students selecting the two most positive options in response to the item on development of the ability to be innovative and creative. The results are broken down into 13 individual disciplines. While Figure 4 shows that Arts and Humanities students stand out as much more positive in that area, Figure 5 shows that, at a finer grain, students in both Computer Science and Engineering and Technology reported stronger growth than those in Historical and Philosophical Studies.

Figure 5: Percentage positivity for 'Being innovative and creative' skills development item, by discipline⁸

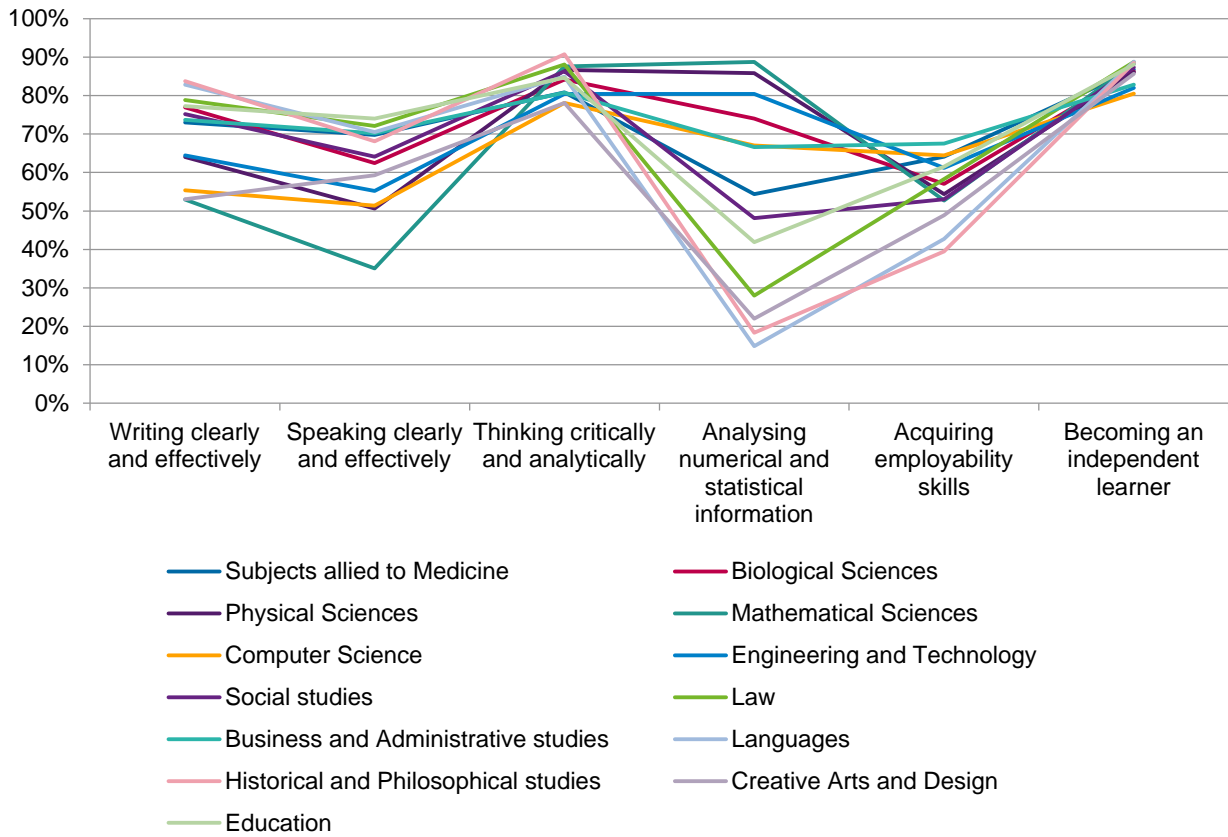


($n = 19,107$)

Figures 6 and 7 show the differences between disciplines for the individual items in the two skills development scales. Figure 6 shows the six items focused on hard skills. The clustering of results for both critical thinking and becoming more independent is particularly pronounced (and mirrors Fig. 3). Also clear is the wide variation between disciplines for 'Analysing numerical and statistical information', and the even spread of disciplines across the range from 15% for Languages to 89% for Maths. Maths is a particular outlier for clear and effective speaking, with a score 15% lower than Physical Sciences, the next lowest.

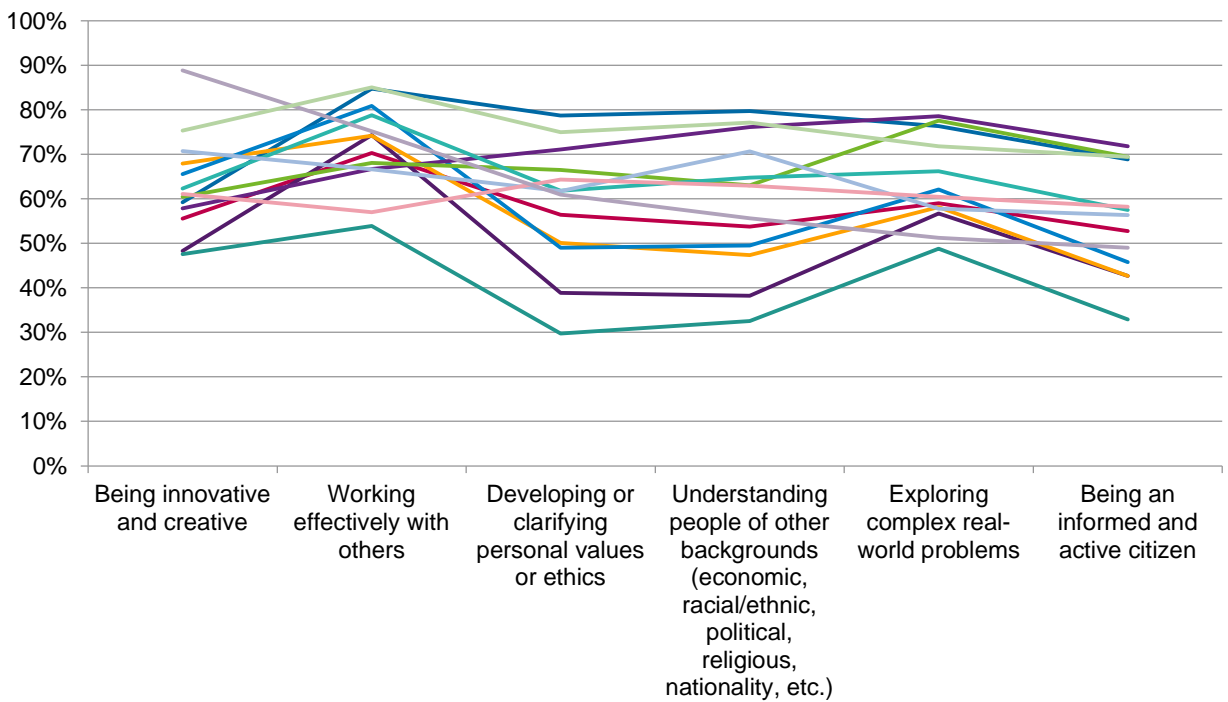
⁸ Only disciplines with at least 500 student responses were included in these charts.

Figure 6: Percentage positivity for hard skills items, by discipline



(n = 19,139)

Figure 7: Percentage positivity for soft skills items, by discipline



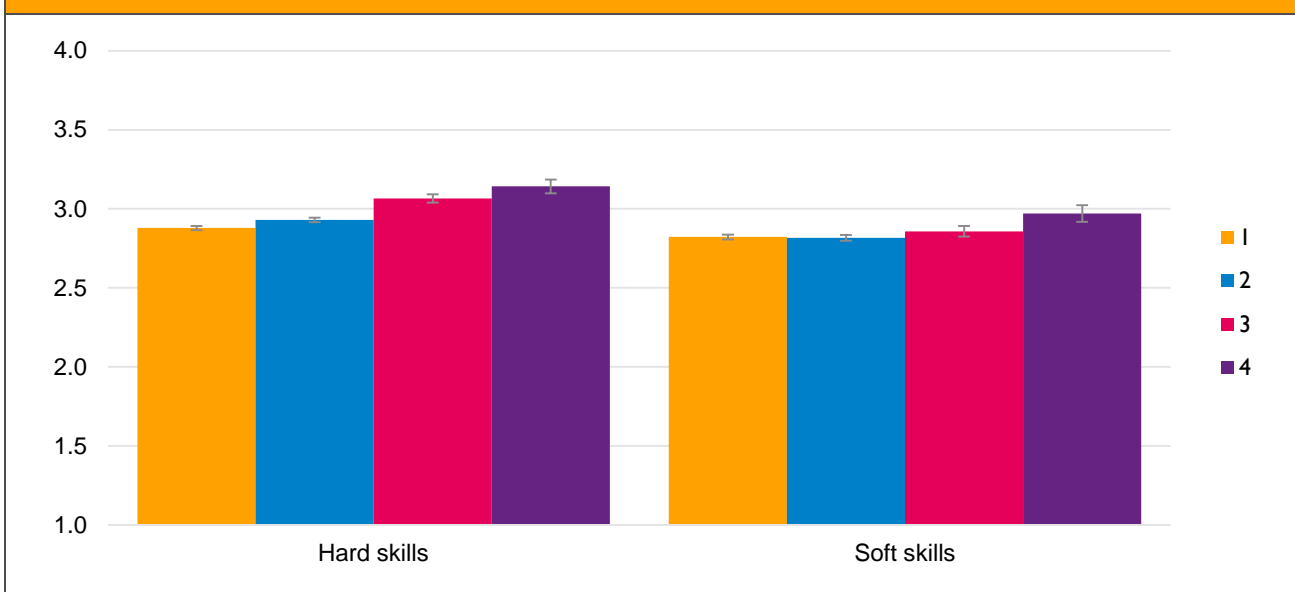
(n = 19,139)

For the items on softer skills, there is considerably more variation between the different disciplines, though there is some clustering for working well with others (with Maths and Historical and Philosophical Studies as outliers). The greatest variation is for developing personal values and understanding people of other backgrounds. For these, as for all of the items in this scale, Maths students report the lowest development. Results for Art and Design students have a particularly distinctive pattern, with a very high score for innovation and creativity, and a low score for addressing real-world issues.

Year of study

As the skills items ask students to evaluate the extent to which their experience has contributed to their development, we would hope (and expect) perceptions to increase the longer that students have been on their course. Figure 8 addresses this question, by showing the average scores for the two skills scales, broken down for the students in different years of study. In order to make an effective comparison, the chart is limited to full-time students.

Figure 8: Mean scores for skills scales, by year of study (full-time students only)



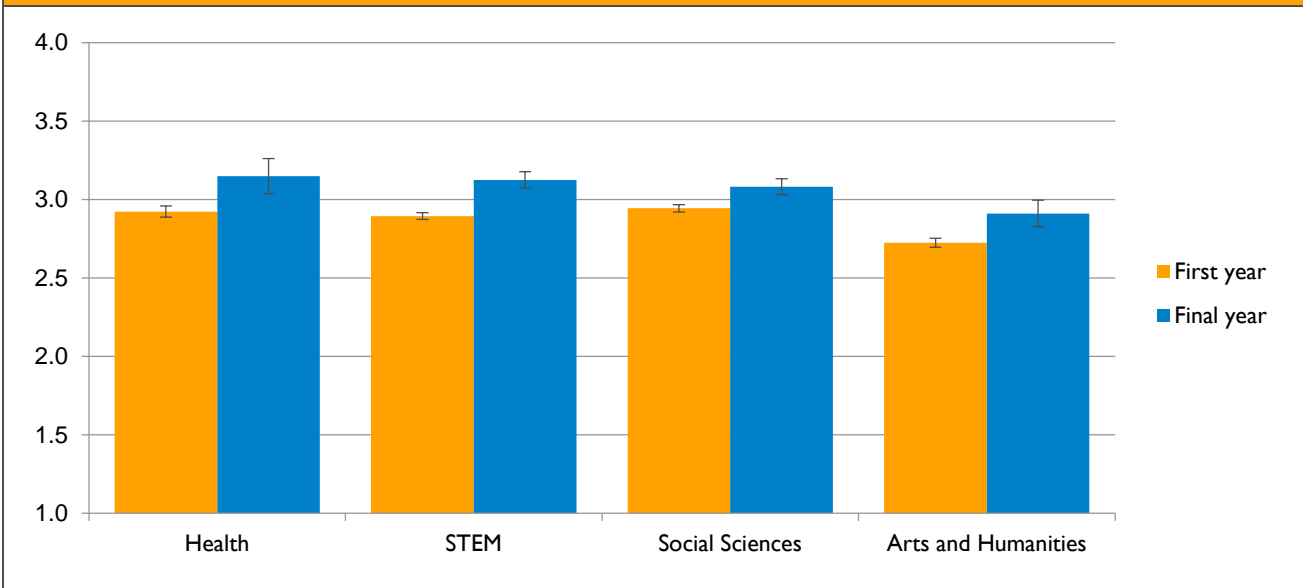
($n = 18,847$)

Figure 8 shows that there is a statistically significant increase each year in students' perceptions of their hard skills development, as they progress through their course.⁹ It is encouraging that students become progressively more positive about their development of those skills traditionally held central to higher education: thinking critically, speaking and writing effectively, quantitative analysis, developing employability skills and the ability to learn independently. For soft skills, in contrast, that kind of progression is not seen. Students in their fourth year do report statistically significantly greater development of soft skills, but that may be an artefact of the kind of (full-time) students who tend to continue to a fourth year. It is striking that for skills around interpersonal relations, values and creativity the increases by year of study are so small that we cannot be confident they are not due to random variations in the data.

Figures 9 and 10 focus on the narrower question of whether students in the first and final years of their course differ in their perceptions of skills development. To examine this in more detail, and to take into account the substantial discipline differences reported above, students in the four discipline clusters have been separated out. Figure 9 shows the results for the hard skills scale, and Figure 10 shows results for the soft skills scale.

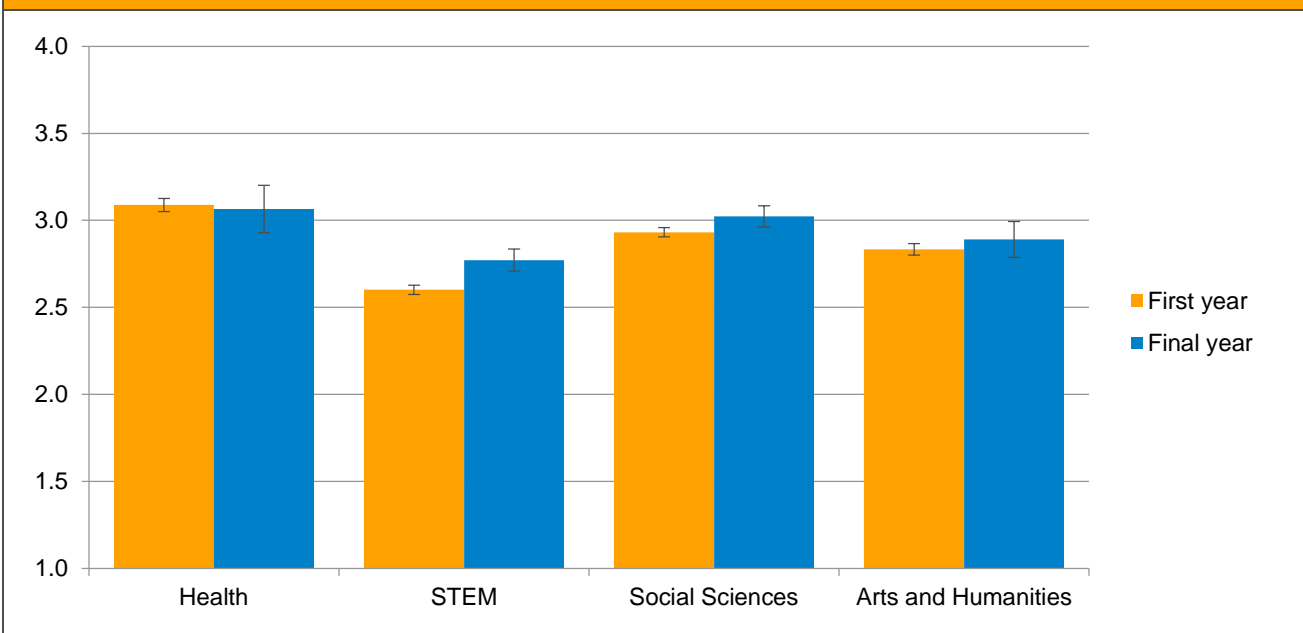
⁹ These results are cross-sectional rather than longitudinal: we cannot trace individual students as they progress through their course, instead we have to infer the experiences of such progression from the feedback from students at different stages of their course.

Figure 9: Mean scores for hard skills scale, by first and final year of study, within discipline clusters (full-time students only)



($n = 10,217$)

Figure 10: Mean scores for soft skills scale, by first and final year of study, within discipline clusters (full-time students only)



($n = 10,220$)

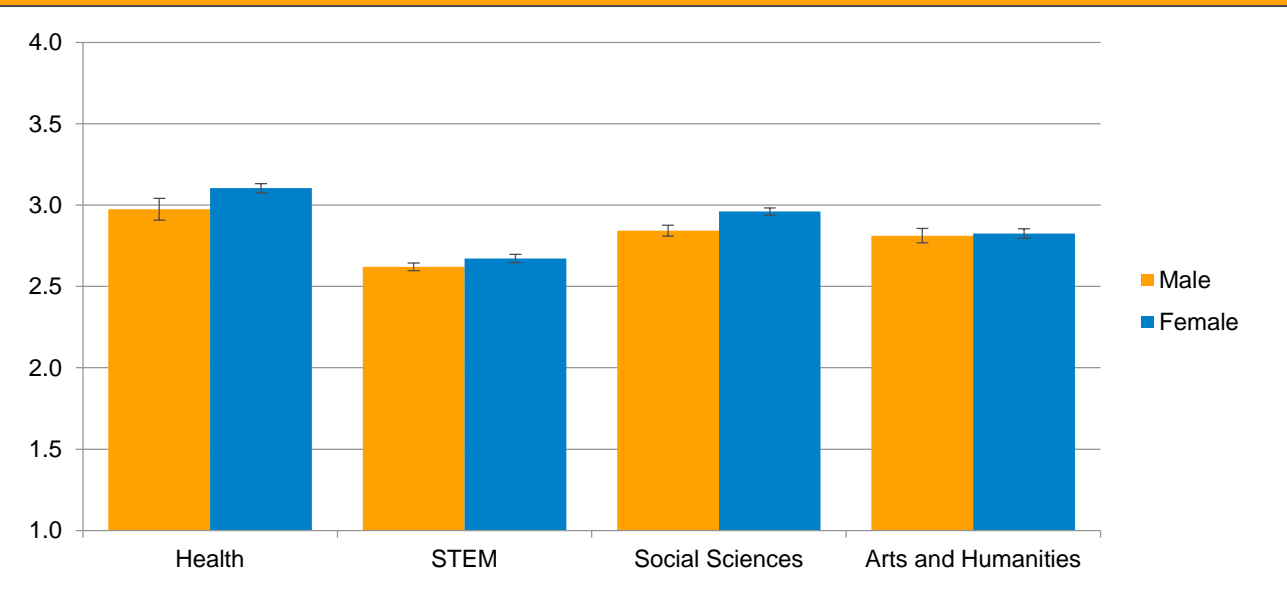
For the scale composed of items exploring the harder academic skills, in all discipline clusters students reported a greater level of growth in the final than in the first year. This offers reassuring evidence that courses across a wide spectrum contribute to students' sense that they have developed their skills in writing, thinking, speaking, learning on their own, dealing with quantitative data and those skills related to employability. The difference is still statistically significant, though less marked, for Social Sciences students.

For the soft skills scale we see a different picture. For that skills area, which more rarely receives explicit attention within a course, there is no statistically significant difference between first year and final year students for three of the four clusters. The exception is STEM; students in that discipline cluster do report a positive difference in their soft skills development in the last year of their programme.

Gender

When male and female students were compared, no statistically significant differences in their perception of hard skills development were found, in any of the discipline clusters. Differences were found for the soft skills scale, however, and the chart below shows the differences by gender within the four discipline clusters. Women reported greater development of soft skills within the Health Disciplines and also, more strongly, in the Social Sciences.

Figure 11: Mean scores for the soft skills scale by gender, within discipline clusters

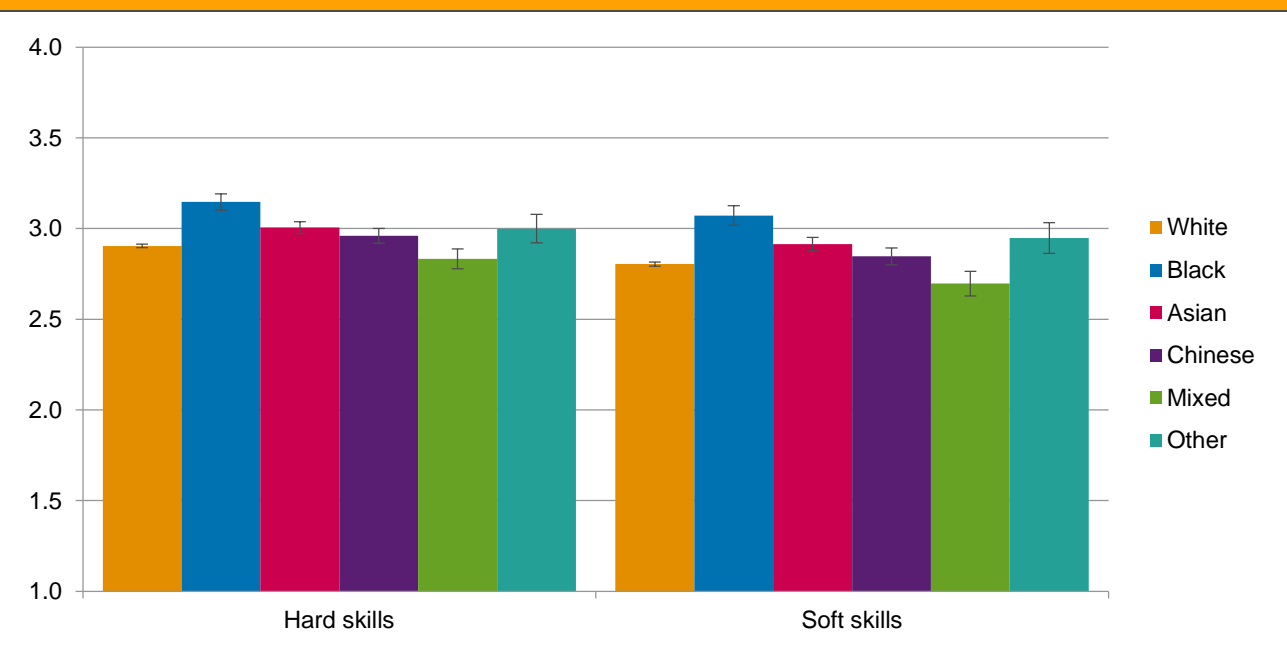


($n = 19,402$)

Ethnicity

For the first time, UKES 2015 included a question asking students to report their ethnicity. The 16 response options have been combined into six broader categories for the purposes of this analysis. When perceptions of skills development are broken down by ethnicity, black students report the highest development of both hard and soft skills. White students and mixed ethnic students are less positive for both sets of skills than all other ethnic groups.

Figure 12: Mean scores for the skills scales, by ethnicity

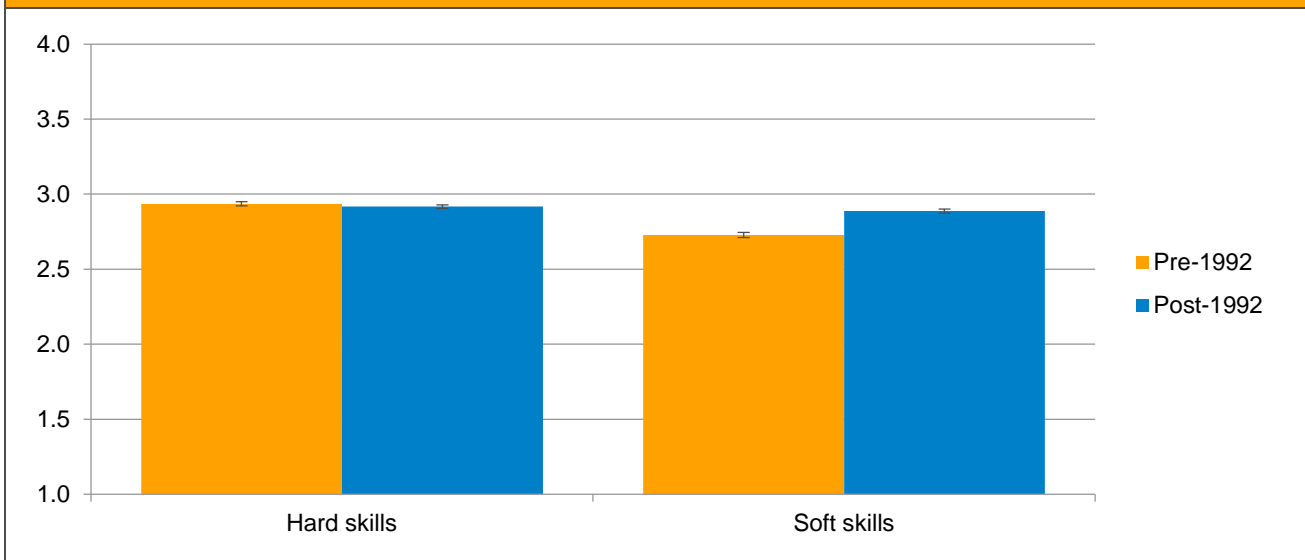


($n = 19,539$)

Institutional characteristics

As well as exploring the relationship between students' perceptions of their skills development and the characteristics that relate to them as individuals (gender, ethnicity, etc.) we can also see how perceptions differ according to the kind of institutions that students attend. As the chart below shows, differences were found between pre-1992 and post-1992 institutions on the soft skills scale, with students at post-1992 institutions reporting a markedly higher level of growth. Further analysis, not shown here, established that this difference between older and newer institutions is apparent within most disciplines. The largest differences are within the STEM cluster.

Figure 13: Mean scores for skills scales, by institution type



($n = 19,570$)

Skills development and student engagement

The fact that the skills development items are embedded in the UK Engagement Survey allows us to explore the relationship between perceived skills gains and other aspects of students' experiences covered by the UKES questionnaire. In particular, we can see how students' perceptions of how they have benefitted developmentally from their course relates to their reported engagement in the important areas: collaborating with other students; interacting with teaching staff; reflecting on, and connecting together, what they have learnt; participating in partnership activities with staff; engaging in, and with, research; and their sense of the academic and intellectual challenge they receive from their course.

A key rationale for the development of UKES was the evidence – including from US research using the National Survey of Student Engagement – that these kinds of engagement are crucial determinants of how much students benefit from HE. The analyses present the evidence on a particular aspect of this question: How does students' reported engagement on these aspects relate to their sense that they have benefitted from their studies?

Exploring the link between engagement and development – regression analysis

An effective way of looking at the relationship between survey scales is regression. This evaluates the amount of variation in a particular target scale (in our case, the hard and soft skills development scales covered in detail in the earlier sections) that is explained by other scales (in our case, the scales relating to students' engagement covered in the rest of the UKES questionnaire). Like the other analyses in this report, this does not illuminate the order of causation, but it is a good way of assessing how the different skills and engagement constructs fit together for students.

Table 2 below shows the results of this regression analysis. The table shows the 'Beta' values of the scales, which are measures of the unique contribution that each engagement scale makes to explaining the variation in each of the skills scale. The higher the value for an engagement scale, the more strongly students' responses to the skills scale are related to that engagement scale. All of the engagement scales made statistically significant contributions to each of the skills scales, indicating that from students' perspectives, their engagement in all those different facets of their course makes a real difference to their skills development. However, the contributions made by the different facets of engagement varied greatly. For both skills scales, the highest contributions were by the engagement scales covering exploring academic challenge (including critical thinking), engagement with research and inquiry, and reflecting on and connecting what has been learnt. Academic challenge contributed most strongly to hard skills, while reflective and integrative learning contributed most strongly to soft skills. Engagement with other people, in the scales on staff–student partnerships, interaction with other students and with staff, made the smallest contributions to both sets of skills.

Table 2: Results of regression of engagement scales on skills development scales

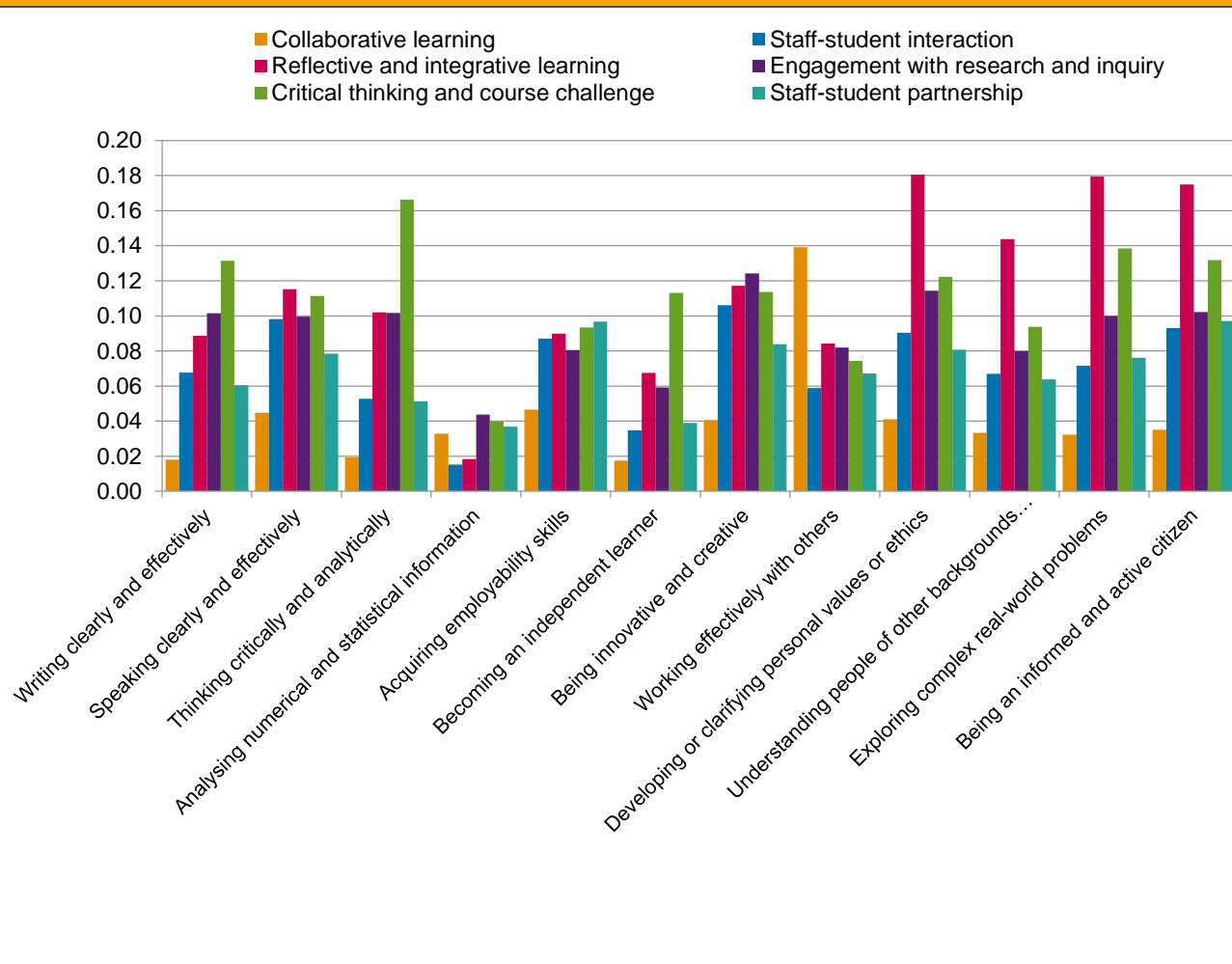
	Hard skills	Soft skills
Critical thinking and course challenge	.308	.197
Engagement with research and inquiry	.165	.141
Reflective and integrative learning	.151	.343
Staff–student partnership	.137	.125
Collaborative learning	.082	.099
Staff–student interaction	.050	.027

It is important to note that this kind of multiple regression only evaluates the unique contribution made by each engagement scale. The engagement scales are reasonably well correlated, with values ranging from 0.225 between collaborative learning and academic challenge, to 0.541 between staff–student interaction and staff–student partnerships. The regression analysis does not account for any contribution that an engagement scale might make to skills development via its correlation with another scale. The six scales taken together (including such shared contribution as well as their unique contributions) explained 43% of the variance in the core skills scale, and 48% of the variance in the soft skills scale. This indicates that students’ perceptions of engagement explain nearly half of the variation in their perceptions of skills development.

When the regression analysis was repeated for each of the four discipline clusters, the results were broadly similar. Collaborative learning makes a stronger contribution to core skills development for students in Social Sciences than in other areas, while engagement with research and inquiry makes a weaker contribution to soft skills development for Arts and Humanities students than for others.

The chart below shows the relationship between engagement and perceived skills development in more detail: at the level of the individual skills development items. The bars represent the ‘effect size’ for the relationship between the engagement scale and the item. All of the relationships are statistically significant. Effect size is a statistical measure that goes beyond significance to indicate whether relationships are of practical interest. Effect sizes above 0.14 are considered large, above 0.06 are considered medium, and above 0.01 are considered small.

Figure 14: Effect sizes for the relationship between the six engagement scales and the 12 individual skills development items



(n = 19,741)

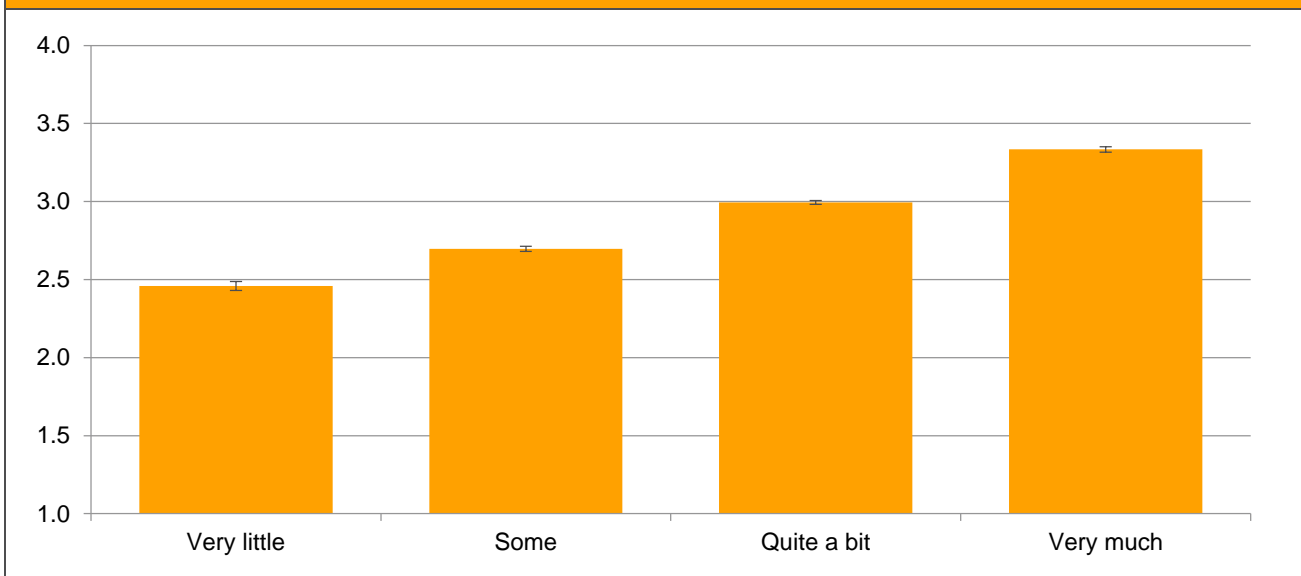
Some of the results are unsurprising, such as the large effect size for the relationship between developing the ability to think critically and analytically, and the engagement scale looking at critical thinking and course

challenge. The relationship between speaking clearly and effectively and collaborative learning has only a small effect size. It is perhaps surprising that students do not see routine interaction with other students as contributing particularly strongly to their ability to express themselves verbally. It is less surprising that the relationship between the collaborative learning scale and the item on working effectively with others has a large effect size.

For the four items that address particularly broad skills (developing personal values, understanding people of other backgrounds, exploring real-world problems and being an informed and active citizen) the relationship with the reflective and integrative learning scale has a large effect size. Students sense that they have developed such rounded and holistic skills is closely connected to how often they have reflected on what they are learning, connected their knowledge together and related it to the real world.

We can also explore the relationship between engagement and skills development from the other direction, by looking at the connection between the two skills development scales and the individual student engagement items. For the hard skills scale, there is only one engagement item for which the relationship had a large effect size: an item on learning about the outcomes of current research. The chart below shows the average score on the hard skills scale for those students selecting each of the four response options for that engagement item. Those students who felt that there was a high level of emphasis in their course on learning about the outcomes of current research reported an average score of 3.33 for the hard skills scale. Those who felt that there was very little emphasis reported a much lower average for the hard skills scale, just 2.46.

Figure 15: Mean score for the hard skills scale, by response to 'Learning about the outcomes of current research in your subject'



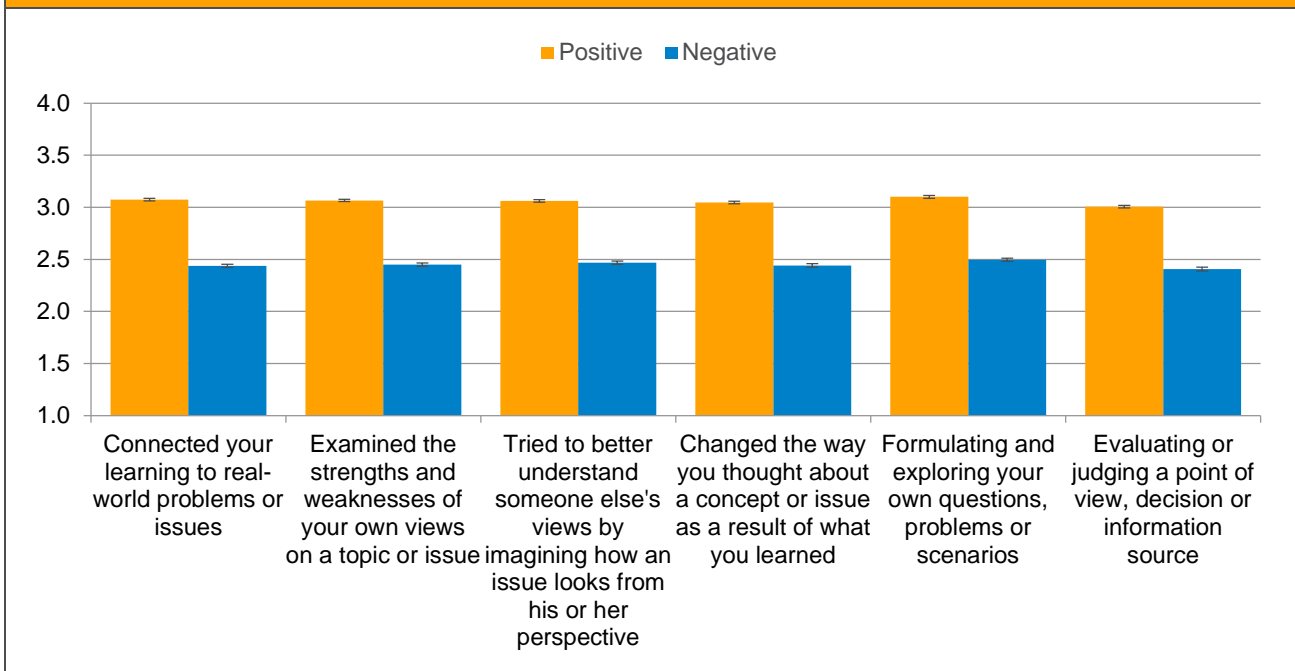
(n = 18,177)

For the soft skills scale, there are six engagement items that show a large effect size. Figure 16 below shows, for these six items, the average score on the soft skills scale, of those students who selected positive and negative responses.¹⁰ The differences for all items are at least 0.5, or half of one whole response option. For example, those students who felt that they had connected learning to real-world problems either often or very often had an average hard skills score of 3.07, compared to only 2.44 for those students who reported doing that only sometimes or never.

Of the six items that show a large effect size, four are from the reflective and integrative learning scale, one is from the engagement with research scale and one is from the academic challenge scale. All six are focused on important high-level cognitive activities.

¹⁰ For ease of presentation, the four response options have been collapsed into two. For the course emphasis questions, a positive response means 'very much' or 'quite a bit', and a negative response is 'some' or 'very little'. For the frequency items, the two categories are formed from 'very often' and 'often', and 'sometimes' and 'never' respectively.

Figure 16: Mean score for the soft skills scale, by positive/negative responses to selected engagement items



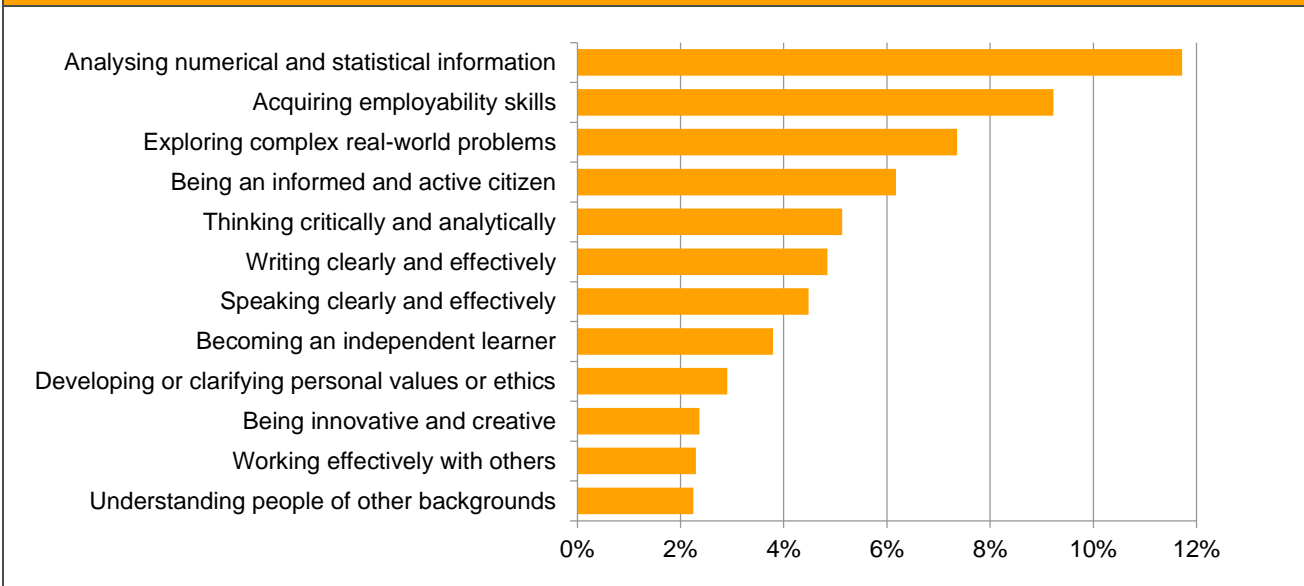
(n = 19,513)

Skills development and time spent on activities

In addition to the items asking students about their level of engagement with specific learning activities, UKES also asks about the number of hours they spend in an average week on a range of broad types of activities (working for pay, commuting, etc.). This allows us to explore the relationship between students' perceptions of their skills development, and whether they spend any time participating in three key activities: extra-curricular or co-curricular activities, working for pay, and volunteering.

Figure 17 shows the amount of difference, for each of the skills items, between students who participate in extra-curricular or co-curricular activities and those who do not. The chart shows the difference in the proportion of students who selected either of the two positive response options ('very much' or 'quite a bit'). The values in Figure 17 are all positive, indicating that for all skill areas, students who participated in extra-curricular or co-curricular activities were more positive about their skills development than those who had not. On average, students who participated in co-curricular or extra-curricular activities were nearly 12 percentage points more positive about the development of their ability to analyse numerical information than those who did not. There are also big differences for skills around employability and addressing real-world problems. For interpersonal items on working with others and understanding people of other backgrounds there is only a small difference.

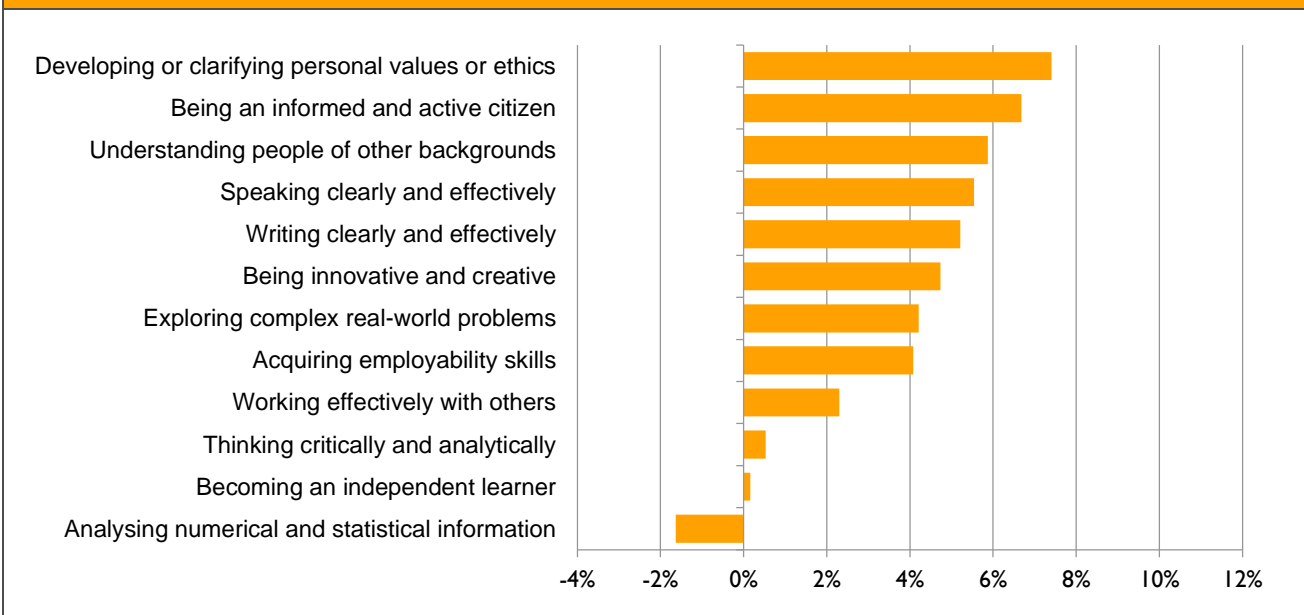
Figure 17: Difference in levels of positivity for skills development items, by whether or not they participate in co-curricular and extra-curricular activities



(n = 19,746)

Figure 18 uses the same format, but shows the difference between students who do, and do not, report spending any time working for pay. For this activity, there is one item where the difference is negative: students who work for pay are less positive about the growth of their qualitative data analysis skills. That negative difference is mostly attributable to students in the Social Sciences: for those in Health Sciences and Arts and Humanities, the difference is positive. The (positive) differences are largest for the soft skill areas: developing personal values, being an informed citizen, and understanding people of other backgrounds. Students who worked did report a stronger sense of acquiring employability skills, but the difference was relatively small (only four percentage points). There is no difference in becoming an independent learner.

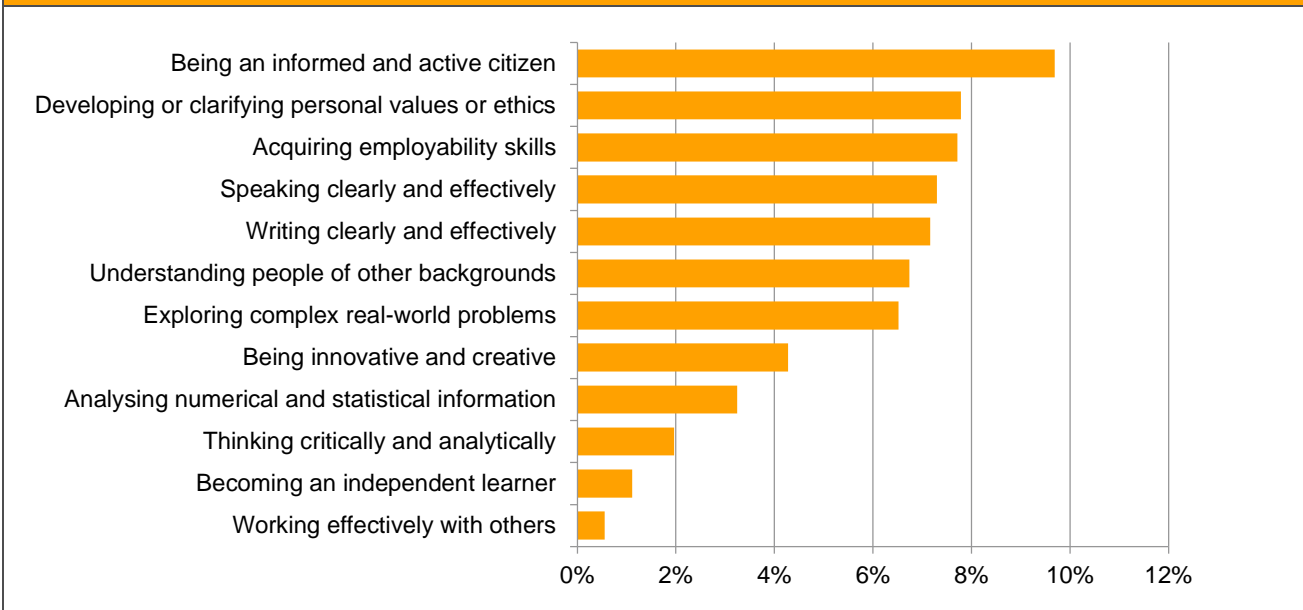
Figure 18: Difference in levels of positivity for skills development items, by whether or not they work for pay



(n = 19,746)

Figure 19 shows the difference between those students who report spending time volunteering and those that do not. Students who volunteer are particularly more likely to be positive about their development of skills around being an informed and active citizen. The smallest difference (0.6%) is for working effectively with others.

Figure 19: Difference in levels of positivity for skills development, by whether or not they participate in volunteering



(n = 19,746)

There were predictable relationships between the amount of time that students reported spending studying, and their reported skills gains. Figure 20 shows the proportion of students who were positive (selecting 'very much' or 'quite a bit') and negative ('very little' or 'some') about becoming an independent learner, by the amount of time spent on independent study. The proportion of negative responses decreases markedly as the amount of time studying increases: for those students who feel they spend 26-30 hours in independent study, over 90% are positive about their ability to be an independent learner.

Figure 20: Percentage positivity for becoming an independent learner, by amount of time spent in independent study

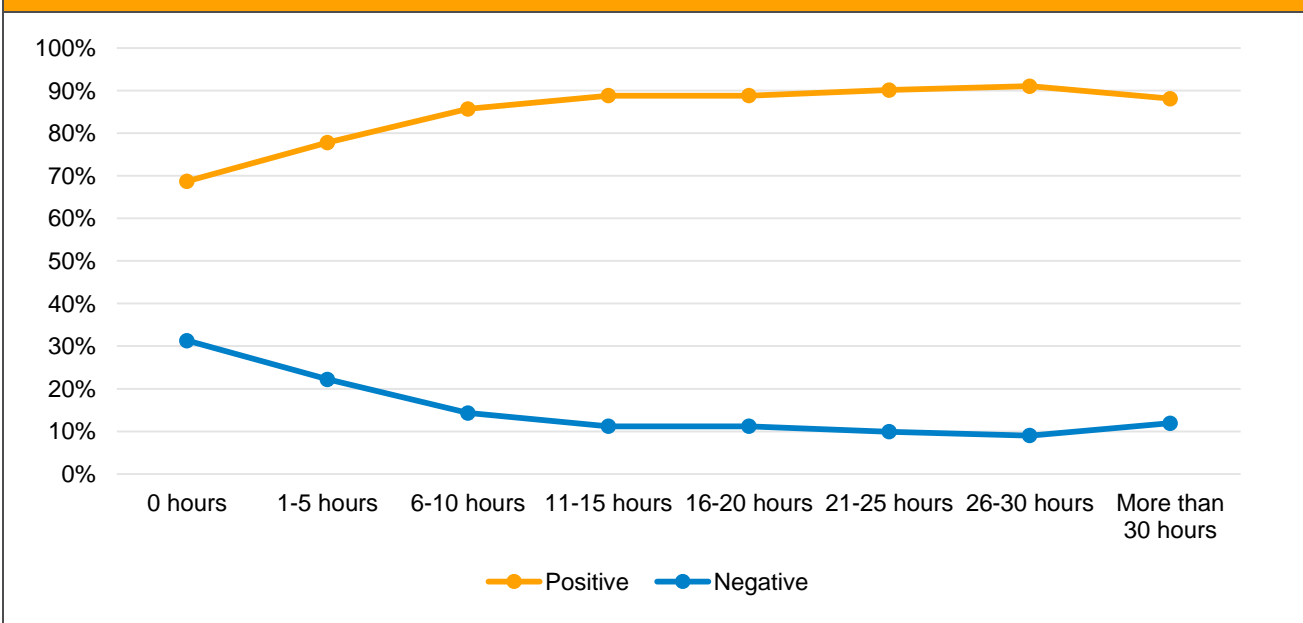
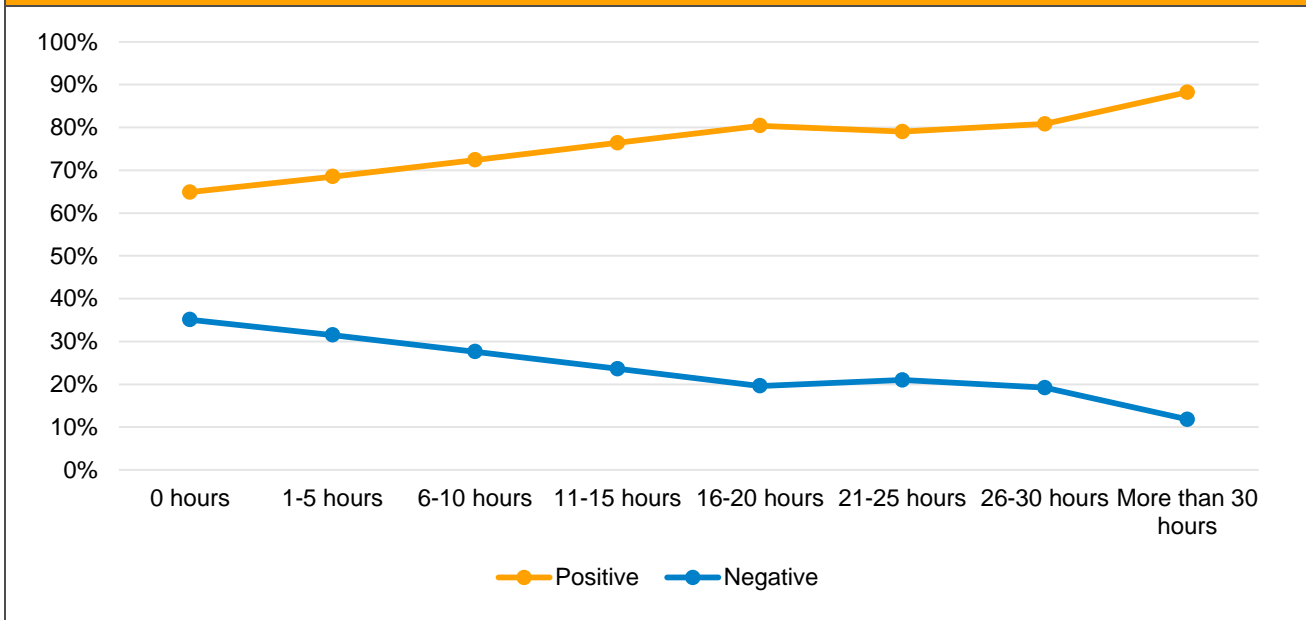


Figure 21 shows the relationship between the amount of time spent in taught sessions, and the development of the ability to work effectively with others. Again, it can be seen that the proportion of students giving negative responses decreases as the amount of time reported as spend studying increases. Of those reporting spending more than 30 hours in taught sessions, only 12% give negative responses about their ability to work well with others.

Figure 21: Percentage positivity for working effectively with others, by amount of time spent in taught sessions



Conclusions

Interesting findings were revealed about the development of two particular skills development items: thinking critically and analytically, and becoming an independent learner. These are arguably the two skills considered most definitive to higher education, and it is therefore a positive finding that students report the greatest development in those skill areas. There is also remarkable consistency on these skills between students in different disciplines, indicating that they are of fundamental importance to students across HE.

Factor analysis showed that the 12 skills development items cover two discrete areas of skills, abilities and knowledge – ‘harder’ skills covering those more narrowly ‘academic’ areas that are likely to receive explicit focus within courses, and ‘softer’ skills such as working effectively with others, developing personal values and understanding people of other backgrounds. The factor analysis revealed some differences when comparing students in different discipline areas. For example, while speaking effectively was included in the narrow set of skills overall, for students in STEM subjects it fell into the broader skills area. Similarly, becoming an independent learner was a more narrowly academic skills for students in Health Sciences, but a broader skill for other students.

There is a natural expectation that through the cumulative nature of their experience, students in later years would report a higher level of skills growth than those in earlier years. This is borne out for the hard skills scale, which consists of abilities more likely to be the explicit focus within courses. However, for the scale focused on softer skills there was no significant difference between students in their first, second and third years of study.

Interestingly, there was a notable relationship between students’ perceived skills development and their engagement in research. The individual engagement item that had a strong relationship with the ‘hard’ skills scale was an item focused on learning about the outcomes of current research. Of all the engagement scales, the scale on engagement in research and inquiry had the strongest relationship with the specific skills development item asking about being innovative and creative.

Significant relationships were found between perceived skills development, and the time that students spend on different activities. Confirming expectations, those students who reported spending more time in independent study also reported more positivity about becoming an independent learner. Those who reported spending more time in taught sessions felt that their skills in working with others grew to a greater extent. Participating in co-curricular or extra-curricular activities was related particularly strongly to the ability to analyse numerical or statistical information; it was also related strongly to acquiring employability skills.

Technical appendix

Response rate

Table 3 shows the participation in UKES over the three years of its existence. As can be seen, there has been a slight drop in the number of institutions participating compared to 2014, however, the number of responses has stayed largely the same, and the response rate has increased.

Table 3: UKES participation

	2013	2014	2015
Institutions participating	9	32	24
Number of responses	8,582	25,533	24,387
Response rate	17%	13%	17%

Scale data

Table 4 presents the headline figures for the eight different scales (or groups of questions) in the survey. The mean score represents the average result for the scale, when the responses are treated numerically. For the scale on the amount of time spent on activities, there were eight response options, for the others there were only four. It can be seen that students report the highest level of engagement for the critical thinking and course challenge scale. The standard deviation indicates the level of variation in students' averages for the items in each scale. Students differ least in their response to the critical thinking and course challenge scale, and differ most in their response to the staff–student partnership scale.

Four of the scales in UKES are used by all of the participating institutions (critical thinking and course challenge, collaborative learning, staff–student interaction, reflective and integrative learning), while three are optional. Table 4 shows the number of institutions using each of the scales.

Table 4: Scale data

Scale	Mean score	Standard deviation	Student responses	Institutions using the scale
Critical thinking and course challenge	3.22	0.55	24201	24
Collaborative learning	2.67	0.68	24354	24
Staff–student interaction	2.13	0.64	24370	24
Reflective and integrative learning	2.81	0.62	24361	24
Engagement with research and inquiry	2.74	0.77	19455	17
Staff–student partnerships	2.20	0.87	20371	20
Skills development	2.12	0.63	19762	18
Time spent on activities	2.46	0.66	21348	21

Engagement scales

Table 5 shows the highest and lowest scoring individual items from the six engagement scale sections (i.e. excluding the skills development and time spent items). Students report the highest frequency for elements of deep learning; connecting ideas from the course to prior experience, and learning something that changed how they thought about a particular concept. Students were least likely to have talked about career plans with teaching staff or advisors or working with teaching staff on activities other than coursework.

In terms of course emphasis, students reported the highest emphasis around taking responsibility for their own learning and challenging them to do their best work. The lowest emphasis was reported for two items from the pilot staff–student partnership scale: contributing to a wider learning community, and working with staff to evaluate teaching and assessment practices.

Table 5: Highest and lowest scoring items

During the current academic year, about how often have you done each of the following?	Very often	Often	Sometimes	Never
Connected ideas from your course to your prior experience and knowledge?	32.9%	43.2%	21.5%	2.3%
Changed the way you thought about a concept or issue as a result of what you learned?	21.3%	41.9%	32.3%	4.4%
Talked about your career plans with teaching staff or advisors?	6.2%	12.6%	38.5%	42.6%
Worked with teaching staff on activities other than coursework?	5.3%	10.5%	26.1%	58.1%
During the current academic year, how much has your course emphasised the following activities?	Very much	Quite a bit	Some	Very little
Taking responsibility for your own learning?	63.3%	30.8%	5.1%	0.8%
How much has your course challenged you to do your best work?	50.9%	36.1%	10.4%	2.7%
Contributing to a joint community of staff and students?	12.4%	25.2%	32.4%	30.0%
Working with staff to evaluate teaching and assessment practices?	12.5%	24.5%	32.9%	30.1%

Factor analysis

As the items in UKES 2015 have been changed slightly from those in 2014, Table 6 presents the results of factor analysis for the new questionnaire. Factor analysis uses patterns in the correlations between the items to ascertain the structure of the questionnaire, that is, what concepts can be taken to underlie students' responses. The values indicate the strength with which an item 'loads' onto a component, that is, influences it. A value over 0.4 is standardly taken to mean that an item can be considered part of a construct (whether the value is positive or negative is irrelevant for current purposes). Only the true 'engagement' items have been included, and not the questions asking about the development of particular skills and the time spent on different activities.

Table 6: Factor analysis

	1	2	3	4	5	6
Applying facts, theories or methods (for example to practical problems or new situations)	-.085	-.711	.078	-.004	.074	-.122
Analysing ideas or theories in depth	.070	-.785	-.050	.063	-.021	.020
Evaluating or judging a point of view, decision or information source	.158	-.538	-.139	-.163	-.171	.128
Forming a new understanding from various pieces of information	.084	-.663	-.037	-.080	-.049	.012
During the current academic year, how much has your course challenged you to do your best work?	.041	-.569	.074	.084	-.079	-.077
During the current academic year, how much has your course emphasised taking responsibility for your own learning?	-.038	-.471	.033	-.053	-.009	.031
Learning about the methods of research and analysis in your subject	-.086	-.163	.014	.016	-.748	-.051
Learning about the outcomes of current research in your subject	-.064	-.102	.040	-.051	-.764	-.069
Formulating and exploring your own questions, problems or scenarios	.077	-.030	-.010	-.145	-.677	-.035
Doing research (such as working on your own research project, or working on a research project with staff)	.086	.099	.036	.015	-.787	.037
Contributing to a joint community of staff and students	.107	-.013	.027	-.066	-.132	-.655
Working with staff to make improvements to your course	.078	-.024	-.032	-.061	.010	-.865
Working with staff to evaluate teaching and assessment practices	.050	-.025	-.025	-.069	.001	-.859
Worked with other students on course projects or assignments	-.013	.025	.608	.019	-.163	-.042
Explained course material to one or more students	.101	-.008	.718	-.098	.053	.037
Asked another student to help you understand course material	-.016	.004	.823	.038	.045	.039
Prepared for exams or assessments by discussing or working through course material with other students	.020	-.051	.775	-.034	.001	.016
Asked questions in taught sessions or contributed to discussions about course material in other ways	.591	-.085	.025	-.180	.096	.120
Discussed your academic performance and/or feedback with teaching staff	.790	-.038	-.026	.027	-.027	-.010
Talked about your career plans with teaching staff or advisors	.707	.000	.018	.070	-.033	-.114
Discussed ideas from your course with teaching staff outside taught sessions, including by email/online	.746	.008	.040	.021	-.027	-.059
Worked with teaching staff on activities other than coursework	.617	.068	.089	.044	-.019	-.205
Made significant changes to your work based on feedback	.495	-.082	.048	-.127	-.092	-.029
Combined ideas from different modules when completing assignments	.056	-.103	.121	-.503	.023	-.110

Connected your learning to real-world problems or issues	-.047	-.041	.045	-.685	.014	-.128
Examined the strengths and weaknesses of your own views on a topic or issue	.111	.049	-.026		-.125	.057
Tried to better understand someone else's views by imagining how an issue looks from his or her perspective	.050	.097	-.013		-.075	.066
Changed the way you thought about a concept or issue as a result of what you learned	.009	-.032	.019		-.032	-.018
Connected ideas from your course to your prior experience and knowledge	-.072	-.077	.013		.054	-.088

0.20 – 0.29	0.30 – 0.39	0.40 – 0.49	0.50 – 0.59	0.60 – 0.69	0.70+
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The items form components largely as expected, and according to the intended structure of the questionnaire. The only unintended and surprising finding is the second component: this is composed of the items asking about critical thinking (analysing, evaluating, etc.) in conjunction with the two items asking about the challenge of the course (the course challenging students to do their best work, and emphasising students taking responsibility for their own learning).

Table 7 shows the internal consistency of the scales suggested by the factor analysis, using a technical measure called Cronbach's alpha. Levels of 0.7 or higher are normally taken to indicate that a scale reliably measures a specific dimension of (in this case) students' engagement. All of the scales show acceptable levels of internal consistency, apart from the scale exploring the time spent on different kinds of activities. This is expected given the fact that the items in that scale do not focus on a particular dimension of engagement, but ask about a very diverse range of activities.

Table 7: Scale reliabilities

Scale	Cronbach's alpha
Critical thinking and course challenge	0.77
Collaborative learning	0.74
Staff–student interaction	0.81
Reflective and integrative learning	0.83
Engagement with research and inquiry	0.81
Staff–student partnerships	0.85
Skills development	0.89
Time spent on activities	0.37

Response demographics

Tables 8 and 9 show the profile of respondents, in terms of both characteristics of the student, and characteristics of the institutions that they attend. Most students (84%) are in their first or second year of study. The presence of the National Student Survey meant that most institutions excluded final-year students from UKES.

Table 8: Profile of respondents, student characteristics

Age	18 years old or under	2395	9.8%
	19-21 years old	14662	60.2%
	22-25 years old	3500	14.4%
	26-30 years old	1436	5.9%
	31-35 years old	741	3.0%
	36-40 years old	618	2.5%
	41-45 years old	412	1.7%
	46-50 years old	289	1.2%
	51-55 years old	165	0.7%
	56 years old or over	124	0.5%
Gender	Male	8938	37.0%
	Female	15233	63.0%
Domicile	UK	21208	87.2%
	Other European Union (EU)	1326	5.4%
	Non-EU	1800	7.4%
Ethnicity	White	18829	77.4%
	Black	1172	4.8%
	Asian	2062	8.5%
	Chinese	1083	4.5%
	Mixed	691	2.8%
	Other	483	2.0%
Discipline	Medicine and Dentistry	389	1.6%
	Subjects allied to Medicine	3105	13.1%
	Biological Sciences	3265	13.8%
	Physical Sciences	993	4.2%
	Geographical Studies	387	1.6%
	Mathematical Sciences	735	3.1%
	Computer Science	1169	4.9%
	Engineering and Technology	1550	6.5%

	Architecture, Building and Planning	345	1.5%
	Social Studies	1896	8.0%
	Law	880	3.7%
	Business and Administrative Studies	3243	13.7%
	Mass Communication and Documentation	533	2.2%
	Languages	1014	4.3%
	Historical and Philosophical Studies	778	3.3%
	Creative Arts and Design	1720	7.3%
	Education	1591	6.7%
	Veterinary Sciences	11	0.0%
	Agriculture and related subjects	120	0.5%
Full-time/part-time	Full-time	23414	96.0%
	Part-time	930	3.8%
Year of study	1	12076	49.7%
	2	8408	34.6%
	3	2656	10.9%
	4	975	4.0%
	5	110	0.5%
	6 or more	60	0.2%
Face-to-face/distance learner	Primarily a face-to-face learner	22837	93.6%
	Primarily a distance learner	1351	5.5%

Table 9: Profile of respondents, institutional characteristics

Institution size ¹¹	Small	5418	22.2%
	Medium	7309	30.0%
	Large	11660	47.8%
Mission group	Million Plus	4149	23.9%
	Russell Group	4326	25.0%
	University Alliance	7906	45.6%
	Guild HE	956	5.5%
Institution type	Pre-1992	8863	36.3%
	Post-1992	15524	63.7%

¹¹ Institution size refers to undergraduate population, and most recent HESA figures were used. 'Small' institutions are those with up to 12,000 students; 'medium' are those with up to 17,000; and 'large' are those with over 17,000.

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