

A new 'University Challenge'

The common evidence base

1. The common evidence base (CEB) is intended to assist in comparing the relative benefit of locating new higher education (HE) provision at different locations. The CEB only measures one dimension of the benefit of new HE provision: increasing local study opportunities. Different specifications allow a set of statistics each orientated towards different priorities. This annex outlines the rationale and specification of the CEB measures.

Estimating the local zone for a HE delivery location

2. The CEB is concerned with local study opportunities. For the purposes of the CEB, we define local study as being able to attend a HE course without having to change your domestic location. To be able to determine the local study opportunities at a particular location (which we term 'local provision') we must make an assessment of commuting behaviour for HE study. This is not straightforward and necessitates a distinction between geographical constraints and personal preferences.

3. We have used a number of analytical approaches to this research question, including looking at the choices made by UCAS applicants and analysing the geographical patterns of young participation around HE sites. The findings from this work have led us to adopt a simple two part model for the local study zone: a central core where the provision is considered fully accessible for local study, followed by a gradual decline in the propensity to access the places for local study, eventually reaching a point where local study at that HE site is no longer possible.

4. These findings are informed by observing the behaviour of HE students that are, or are intending, to use different (unknown) modes of transport. We need to express the results against an approximate accessibility scale to allow consistent national calculations. This is achieved by using road-based travel times, a similar solution to the road-distance measures used for the barriers-to-services component of the 2007 English Indices of Deprivation (English Indices of Deprivation 2007, Department for Communities and Local Government, 2008). We have chosen to use travel times, rather than distances, to reflect the slower progress across urban areas compared to, for example, motorways. Expressing our local study zone model in terms of road-based travel times (unadjusted for traffic congestion, sometimes called 'off-peak') defines HE places to be fully available for local study up to 10 minutes away from the delivery site. Beyond that we consider the proportion of places effectively available for local study to decline linearly with travel time, so that at 45 minutes and beyond will consider places to be unavailable for local study. We make some adjustments to the standard road travel time for journeys between the Isle of Wight and the mainland, to try to account for the use of passenger routes for commuting purposes.

Size, nature and location of existing and planned HE provision

5. To map local provision we need to know the size, location and nature of all the existing and planned HE provision. This information is collated for Great Britain as a whole, so that local provision in England is correctly assessed in border areas, drawing upon administrative student record data sets relating to the academic year 2006-07. The size of HE locations is measured by a count of Great Britain domiciled undergraduate entrants. A simple count of entrants is used in preference to the number of students, or their full-time equivalent (FTE), as this is a good guide to study opportunity which is not confounded by variations in course lengths and non-completion rates. We use the broadest definition of undergraduate HE that permits consistent use of the different student data sets.

6. Entrants recorded as studying for courses at a low intensity (less than 0.2 FTE) are removed. This is to avoid distorting the map of provision if a HE site offers a large number of very short duration continuing-education courses. We also remove provision that is not delivered at a classroom location. The main effect of this is to remove distance learning provision. Such provision can, to a reasonable approximation, be regarded as universally accessible and therefore not informative in discriminating between potential new HE provision sites.

7. All provision is assigned to a geographical location. For provision registered to a higher education institution (HEI) this is done at campus level, with franchised provision located at the institution providing the largest amount of teaching. In making these assignments, we have drawn upon our extended delivery-location information that has been developed at HEFCE. HE provided by Scottish further education colleges (FECs) is located at campus level. HE provided by directly funded English FECs is located at the delivery location recorded on the ILR record. HE provided by Welsh FECs is located at the main HE campus of that institution. In the small number of cases where campus or franchised provision is not properly referenced we allocate the places to the largest HE site of that institution. Sites with ten entry places or less are not used in the calculations.

8. The anticipated contribution of HE centres that have already been agreed but are not yet fully reflected in the administrative records is accounted for by imputation. For the purposes of calculating local provision we make an approximation that these HE centres will eventually have an annual total of at least 250 undergraduate entry places at each site (including any places already reported at that site).

9. For some of the CEB measures, we want to avoid counting local provision places that originate from highly selective institutions with academic entry requirements that few are likely to attain. We do this by estimating the proportion of places at each institution likely to be attainable for someone holding the equivalent of 200 UCAS tariff points at entry. For HEIs we estimate this proportion by looking at the share of entrants holding entry qualifications likely to be at or below the 200 tariff point threshold. The groupings used for this are based on those used in the [Performance Indicators](#) but, for the purpose

of estimating this proportion, we exclude those that do not have a clear rank order or are likely to represent different levels of prior attainment between institutions.

10. Where the proportion of attainable places estimated by this method is below 5 per cent, or above 95 per cent, it is set to be 0, or 100, per cent respectively. This is to account for the fact that entry qualification recording can contain errors, and that we only have achieved qualifications which may be higher, or lower than the required entry qualifications. In particular this truncation is used to avoid very small proportions of apparently attainable places recorded at large, very selective institutions being treated as clusters of attainable provision.

11. It is not possible to replicate these calculations on most HE delivered at FECs; we assume that all provision at HE delivered by FECs (whether directly or indirectly funded) is fully attainable. We also assume that the provision from anticipated HE centres is fully attainable. The number of attainable places at each delivery location is obtained by applying the estimated institutional attainability proportion to the total entry place count.

Local provision

12. The model of the local study zone is used to calculate how many of the entry places at a particular HE site can be considered as available for local study in each of the surrounding census wards. The sum of the local study places across all the HE delivery sites gives the amount of local provision for each ward. Repeating these calculations using the estimated attainable places at each delivery site gives attainable local provision for each ward.

Populations

13. To assess the benefit of potential new HE provision sites, the increase in local provision from the new site needs to be considered with the population that the new site can serve. In order to do this we use several measures of resident populations. The specification of these population measures is guided by their role of providing a guide to the relative populations of different localities rather than absolute estimates.

14. We use different measures to represent the young and mature populations. For the young we use the typical single-year size of the secondary school age (10-15) cohort in 2006, derived from the Office for National Statistics (ONS) and the General Register Office for Scotland (GROS) small-area population estimates. For the mature populations we use an estimate of those who have lower-level qualifications but have not yet entered HE. This is based on a count of those aged 25 to 49 with the highest qualifications held being in the 2001 Census 'lower level' group (levels 1,2 and 3 in England) who are not students from Table 32 of the 2001 Census Small Area Statistics. The qualification profile is chosen to indicate those likely to be able to take advantage of opportunities to upskill to the HE level. Students are excluded so that the benefit measures are not distorted by the large numbers of lower-level qualified HE students that live around major HE providers. This count is then updated to be consistent with ratio change between 2001 and 2006 for the 25 to 49 year-old population in the ONS and GROS small-area

population estimates. The age range used for the mature measure is chosen to further minimise the risk of counting resident students while accommodating the table constraints of the population sources. The young measure is intended to represent the population who enter HE at 18 or 19. The mature measure is intended to represent entrants at all other ages.

Geography and area classifications

15. All calculations for the CEB, including the travel times, use the 2001 Census area statistic ward geography. Some of the CEB measures consider only people living in particular types of areas. The measures for the young population use groupings of the 40 per cent of wards (by young population, percentile, typically determined with reference to England) that have (a) the lowest levels of young participation (measured by POLAR2 area classification that is used in the Widening Access funding allocation and provided at www.hefce.ac.uk/widen/polar/polar2/); and (b) the highest levels of income deprivation affecting children. The income deprivation affecting children is obtained from the English Indices of Deprivation 2007. This measure cannot be obtained on the same basis for Scotland and Wales so an estimate is made, consistent with the English data, using 2001 Census information on unemployment.

16. The measures for the mature population use groupings of the 40 per cent of wards (by the relevant mature population) that have (c) the lowest levels of HE qualifications amongst adults (this uses HE qualified adult area classification used in the 20-2009 Widening Access funding allocation and provided at www.hefce.ac.uk/widen/polar/polar2/); and (d) the highest levels of unemployment. The unemployment measure is derived from the English Indices of Deprivation 2007. This statistic cannot be obtained on the same basis for Scotland and Wales so an estimate, consistent with the English data, is a made using 2001 Census data.

Defining what level of local provision is considered low

17. We use two thresholds of low local provision in determining which areas to prioritise. The main threshold is 500 local study places; this means that we consider wards which have local provision (of all places, or attainable places depending on the particular benefit statistic) of less than 500 places to be prioritised for new local provision. Around 2 to 4 per cent of the English population live in such areas. This varies by whether all or attainable places are considered together with which section of the population is being used (for example, low income neighbourhoods are often in cities that are well served in terms of local provision). The secondary threshold is 1,500 places. This means the target population includes a broader 6 to 12 per cent of the population, and is intended to highlight areas that, although not experiencing the very lowest levels, have local provision well below average. For both thresholds the calculations treat increases in local provision at the lower end of the range as more beneficial than similar increases close to the threshold itself.

Measuring the benefit of new provision

18. Our calculation of the benefit of locating new provision at a particular location is related to how much that new provision will reduce the degree of low local provision experienced by specified population groups within the local study zone. Equation 1 shows how that statistic is formulated. Different specifications of the low local provision threshold and the population groups give the different benefit statistic measures.

Equation 1: The common evidence base benefit statistic

$$B_i = \sum_{\text{all wards } j} \left(\int_{l_j = \min \left[\sum_{\text{all wards } k} w_k \cdot f(d_{j,k}), t \right]}^{l_j = \min \left[x_i \cdot f(d_{i,j}) + \sum_{\text{all wards } k} w_k \cdot f(d_{j,k}), t \right]} (1.25t - l_j) dl_j \right) \cdot p_j$$

or, when integrated,

$$B_i = \sum_{\text{all wards } j} \left(\left[1.25tl_j - 0.5l_j^2 \right]_{\min \left[\sum_{\text{all wards } k} w_k \cdot f(d_{j,k}), t \right]}^{\min \left[x_i \cdot f(d_{i,j}) + \sum_{\text{all wards } k} w_k \cdot f(d_{j,k}), t \right]} \right) \cdot p_j$$

B_i = benefit of extra provision x_i located at ward i

l_j = local provision in ward j

t = low local provision threshold

$$f(d_{a,b}) = \begin{cases} 1 & \text{if } d_{a,b} \leq 10 \text{ minutes} \\ \frac{45 - d_{a,b}}{35} & \text{if } 10 \text{ minutes} < d_{a,b} < 45 \text{ minutes} \\ 0 & \text{if } d_{a,b} \geq 45 \text{ minutes} \end{cases}$$

p_j = target population resident in ward j

w_k = existing provision at sites in ward k

$d_{a,b}$ = road based travel time between wards a and b

19. The incremental benefit of increasing local provision within the range of low local provision is set to be proportional to the difference between the level of local provision and 125 per cent of the low local provision threshold. This is to ensure that increases in local provision for wards with levels of local provision close to zero generate more benefit than similar increases for those wards that have local provision nearer to the low local provision threshold. The benefit is set to be proportional to 125 per cent of the threshold to limit this prioritisation to no more than 5:1 (to avoid excessive weights on small increases for areas with close-to-zero levels of local provision). For example, with a low provision threshold of 500 local study places, the benefit for increasing local provision from 0 to 125 local study places generates a contribution to the benefit statistic three times that for increasing local provision from 375 to 500 local study places (if the populations are equal).

20. The calculation of the benefit of new provision requires an assumption of the approximate size of the new provision (because of the interaction with the low local provision threshold). The calculations use an assumed size of 250 attainable undergraduate entry places, equating to roughly 500 FTE for the type of provision likely to be found in HE centres. This is consistent with the range of sizes seen for existing HE centres, and the resources currently indicated for the programme.

The benefit measures in the CEB

21. The benefit measures report the benefit against specified policy objectives of locating new provision at a particular location. Table 1 in “A new ‘University Challenge’: proposals for higher education centres” defines the six core benefit measures and the policy objectives they inform. These six core measures are calculated for two definitions of low local provision (500 and 1,500 entry places) to give 12 benefit statistics in total. In the data files and maps these statistics are identified with a systematised naming structure comprising five elements delimited by underscores. For example, the benefit statistic identified as B500_ATTUG_YOUNG_ALL_LOWYPR uses a specification of a low local provision threshold of 500 attainable undergraduate entry places with a benefit population that is young, holding any level of highest qualification, and living in the 40 per cent of areas with the lowest young HE participation rates. Table CEB1 defines this naming structure. Table CEB2 lists the 12 measures used in the CEB.

Table CEB1 Naming system for the benefit statistics

Position	Measures	Values
1	Low local provision threshold	B500=500 local entry places B1500=1500 local entry places
2	Type of local provision	ALLUG=All undergraduate entry places ATTUG=Attainable undergraduate entry places
3	Benefit population: age group	YOUNG=Young people OLDER=Mature people
4	Benefit population: highest qualification held level	ALL=All LOW=Lower level.
5	Benefit population: type of neighbourhood	WHOLE=All areas LOWYPR=40 per cent with lowest young participation (used for young only) LOWINC=40 per cent with lowest income (used for young only) LOWEMP=40 per cent with highest unemployment (used for mature only) LOWAHE=40 per cent with lowest HE qualification levels (used for mature only)

Table CEB2 Benefit measures in the common evidence base

Benefit measure	Benefit specification
B500_ALLUG_YOUNG_ALL_WHOLE	Low local provision threshold of 500 undergraduate entry places with a benefit population that is in the young age group, has any level of highest qualification, and lives in any type of area.
B500_ATTUG_YOUNG_ALL_LOWINC	Low local provision threshold of 500 attainable undergraduate entry places with a benefit population that is in the young age group, has any level of highest qualification, and lives in the 40 per cent of areas with the lowest household income.
B500_ATTUG_YOUNG_ALL_LOWYPR	Low local provision threshold of 500 attainable undergraduate entry places with a benefit population that is in the young age group, has

	any level of highest qualification, and lives in the 40 per cent of areas with the lowest young HE participation rates.
B500_ALLUG_OLDER_LOW_WHOLE	Low local provision threshold of 500 undergraduate entry places with a benefit population that is in the mature age group, holds a highest qualification in the lower level group, and lives in any type of area.
B500_ATTUG_OLDER_LOW_LOWAHE	Low local provision threshold of 500 attainable undergraduate entry places with a benefit population that is in the mature age group, holds a highest qualification in the lower level group, and lives in the 40 per cent of areas with the lowest levels of HE qualifications.
B500_ATTUG_OLDER_LOW_LOWEMP	Low local provision threshold of 500 attainable undergraduate entry places with a benefit population that is in the mature age group, holds a highest qualification in the lower level group, and lives in the 40 per cent of areas with the highest levels of unemployment.
B1500_ALLUG_YOUNG_ALL_WHOLE	Low local provision threshold of 1500 undergraduate entry places with a benefit population that is in the young age group, has any level of highest qualification, and lives in any type of area.
B1500_ATTUG_YOUNG_ALL_LOWINC	Low local provision threshold of 1500 attainable undergraduate entry places with a benefit population that is in the young age group, has any level of highest qualification, and lives in the 40 per cent of areas with the lowest household income.
B1500_ATTUG_YOUNG_ALL_LOWYPR	Low local provision threshold of 1500 attainable undergraduate entry places with a benefit population that is in the young age group, has any level of highest qualification, and lives in the 40 per cent of areas with the lowest young HE participation rates.
B1500_ALLUG_OLDER_LOW_WHOLE	Low local provision threshold of 1500 undergraduate entry places with a benefit population that is in the mature age group, holds a highest qualification in the lower level group, and lives in any type of area.

B1500_ATTUG_OLDER_LOW_LOWAHE	Low local provision threshold of 1500 attainable undergraduate entry places with a benefit population that is in the mature age group, holds a highest qualification in the lower level group, and lives in the 40 per cent of areas with the lowest levels of HE qualifications.
B1500_ATTUG_OLDER_LOW_LOWEMP	Low local provision threshold of 1500 attainable undergraduate entry places with a benefit population that is in the mature age group, holds a highest qualification in the lower level group, and lives in the 40 per cent of areas with the highest levels of unemployment.

22. The population measures used in the benefit calculations are intended only for comparisons between areas rather than direct measures of the population. This means that the raw values from the benefit calculations can only be readily compared between areas within a particular benefit statistic specification and not across benefit statistics with different specifications. To aid the comparison of areas within a particular benefit specification, all the benefit measures are reported as an index with the benefit index value for the ward, with the highest benefit value on that measure set to 100. For example, if a ward has a benefit index of 50, then locating new HE provision there has 50 per cent of the benefit of locating the same provision in the most favoured ward for that particular benefit statistic specification.

23. All 12 benefit index statistics are provided in a data file for every 2001 Census area statistics ward in England and Wales¹. Maps are also provided of the benefit index where colours used to indicate the level of benefit. Areas where locating provision would have no benefit (against the specification for that measure) form one group shaded dark red. The remaining areas are divided into nine groups, with equal (English) surface area, according to their level of benefit with those wards with the highest level of benefit shaded dark blue. Parts of Scotland are included on the maps for clarity but shaded grey as the benefit statistics for these areas are not shown.

¹ The CEB was extended to include Wales in May 2010. The data for England remains unchanged.