Learning gain in English higher education

Progress report

This report provides an overview of the progress to date of the HEFCE funded learning gain programme and related developments, as requested in the 2017 HEFCE grant letter. The report sets out plans for further developing learning gain methodologies for use in English higher education and by Government.

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Learning gain in English higher education: Progress report

To	Heads of HEFCE-funded higher education institutions
Of interest to those responsible for	Learning and teaching
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Executive summary

1.   This report provides an overview of the progress to date of the HEFCE funded learning gain programme and related developments, as requested in the 2017 HEFCE grant letter. The report sets out plans for further developing learning gain methodologies for use in English higher education and by Government.

2.   In the context of higher education, learning gain is concerned with the distance travelled by students during their course in terms of increased knowledge, personal growth, acquisition and development of a wide range of skills, and how ready they become for the world of work during the period of their studies. Understanding and measuring such attributes is a complex but important aim. Robust measures have the potential to deliver government objectives in:

   a.   Improving quality and driving continuous improvement across the sector, including through improved practice in teaching and learning, and in providing more granular information for students about their attainment over time.

   b.   Promoting equality of opportunity and student success, particularly by helping providers understand and address differential learning experiences and outcomes for all students.

   c.   Delivering value for money and improving accountability of higher education (HE) to students and the wider public.

3.   As a result of two years of HEFCE investment, there is now substantially more interest and activity in relation to learning gain across English HE. We have funded a range of underpinning studies and exploratory research projects including:

   - independent research into the current range and depth of learning gain activity
   - institutionally-led pilot projects and associated evaluation
   - a HEFCE-administered national project and associated evaluation
   - analysis of the potential application of administrative data to understand learning gain in HE.

4.   The impact of our work may be summarised under the following headings:

   a.   **Setting agendas and raising awareness** – from being a novel and relatively unexplored concept, learning gain has been established as a concern throughout the learning and teaching community in England and in wider HE debates. For example, recent conferences of the Staff and Educational Development Association and the Society for Research in Higher Education have been dedicated to the topic.

   b.   **Advancing understanding of learning gain –** our primary and secondary research has, for the first time in an English context, revealed and developed concepts of learning gain that are relevant and applicable to institutional practice.

   c.   **Testing and developing learning gain measures** across a diverse range of contexts, with more than 70 institutions participating in HEFCE projects.

   d.   **Improving understanding of the conditions and factors** required to implement learning gain measures effectively, including managing complex areas such as ethics, data sharing and privacy, and student participation.

e. **Making impacts on learning and teaching practices** beyond simply measuring learning gain. For example, data gathered on assessment outcomes has stimulated two of the pilot project institutions to explore their overall approaches to assessment practice.

5. Learning gain activities necessarily rely on gathering and analysing data about student cohorts across the full period of their studies, so we are not yet able to provide data on the learning gain demonstrated through the projects. We have already, though, been able to identify some of the challenges and benefits associated with measuring learning gain.

6. Since the HEFCE learning gain programme began in 2015, the Government has introduced the Teaching Excellence and Student Outcomes Framework (TEF). By combining national metrics with institutional evidence, the TEF has further highlighted the importance of high-quality teaching, the student experience and student outcomes. The Government has set out its plans to refine and improve the TEF through testing at subject level, and has introduced a supplementary metrics using the Longitudinal Educational Outcomes survey and data on grade inflation. It is therefore timely to review the progress of our learning gain programme and to take steps to ensure that future activity supports the new policy environment and the broader duties of the Office for Students. The promotion of choice, value for money and equality of opportunity for money for students could all potentially be informed by learning gain data.

7. Building on the research and activity so far, we are establishing during the current academic year a **Learning Gain Toolkit**, which will provide a basis for learning gain methodologies to be quality assured and used comparatively. A core output from this will be the provision of tested methodologies for institutions to undertake their own learning gain measurements and to demonstrate the outcomes through assessments such as the TEF.

8. To deliver this, we are **defining the principles and thresholds for the methodologies and measures** to be included: the approaches currently being developed through the HEFCE projects have local value and buy-in but, for wider take-up, institutions will need access to resources and information about the practical use and credibility of methods. The **Learning Gain Toolkit** will provide these resources, underpinned by sector-led governance and oversight through a panel and peer-review process.

9. **In addition, we are initiating work to ensure the interests of students and employers are represented:** this will be achieved through the development and implementation of a student engagement plan to ensure the learning gain programme understands and is aligned to their interests, reflecting the focus of the Office for Students. The employer perspective is already embedded in the projects, and will be developed further through the development of the Learning Gain Toolkit.

Introduction

10.   Students, employers and providers expect that the experience of higher education will confer deep subject knowledge, lead to personal growth, facilitate the acquisition and development of a wide range of skills, and prepare students for the world of work. These acquired attributes – the learning students gain – are expected then to have a positive impact beyond higher education.

11.   English higher education (HE) has a mature system of measures and data that allows considerable insight into student outcomes (such as data on class of degree attained and the type of subsequent employment or further study). There is a well established and wide-ranging research base examining and informing the enhancement of learning and teaching practices. There is, however, less specific evidence quantifying **learning gain**, the distance travelled and the extent to which a student's HE experience adds value, all else being equal. How are HE providers actually maximising their students' knowledge, skills and potential? The challenge of understanding learning gain in HE is now the focus of ground-breaking activity and discussion across the sector.

12.   Since 2014, HEFCE has been working with HE providers, students and other sector agencies to provide evidence-based advice on good practice in the use of learning gain methodologies, both to enhance learning and teaching and to explore the potential for a sector-wide approach to measuring learning gain in higher education in England. In doing so, our key objectives have been to:

- catalyse activity and dialogue on learning gain across the sector
- develop sector-wide agreed, common characterisations of learning gain (appropriate for the English HE context)
- identify methods for measuring learning gain
- explore whether a valid proxy or proxies for learning gain could be used that would enable low burden comparison
- identify and share experiences on the use of learning gain measures to enhance learning and teaching strategies and practice.

'Learning gain is defined as the "distance travelled" by students during their studies, demonstrable by improvements in knowledge, work readiness, critical thinking skills and personal development between two points in time. In order to better measure and understand this "distance", for the purposes of this project, we also consider it crucial to collect information and map the trajectories and experiences during this HE journey. We thus consider learning gain to be an interconnection of various interrelated dimensions and influences which we will account for in the statistical modelling. Such models will help our institution (and others) to evaluate teaching and learning and adapt current practices accordingly in order to enhance the student experience and eventually optimise learning gain.'[1]

13.   In the first part of this report, we provide an update on the progress of our core programme of activity to date, which includes:

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[1] All quotes are taken from institutions operating learning gain pilot projects.

- independent research into the current range and depth of learning gain activity
- Investment of £4 million in institutionally-led pilot projects and associated evaluation
- a HEFCE-administered national project and associated evaluation
- analysis of the possible application of existing and potential future administrative data to understand learning gain in HE.

14.   In the second part, we discuss the establishment of a sector-led Learning Gain Toolkit, which we believe will provide a path forward for learning gain measures to be used in a comparative national context. A core output from this will be the provision of tested and accredited resources to enable HE providers to assess learning gain and demonstrate the outcomes from this. In developing these plans we have considered that learning gain measures may be used in a variety of contexts, including:

- in a national context across institutions
- for institutional understanding and enhancement
- to support individual students.

15.   Measures of learning gain that are useful for learning and teaching enhancement may not be those that are useful for national comparisons. Nor are learning gain measures likely to be placed in a continuum or hierarchy, whereby the better a measure is for institutional enhancement the more likely it is to be useful in a national context. This means that the Learning Gain Toolkit will need to treat measures differently where they have different purposes, and this will need to be explored carefully as it is established.

Developments in learning gain

16.   Understanding student learning has been central to longstanding debates about excellence and quality in higher education[2]. From an English policy perspective, the Browne review (2009-10), the raising of tuition fee levels in England (for 2012-13 entrants onwards), and international debate on the quality and value of student experiences have all intensified discussion of the efficacy of learning and teaching in higher education[3]. HEFCE's 2014-15 grant letter included a request to 'consider whether there are better indicators, such as measures of students' engagement with their learning, to provide information on what a high quality student experience

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[2]See for example Matthew, B., (2003), *'Excellent teaching or excellent learning? Are we asking the right question?'* (Exchange 5, p30):

  'Good, or even excellent, teaching is not the main issue: it is the learning that should be at the heart of our concerns […] We need to focus on what education is about, and that is learning. So I would want to stop rewarding 'excellence in teaching" and start rewarding 'those who promote excellence in student learning". It's a subtle difference but the former is about a process, and increasingly a highly mechanical process that encourages dependency in learners, while the latter is about the outputs (more difficult to measure or quantify) that should be at the heart of education.'

(Cited in Little, B., et al (2007), *'Excellence in teaching and learning: a review of the literature for the Higher Education Academy Centre for Higher Education Research and Information'*, available at https://www.heacademy.ac.uk/knowledge-hub/excellence-teaching-and-learning-review-literature-higher-education-academy).

[3] A selection of international projects were presented at HEFCE's 2015 learning gain conference, and can be found on our webpages at www.hefce.ac.uk/news/Events/2015/Name,101449,en.html. See also Arum, R., and Roska, J., (2010), 'Academically adrift: Limited learning on college campuses' and Gibbs, G. (2010), 'Dimensions of quality', available at https://www.heacademy.ac.uk/system/files/dimensions_of_quality.pdf.

looks like' and subsequent grant letters have flagged the importance of exploring learning gain[4]. The establishment of the Teaching Excellence Framework (TEF) from 2016-17 represents a further significant step forwards in the measurement and communication of teaching quality and student outcomes. The pursuit of better indicators of what students learn and gain from their higher education experience could be an important aspect of its future development, and could contribute more broadly to other aspects of the work of the Office for Students, such as quality assessment, student information and access, and participation plans.

Defining learning gain

17.   In 2015, RAND Europe produced a scoping study for HEFCE, drawing on national and international practice with regard to learning gain[5]. On the basis of this report, learning gain has been understood for the purpose of HEFCE's work to relate to the changes in knowledge, skills, work-readiness and personal development during a student's time in HE (see Table 1). This is not intended to be a precise definition of learning or learning gain: it is recognised that these different concepts overlap and converge, and that there are wider interpretations of learning. It does, however, successfully capture the topics and issues currently being explored.

Table 1: What aspects should learning gain cover?[6]

Knowledge	'Content knowledge represents a significant part of what students learn in higher education. This can include curriculum-based knowledge, or more generally a body of information related to a particular field. Students traditionally acquire this knowledge through their classes and other study at university'
Skills and competencies	'Students also improve their skills and competencies in higher education. Skills are generally defined as the abilities or proficiencies to apply cognitive or practical knowledge and use know-how to complete tasks and solve problems in certain areas. A competence, in addition to including a skill, covers abilities, behaviours and knowledge that are fundamental to the use of such skill. A competence is a proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development.
	'The development of skills and competencies during higher education study has been widely debated within the literature. For example, the OECD defines these skills as "critical thinking, analytical reasoning, problem-solving, and written communication". HEFCE also considers the following additional skills as part of higher education: "imaginative understanding", "seeing the broader perspective", "seeing relationships within what students have learned", "an enquiring, independent approach", "critical self-awareness", "learning how to learn", and "personal fulfilment". [...] Skills and competencies can be either

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[4] www.hefce.ac.uk/news/newsarchive/2014/Name,93996,en.html.
[5] McGrath, C., et al (2015), 'Learning gain in higher education', commissioned in partnership between HEFCE, the Department for Business, Innovation and Skills and the Higher Education Academy, available at www.hefce.ac.uk/pubs/rereports/year/2015/learninggain/.
[6] The sections on Knowledge, Skills and competencies, and Personal development are extracted directly from the RAND report.

	discipline-specific or non-discipline-specific.'
Personal development	'As well as the enhancement of skills and content knowledge, the learning gain experienced by students undertaking higher education could also be seen in terms of broader personal and psychological development. This development could be seen in terms of citizenship or confidence, or touch upon values such as respect for diversity'.
Work-readiness	The RAND report highlighted that employability skills were a priority for professional bodies and for their stakeholders. Work-readiness relates to concepts of employability, which Yorke and Knight (2006)[7] defined as 'A set of achievements – skills, understandings and personal attributes – that make individuals more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy'. It also relates to concepts of career-adaptability which Bimrose et al[8] defined as 'The capability of an individual to make a series of successful transitions where the labour market, organisation of work and underlying occupational and organisational knowledge bases may be subject to considerable change'[9].

Institutional activity

18.   As there has only been a small amount of dedicated institutional activity on learning gain in England, HEFCE's work in this area initially focused on increasing institutional engagement and practice by:

- testing and evaluating different ways of measuring and assessing learning in higher education
- building knowledge about, and capacity for, measuring learning gain
- promoting partnerships and encouraging dialogue across the sector.

19.   To initiate this, we funded 13 institutional pilot projects, commencing in autumn 2015, investigating the following range of methodological approaches identified by RAND:

a.   **Grades** – Differences between student grades at two points in time.

b.   **Surveys** – Students self-reporting on what they have learned (through a survey).

c.   **Standardised Tests** – Measuring acquisition of generic or specialised skills.

d.   **Other qualitative methods** – Including a personal development portfolio, a reflection on the skills gap, or both.

e.   **Mixed Methods** – Using a range of tools and methods to track performance.

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[7] Yorke, M, and Knight, PT, (2006) 'Embedding employability into the curriculum: Learning and employability series 1'. The Higher Education Academy, York.
[8] Bimrose, J, et al (2011) 'The role of career adaptability in skills supply', Wath-upon-Dearne, London: UK Commission for Employment and Skills, Evidence report 35. Main report.
[9] For further information see Artess, J., et al (2017), 'Employability: A review of the literature 2012-2016' available at https://www.heacademy.ac.uk/knowledge-hub/employability-review-literature-2012-2016 and Wright, T., and Frigerio, G, 'The Career Adapt-ability pilots project', available at https://www.heacademy.ac.uk/knowledge-hub/career-adapt-ability-pilots-project.

As of autumn 2018, 10 of the projects have been running for three years; one was completed in October 2016 and two during autumn 2017. An overview of each of the 13 pilot projects is available at www.hefce.ac.uk/lt/lg/projects/.

'In exploring the views of HE stakeholders (students, staff, parents and employers) what became clear is the value placed on higher education as a vehicle for transformation. Hence, using mixed methods, we are seeking to devise and test measures of learning gain as defined by the development of non-cognitive skills, including resilience, graduate capital and identity, self-theories and implicit theories.'

University of Portsmouth

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20.   The experiences and findings from the projects are being explored, analysed and synthesised by an independent evaluator, Camille Kandiko-Howson of Kings College London. This work will identify best practice and supporting evidence, determine the extent to which the different methods piloted would represent useful measures of learning gain that could be applied across the English HE sector, and provide advice on the strengths and weaknesses of the different methodologies and approaches across the range of projects. The final report is due in December 2018. The initial evaluation report of the first year of activity categorises the pilot projects as either **telescope** or **microscope** projects[10]:

    a.   **Telescope projects** 'involve analysis of large amounts of data, and face the challenge of uncovering meaningful patterns, trends and areas for further investigation. These projects captured data from whole cohorts of students or conducted analyses of existing secondary data. These include measures and use of learning analytics and registration data. These can be very useful for uncovering patterns in progress and attainment across student groups or courses of study.'

'Our longitudinal analyses across 100 modules and 40 degree qualifications indicate substantial variation in learning gains that are found between students, modules, and qualification. Similarly, substantial variation is present when comparing results across other universities, highlighting a need for advanced statistical modelling to unpack complex learning gains across institutions.'

Open University

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    b.   **Microscope projects** 'focus on collecting data from specific groups of students and, in several projects, tracking them over time. Methods include tests, surveys and qualitative measures. Most of these projects target students in specific subjects at different institutions. These projects have a specified area of inquiry, such as exploring the effect of work placements or study abroad; however, the challenge of these projects is gathering sufficient data to be generalisable across student characteristics, subjects and institution type.'

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[10] See 'Evaluation of HEFCE's learning gain pilot projects: Year 1 report', available at www.hefce.ac.uk/pubs/rereports/year/2017/lgeval/.

'The project is based on evaluating the value of using research methods learning as a proxy measure of learning gain. Understanding and applying research methods is a core component of higher education across disciplines and this project examines how students' knowledge, skills and experience can be captured and contextualised across disciplines'

University of Plymouth

21.   The report also highlights that the measures the projects are exploring can be categorised into affective, behavioural and cognitive measures (see Table 2).

Table 2: Affective, behavioural and cognitive measures explored in the pilot projects

Affective	Behavioural	Cognitive
• self-efficacy • well-being • resilience • disposition to learning • satisfaction.	• student engagement with their learning • work placements • co-curricular activities • skills self-assessment • employability-enhancing experiences • study abroad • virtual learning environment engagement • learning analytics.	• grades • general cognitive gain (for instance problem solving, quantitative reasoning, critical reading and evaluation) • disciplinary cognitive gain • critical reasoning skills • situational judgement • research methods.

'Our approach relies on a mixed-methods design, whereby an initial qualitative phase (interviews with students) informed the development of data collection instruments for the second, quantitative phase (a longitudinal survey). Tying both phases together, a comprehensive conceptual framework was developed. The measurement instruments chosen for the longitudinal survey reflect this conceptual framework. Twelve separate measurement scales are included in the survey: some used with permission from other authors (e.g. deep learning), some adapted from existing instruments (e.g. social and emotional engagement), others compiled from an existing item bank, and others derived specifically for the purposes of this research (e.g. attitude to research).'

University of Cambridge with 10 partner institutions (Queen Mary University London, University College London, University of Warwick, University of Birmingham, University of Manchester, University of Exeter, Durham University, University of Newcastle, University of Nottingham, Sheffield Hallam University)

22.   In order to support enhancement in institutions and the progress of individual students, the methods used to understand learning gain need to be localised and contextualised. Qualitative information is likely to be as important as quantitative measures. Students' engagement with their learning and good-quality academic feedback play important roles, and it is appropriate to have an holistic view of the types of information that could be used to understand an individual's learning gain. The pilot project evaluation report identifies that the approaches used for such enhancement and student support include:

a.   '**Personalised approaches.** Some projects have fed data into personal development tools for use by students, and some have provided students with personalised reports or dashboards on their learning and progress. The "telescope" projects have used data to target students for personalised follow-up, such as offering one-to-one career advice sessions. A number of projects share data with personal tutors who can follow up directly with students. Some projects have developed data that can be used to "nudge" students towards behaviours linked with positive student outcomes, such as the association of hours spent in the library and degree outcomes, tailored to students' specific courses.'

'The university's Careers and Employability Service and academics within individual schools [have requested] data to enable them to develop and shape their curricula and study skills courses to meet the individual needs of students.'

University of Lincoln

b.   '**Pedagogy and curriculum design.** Data has been used to enhance the classroom learning experience. Some projects have trialled and tested new pedagogical approaches in specific classroom settings. These were able to provide immediate feedback to students and offer outcome data on innovative practices to share within and beyond the institution. Data from the projects can provide tailored information to enhance programme design, for example a project found that programme leads and teaching staff have valued the opportunity to discuss and reflect upon how students are developing their understanding of research methods within their programmes of study.'

> 'The modelling of student progression presented allows staff and senior managers to compare attainment across programmes and between student groups within programmes. This has already highlighted where some programmes need to reconsider their assessments and marking criteria. Even if no changes are necessary, the modelled data presented encourages reflection and internal discussion on how learning gain can be measured and the value of such information.'
>
> **University of Reading**

c. '**Institutional services.** A number of the projects provide data that helps support services like Careers offices and Skills and Training units to tailor services and target specific at-risk or in-need students. Staff involved in projects have been able to develop institutional expertise and share their experiences of trialling measures of learning gain, and consider how this may support other institutional activities.'

> 'We used the work experience questions to look for those [widening participation] students who stated that they had no work experience. We then contacted them to promote our programme which matches eligible students to an employer to give them a better understanding of working in [a small or medium-sized enterprise].
>
> 'We are looking at whether those students who dropped out of university have displayed any particular patterns in terms of their career-thinking responses and whether there's anything we can do from a careers perspective to help these students remain in university.'
>
> **Careers Group partner institutions**

d. '**External engagement.** Through engaging with alumni by following up on their career trajectories, some institutions were able to reconnect graduates with the institution. One had such positive feedback from alumni that the work will be 'mainstreamed' as part of institutional activities. This helps with alumni fundraising, mentoring and careers, and placement support. Other projects plan to use data to motivate prospective students, linking student activities and engagement with employability outcomes.'

23.   Other uses may emerge, in particular as institutions develop, in their own context and in response to wider sector developments, new and innovative solutions and applications for learning gain measures. For example, we are aware of institutions applying similar approaches in their work to identify and address differential student attainment, and that learning gain data has been included in several institutions' access agreements.

National activity

Centrally administered testing

24.   Alongside the institution-led projects, HEFCE is administering a three-year longitudinal study, the National Mixed Methodology Learning Gain project (NMMLG), in which students at 10 selected institutions[11] are completing a series of repeated online assessments throughout their course. The final outcomes from the study, including an evaluation of the approach, will be available in the summer of 2020. The data arising from these assessments will be linked to

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[11] Anglia Ruskin University, Bishop Grosseteste University, the University of Greenwich, the University of Hertfordshire, the University of Hull, the University of Kent, the University of Leicester, the University of Liverpool, the University of St Mark and St John and the University of Wolverhampton.

centrally held administrative data, including student outcomes data. Through this study we are seeking to:

- understand the logistical requirements of administering a common approach to testing across multiple providers
- explore whether the NMMLG methodology might be appropriate for comparing learning gain across groups of students, disciplines and providers
- consider how the measure achieved through the NMMLG methodology relates to other measures (such as those developed through the institution-led projects).

25.   The project draws broadly on the approach of a previous study undertaken in the USA by the Centre of Inquiry at Wabash College[12] and is designed to recognise and test the importance and interaction of cognitive and non-cognitive skills. The assessment instrument is a three-part test, comprising:

a.   A critical thinking and problem solving skills test. Among other aspects of learning and development, the questions in this test, developed by Cambridge Assessment, assess students' ability to detect reasoning errors, apply principles, summarise conclusions, and assess the impact of evidence.

b.   Survey questions focused on students' attitudes to their study experience. These questions were used in the Wabash study and were adapted in consultation with Wabash College academics and Ernest Pascarella (Chair in Higher Education at the University of Iowa, who designed the original questions). They explore academic motivation, attitudes towards diversity and attitudes towards literature and literacy.

c.   Survey questions on students' engagement with their learning. These questions, drawn from the Higher Education Academy's UK Engagement Survey, explore aspects of students' engagement with their studies, including their course's emphasis on critical thinking, their interaction with staff, and time spent on various academic and non-academic activities.

26.   While there have not yet been sufficient cohorts to derive longitudinal findings across the pilot projects and the mixed methodology project[13], we have already gathered lessons on the technical and procedural challenges of running learning gain methodologies, including securing the right staff and expertise, negotiating partnerships, and ensuring appropriate ethical frameworks and IT and data protection arrangements. Obtaining the engagement and ongoing participation of students has also been a key challenge.

Using administrative data

27.   The English HE system has a mature and wide-ranging data landscape, so we have been investigating whether linking and analysis of existing administrative data could inform our understanding of learning gain. This approach might be considered to produce more proxy measurements than the direct and individualised approaches in other projects, but it is likely to

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[12] Full details, including methodologies, instruments and results, are available at the Center of Inquiry website, www.liberalarts.wabash.edu/study-overview/.

[13] The majority of pilot projects are funded to the end of academic year 2017-18, but there will be a lag for longer term results, such as employment outcomes. Degree outcomes are observable in annual Higher Education Statistics Agency data, which becomes available in the academic year following completion.

be less burdensome and would clearly work across all HE providers. This project, Higher Education Learning Gain Analysis (HELGA), is designed to complement the other funded activities and has two particular aims:

a. To test the validity of measures of learning gain derived from existing representations of students' initial and final levels of knowledge and skills held in administrative data, such as school results and degree class. Since this data is available at far lower cost and burden than bespoke learning gain measures, HELGA will compare measures of learning gain derived from it with the measures derived from the NMMLGP and, where possible, with the measures from the pilot projects.

b. To identify and evaluate techniques for comparing learning gain between individuals, subjects and institutions by constructing a counterfactual situation that predicts the final level of knowledge and allows comparisons between a student's observed performance at one institution and their likely performance at another institution. Whatever measures of start and end points are used, comparisons of learning gain between institutions require an estimate of the learning gain a student would have achieved at a different institution. Simple comparisons of the learning gain will not elicit that part of the gain that is due specifically to the institution. A model is required, therefore, to account for other factors that may affect the progress a student makes during higher education.

28. We are exploring through this project two techniques that can be applied to most measures of start and end points to estimate the relative learning gain, or added value. When applied to measures of students' attainment, they yield a comparison of the added value across institutions:

a. Multi-level modelling to partition the variance in learning gain between the institution, the department and the individual. This has the advantage of being applicable to nearly all young students but can only account for characteristics observed in the administrative data, such as gender and ethnicity (the administrative data does not observe other characteristics which may have an effect – such as students' personal preferences)[14].

b. A quasi-experimental, paired comparisons technique that exploits the similarity between the marginal students accepted by an institution and those who are on the verge of admission but then enrol elsewhere[15]. This allows many unobserved characteristics to be accounted for and is likely to provide greater validity than the previous technique, but will only enable estimation of learning gain for students on the cusp of admission to those institutions where randomness can be inferred. This is likely to limit this technique to a subset of students at the more selective institutions.

Related developments

29. The methodologies we are exploring through our learning gain programme are not the only ways to understand how effectively students learn and how HE providers are performing in this respect, so it is worth noting the following related developments:

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[14] For examples of the use of similar techniques see Broeke, S., and Nicholls, T., (2006), 'Ethnicity and degree attainment', available at http://dera.ioe.ac.uk/6846/, and 'Differences in degree outcomes: The effect of subject and student characteristics' (HEFCE 2015/21), available at www.hefce.ac.uk/pubs/year/2015/201521/.

[15] See Hoxby, C., (2015), 'Computing the value-added of American postsecondary institutions', available at https://www.irs.gov/pub/irs-soi/15rpcompvalueaddpostsecondary.pdf.

a.   **Students' engagement with their learning:** this is a key feature in a number of the projects, including the NMMLG. Measures of this were also included for the first time in the National Student Survey from 2017[16].

b.   **Differential outcomes:** data that identifies the influence of students' backgrounds on their learning outcomes features in the projects[17]. We are developing an increasingly sophisticated understanding of the outcomes achieved by students from different backgrounds, and investing through the Catalyst Fund in a programme of 17 collaborative projects pursuing innovative approaches to addressing this, with a view to improving practice sector-wide. This activity is particularly important in the context of the extension of access agreements to include successful participation in the duties of the Office for Students and the context-specific student outcome measures used in the TEF.

c.   **Learning analytics in HE:** this is enabling institutions to draw on increasingly sophisticated student data (such as, for example, real-time data on engagement and granular information about learning outcomes), to inform learning and teaching approaches[18]. To maintain an up-to-date understanding of potential connections between learning analytics and learning gain, we are liaising with Jisc, which is particularly active in this area of work.

d.   **Employment data:** the review of the Destinations of Leavers from Higher Education survey led by the Higher Education Statistics Agency, and the introduction of the Longitudinal Educational Outcomes dataset by the Department for Education could, if suitably contextualised, produce more robust and longitudinal outcomes measures of employment outcomes for use both by institutions and for external assessment such as TEF[19].

30.   An important dimension of these developments is the use of data not just for improvement, but also for student information and performance incentives, which are the focus of TEF. HEFCE is currently commissioning an analysis of the learning gain activity identified within TEF year 2 submissions. However, the insights we have received to date from panellists and assessors suggests that providers have substantial evidence relating to student outcomes and interest in developing learning gain methodologies, but little evidence that could be used across a range of providers to demonstrate learning gain. This is therefore a priority for the future.

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[16] National Student Survey 2017 results, and review of the provision of information which led to the inclusion of student engagement questions, are available at www.hefce.ac.uk/lt/nss/.
[17] See www.hefce.ac.uk/sas/inequality/differential/.
[18] Sclater, N., et al, (2016) 'Learning analytics in higher education: A review of UK and international practice' available at https://www.jisc.ac.uk/reports/learning-analytics-in-higher-education.
[19] Information on the review of destinations and outcomes is available at https://www.hesa.ac.uk/innovation/records/reviews/newdlhe. The experimental release of Longitudinal Educational Outcomes data is available at https://www.gov.uk/government/statistics/graduate-outcomes-for-all-subjects-by-university. HEFCE has produced a set of FAQs to help institutions and others in analysing and interpreting the data, available at www.hefce.ac.uk/news/newsarchive/2017/Name,114470,en.html.

Next steps for learning gain: translating evidence into practice

31.   Our experience of initial activity in the programme suggests that learning gain is complex and multi-dimensional, that there are legitimate differences of opinion about what can be considered high performance, and that there are different views about what matters for measurement. For these reasons we flagged in the introduction to this report that learning gain should be considered in relation to its use:

- in a national context across institutions
- for institutional understanding and enhancement
- to support individual students.

32.   The proposal that indicators and measures may inform national, institutional local and individual interests, and so have context-specific and potentially time-bounded utility, reflects how indicators are used in other UK education sectors, other countries' HE systems and other sectors. For example:

a.   Statistical measures of progress in the schools sector have developed over the last 25 years[20], and new accountability arrangements for both primary and secondary schools are being implemented from 2016. The arrangements include a new progress measure, which looks at the progress made between Key Stage 1 and Key Stage 2 at the end of primary school. At secondary level the new 'Progress 8' measure aims to capture the progress between Key Stage 2 outcomes at the end of primary school and Attainment 8 outcomes at the end of Key Stage 4. These measures, which are designed to incentivise academic improvements and reward teaching more broadly, are calculated for individual pupils and aggregated to calculate a school-level score and allow comparison against the actual achievements of other pupils nationally with similar prior attainment[21].

b.   There are other value-added approaches in use for the schools sector; for example, the Centre for Evaluation and Monitoring at the University of Durham has a range of learning assessment tools aimed at measuring each pupil's potential and progress[22], and is currently involved in developing an international framework of performance indicators based on a longitudinal assessment of children's cognitive and non-cognitive abilities[23]. In addition, the Education Endowment Foundation[24] has developed a Teaching and Learning Toolkit, which seeks to measure the impact of interventions, standardised in terms of the

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[20] Leckie, G. and Goldstein, H. (2017) 'The evolution of school league tables in England 1992-2016: "contextual value-added", "expected progress" and "progress 8"', British Educational Research Journal 43, no. 2 (1 April 2017): 193–212, doi:10.1002/berj.3264.
[21] See Department for Education (DfE) (2016) 'Primary school accountability in 2016: A technical guide for primary maintained schools, academies and free schools', available at https://www.gov.uk/government/publications/primary-school-accountability and DfE (2017) 'Progress 8 and Attainment 8 Guide for maintained secondary schools, academies and free schools' available at https://www.gov.uk/government/publications/progress-8-school-performance-measure.
[22] See www.cem.org/assessment-monitoring-systems.
[23] DfE (2014) 'Performance indicators in primary schools: A comparison of performance on entry to school and the progress made in the first year in England and four other jurisdictions' available at https://www.gov.uk/government/publications/performance-indicators-in-primary-schools
[24] See https://educationendowmentfoundation.org.uk/.

additional months' progress that pupils are expected to make as a result of the intervention[25].

c.   The health sector has adopted a multi-faceted approach through the National Institute for Health and Care Excellence (NICE)'s approach to quality standards and indicators, which go through a process which includes development by an independent expert committee, testing and piloting and public consultation. A range of users and purposes are anticipated by NICE:

      i.   Commissioners use quality standards to ensure that high-quality care or services are being commissioned.

      ii.   Service providers use quality standards to monitor service improvements, to show that high-quality care or services are being provided and highlight areas for improvements.

      iii.   Health, public health and social care practitioners use audit and governance reports to demonstrate the quality of care, as described in a quality standard, or in professional development and validation.

      iv.   Regulators like the Care Quality Commission and Ofsted endorse the use of quality standards to help identify and define good quality care[26].

33.   In common with these practices, sector-wide approaches to measuring learning gain in higher education could provide:

a.   Accountability to Government and regulators by ensuring that central government funding, including student finance and teaching grant, is well invested and by supporting regulatory and assessment mechanisms to assure and promote quality.

b.   Accountability to students by ensuring that personal investment in higher education (through tuition fee and other investment) is justifiable.

34.   In support of these purposes, they could also:

a.   Enable an overall assessment of the difference to student and society outcomes that can be attributed to different activities (impact assessment).

b.   Demonstrate the value and impact of activities (return on investment).

c.   Identify differences between institutions and understand the extent to which these can be attributed to the institution rather than to factors beyond its control (benchmarking).

d.   Establish the effect of different types of HE activities and interventions, promoting evidence based good practice in the use of learning gain to enhance learning and teaching (what works).

35.   In the national context, with specific reference to performance incentives and accountability, there is the question of whether a small number of consistent, national measures

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[25] CFE (2015) 'Student opportunity outcomes framework research: in-depth study' pp. 72-76, available at www.hefce.ac.uk/pubs/rereports/year/2015/sodepth/.

[26] For further information see https://www.nice.org.uk/standards-and-indicators and NICE (2014), 'Indicators process guide' available at https://www.nice.org.uk/media/default/Get-involved/Meetings-In-Public/indicator-advisory-committee/ioc-process-guide.pdf.

for learning gain is achievable. It may be technically possible, using the HELGA approach, to produce a methodology that can compare institutions based on students' start- and end- point data. The choice of which start and end points are appropriate to use, and how we use the data to develop a robust measure of learning gain, is to be addressed through the project. While we have credentials data (such as A-level and degree qualifications), these are not available for all students and qualifications. It is also questionable whether these measures are sufficiently comparable and granular to discriminate between institutions. If credentials are used, as in the HELGA project, it must be recognised that they are a proxy for learning gain.

36.   We are also, through the pilot projects and the NMMLG, exploring the use of standardised tests. The introduction of standardised tests would require clear incentives for students and providers to participate. There could also be some challenges in that testing generic attributes does not capture the necessary dimensions of learning gain since they are not necessarily the attributes that courses seek to enhance.

Learning Gain Toolkit

37.   In the next phase of our learning gain work, we are continuing to gather data through the projects we have established. In parallel we are developing, in discussion and collaboration with students and HE providers, a set of principles and standards for the type of start- and end-point measures or tests that would enable a feasible and valid test of what matters. Establishing a set of principles and threshold standards for learning gain approaches (where they are to be used in wider, national contexts) reflects the way in which methodologies have developed in sectors such as schools and health. Mapping these approaches to relevant descriptors within the Framework for Higher Education Qualifications[27] would enable the measures to be aligned to sector-agreed baseline learning outcomes, while maintaining the flexibility to include additional outcomes for excellent provision and new skills as learning and employment evolve. We are, therefore, developing a Learning Gain Toolkit, with expert oversight through a panel and peer-review system, to support a broader take-up of learning gain activity and to identify principles against which national metrics could also be considered.

38.   The central output of the Learning Gain Toolkit will be an actively updated repository of learning gain resources (akin to the What Works Network[28], the Education Endowment Foundation toolkit[29], the NICE indicator programme, and the National Survey of Student Engagement Accreditation Toolkit[30]). It will allow institutions to identify and put in practice combinations of methodologies most appropriate to the intended purpose, the learning context and the institution's strategic approach to teaching enhancement. We anticipate the repository will consist of:

   a.   Sets of instruments and methods, enriched with practical guidance, and identifying potential costs.

   b.   Comparative information about statistical robustness, validity and the statistical relationships between measures, with broader trends (or other aggregated data). In time,

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[27] Quality Assurance Agency for Higher Education 'Quality Code Part A: Setting and maintaining academic standards': www.qaa.ac.uk/assuring-standards-and-quality/the-quality-code/quality-code-part-a.
[28] See https://www.gov.uk/guidance/what-works-network.
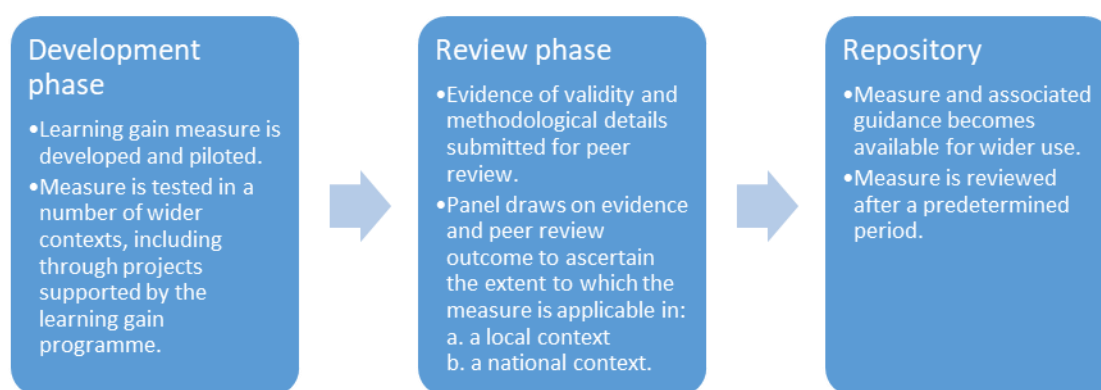[29] See https://educationendowmentfoundation.org.uk/resources/teaching-learning-toolkit.
[30] See http://nsse.indiana.edu/html/accred_toolkits.cfm.

counterfactual methodologies developed through the HELGA work might provide standardised comparison approaches.

c.   Summative information about the evidence base relating to the approaches and their purposes.

39.   The toolkit will support institutions to determine the learning gain approaches to deploy in their own context and to demonstrate the findings from them, including through reference to criteria such as the student outcomes and learning gain category currently used within the TEF. In doing so, it will provide standardised methods for demonstrating the impact of student and public investment. It could also be extended to include information on broader learning and teaching interventions and practices evaluated using learning gain measures, which would support wider efforts to better evaluate higher education practices.

Figure 1. Overview of the learning gain toolkit panel and peer review process

Development phase
- Learning gain measure is developed and piloted.
- Measure is tested in a number of wider contexts, including through projects supported by the learning gain programme.

Review phase
- Evidence of validity and methodological details submitted for peer review.
- Panel draws on evidence and peer review outcome to ascertain the extent to which the measure is applicable in:
  a. a local context
  b. a national context.

Repository
- Measure and associated guidance becomes available for wider use.
- Measure is reviewed after a predetermined period.

40.   We expect that it will be possible to align the development of the Learning Gain Toolkit with future iterations of TEF, which currently combines national metrics and contextual information in the provider submission. The toolkit could, by the time of the 2019-20 exercise that will follow the subject-level pilots and independent review of TEF, begin to support the provider submissions by offering a selection of tested methodologies to describe enhancement and the impact on learning and student outcomes. TEF panel members would have greater confidence in what was being presented to them and the evidence presented by providers would be more consistent. This would not, though, rule out the use and presentation of innovative approaches that had not been accredited through the toolkit.

41.   There is particular value in aligning the use of methodologies accredited by the framework with the introduction of subject-level TEF evaluation in 2019-20. A wider range of learning gain measures are likely to be valid at subject level, and could form supplementary or contextual information for the subject-level provider submissions.

42. The Learning Gain Toolkit is being developed in discussion and collaboration with the sector, and we are securing expert oversight, through a peer review group and panel, to ensure credibility. The panel will include in its remit:

    a. Development of principles encompassing:

        i. Technical expectations and thresholds.

        ii. Providing an opinion on whether proposed approaches and indicators measure what matters.

    b. Assuring the methodological reliability of approaches.

    c. Dissemination of learning gain developments and the provision of advice on any gaps in the framework (for example we may wish to test learning gain methods in relation to specific provision such as accelerated degrees).

43. We anticipate that the identification of principles will act as a catalyst for identifying learning gain methodologies that could be used for national metrics. Measures of learning gain are not likely to be placed in a continuum, or hierarchy, whereby the better a measure is for institutional enhancement the more likely it is to be useful in a national context. Different types of approaches could therefore be included within the framework, as follows:

    a. **Experimental and novel approaches** still being explored and transferred in a wide range of contexts. Validity might only be locally confirmed rather than demonstrably transferable. The methodology would be developmental, in a stage of adaption and refinement, with improvements sought from adopting institutions.

    b. **Approved approaches** where there is a recognised degree of validity in various contexts, such as the subject areas used for TEF categorisations. The methodologies would be 'closed', for national purposes, in that there would be a specified approach that had developed through peer review and wider testing. If they were used in, for example, TEF provider submissions, institutions would need to demonstrate that the approved method had been adhered to, but they could make refinements in a local context for their own enhancement purposes. There would also be a need for ongoing review and update of methodologies to account for new data, techniques and practices.

    c. **National measures** would be approaches that have reached an agreed standard of validity and robustness, and can be used consistently across a wide range of institutions.

44. The learning gain pilots might offer the first wave of methodologies to be reviewed against the principles, but we are aware of a range of activity now taking place across the sector so others can be expected to come into play.

Conclusion

45. There is an increased profile of learning gain activity in English HE, which signals that we may soon see a step change in the sector's understanding of learning gain, and how to measure it.

46. HEFCE is establishing a Learning Gain Toolkit to provide a path for learning gain to be used in a comparative national context. This includes as a core aim the provision of peer reviewed resources for institutions to enable them to undertake learning gain assessments and to demonstrate the outcomes in a national context.

47.   To deliver this, HEFCE is securing agreement on principles and quality thresholds for measures. The approaches currently in development have local-value, but to enable wider institutional adoption, institutions need access to resources and information about the practical use of, and credibility of methods. The Learning Gain Toolkit will be underpinned by principles and evidence developed in discussion and collaboration with the sector and students, who will have close involvement also in its governance and oversight.

48.   These developments should align with the next stage of TEF development and other activities to be delivered by the Office for Students.

List of abbreviations

DfE   Department for Education

HE   Higher education

HEFCE   Higher Education Funding Council for England

HELGA   Higher Education Learning Gain Analysis

NICE   National Institute for Health and Care Excellence

NMMLG   National Mixed Methodology Learning Gain project

OECD   Organisation for Economic Co-operation and Development

Ofsted   Office for Standards in Education, Children's Services and Skills

TEF   Teaching Excellence and Student Outcomes Framework