



Department
for Education

Ad-hoc Notice **Post-16 pathways at level 3 and below**

**Experimental statistics on young
people's transitions from education to
work in England**

November 2020

Contents

Post-16 pathways at level 3 and below	3
Introduction	3
Summary	3
Existing evidence	4
Six pathways through education and into the labour market (at level 3 and below)	5
Pathways, qualifications and subject areas	10
Modelled chance of successful transitions into work	12
Annex A: data and methodology	17
Data sources and coverage	17
Methodology	17
Data processing	17
Missing information	18
Sequence analysis and cluster selection	18
Related publications	19
Annex B: regression modelling and weighting for missing data	20

Post-16 pathways at level 3 and below

Introduction

This report includes experimental statistics that describe students' pathways through post-16 education and their transitions into work. The focus is on students who leave education at level 3 or below; students who reach Higher Education are excluded. The analysis aims to:

- Show how many students experience difficult transitions into work, and cycle between work, education and benefits, or are not in education, employment, or training (NEET).
- Identify qualification pathways at level 2 and level 3 that are associated with successful transitions into work.

The analysis uses the longitudinal education outcomes (LEO) study to map students' education activity to their employment and benefit history. Focusing on the 2006/07 GCSE cohort, students are grouped into distinct pathways using social sequence analysis – a set of statistical and cluster analysis techniques – to analyse and categorise people using only their quarterly education and labour market activity. Students' activities are followed for 9 years after completion of GCSEs (ages 16-25).

Feedback
The Department invites feedback on the methodology in this report. Please direct all comments to the following email address: FE.OUTCOMESDATA@education.gov.uk

Summary

This report identifies six pathways through post-16 education at level 3 and below. These fall into two broad groups: difficult transitions into work and successful transitions into work.

Of the students who leave post-16 education with a qualification at level 3 or below, around a third (30%) experience difficult transitions into work – and these more difficult transitions are associated with lower employment and earnings outcomes in the future.

Students who leave education with a full level 2 or full level 3¹ are more likely to make a successful transition into work than those at below level 2, and students with apprenticeships are more likely to experience successful transitions than students who achieve technical courses² in the classroom.

¹ Full level 2 is 5 GCSEs grade A*–C or 4-9, or equivalent; full level 3 is 2 A levels or equivalent

² Technical courses are defined as all classroom-based qualifications other than GCSEs and A Levels.

After accounting for student characteristics and prior attainment, analysis suggests that the average below level 2 student could be 30% more likely to follow a successful transition into work with a full level 2, and twice as likely with a full level 3.

Existing evidence

The DfE publishes statistics on the destinations and outcomes of students reaching the end of study at [key stage 4, ages 16-18](#), and as [adults in Further Education \(FE\)](#):

- 94% of students who left key stage 4 in 2016/17 entered sustained education or employment in the following year.
- 88% of 16-18 education leavers who studied at level 3 entered sustained further learning or employment, while students who studied at level 2 (74%) or below (56%) were less likely to have a sustained destination overall.
- 76% of learners completing FE courses in 2016/17 progressed into further learning or employment. Apprenticeships (91%) were more likely to lead to sustained positive outcomes than adult (19+) classroom courses (71%).

DfE has also [published research](#) to understand the link between highest level of qualification and labour market outcomes in early adulthood. The report finds that higher levels of education by age 23 are associated with better employment and earnings outcomes at age 26, and that this is true for low, middle and high attaining GCSE students.

This report aims to build on these statistics by looking across students' full post-16 education history, and linking an analysis of educational attainment by age 25 with a classification of how successfully and when students transition into work.

Social sequence analysis is an increasingly common methodological approach to studying individuals' life trajectories, including education pathways. [Dickerson et al \(2020\)](#) use sequence analysis and find six pathways through post-16 education between ages 16 to 20: 1) employment dominated; 2) NEET dominated; 3) below level 3 dominated; 4) apprenticeships; 5) vocational level 3 to HE; 6) A levels to HE. They find that A levels to HE and apprenticeships have the best labour market outcomes, and that 6% follow the NEET dominated pathway.

This report adopts a similar methodological approach to Dickerson et al (2020). Important differences are:

- A focus here on students at below level 3 rather than the full post-16 landscape.
- Classifying education pathways in terms of transitions into work over nine years (ages 25), rather than building pathways from different types of learning undertaken between ages 16 to 20.
- Use of the LEO study to include more detailed information about qualification achievement.

Six pathways through education and into the labour market (at level 3 and below)

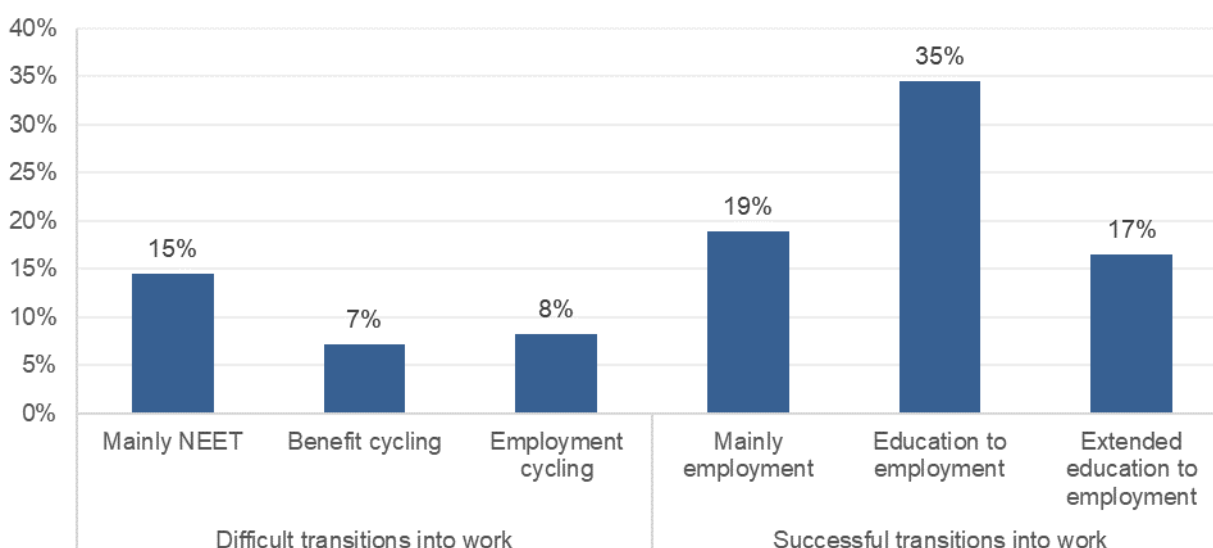
This report identifies six distinct education pathways for students who leave education at level 3 and below. These fall into two broad groups:

- Pathways characterised by difficult transitions into work – for example, students who leave education and struggle to find sustained employment.
- Pathways characterised by a successful transition into work – for example, students who leave education and quickly find employment that is sustained.

The six pathways are summarised in Figure 1 and pages 8-9 include a detailed and graphical description of each pathway. Pathways are selected using clustering techniques, which include an element of subjective choice – see Annex A for more detail.

Figure 1: proportion of students following each post-16 pathway

Students who completed GCSEs in 2007 and left education at level 3 and below



Source: Longitudinal Education Outcomes (LEO) study

Around a third (30%) of students who leave education at level 3 and below experience difficult transitions from education into work:

- 15% follow a **mainly NEET** pathway. These students are characterised by long periods of claiming out-of-work benefits. There are spells of education early on, mostly at below level 2, that do not result in sustained employment.
- 7% follow a **benefit cycling** pathway. This is characterised by students cycling between learning, benefits and employment, with an emphasis on training and benefits, and limited progression to sustained employment in later years. Education activity is mainly in the classroom and at level 2 and below.
- 8% follow an **employment cycling** pathway. This pathway is characterised by cycling between learning, benefits and employment that tends to result in sustained employment in later years. Education activity is split between courses at level 2 and below and technical courses at level 3.

Of those experiencing difficult transitions into work, students who are mainly NEET can be considered furthest from the labour market and tend to have performed least well in education: just 4% of students in this pathway achieved 5 GCSEs grade A*-C including English and maths. They are also more likely than other students to have been eligible for free school meals and to have had special education needs at some point in school [Table 1].

Students in the employment cycling pathway are considered closest to the labour market out of those who experience difficult transitions into work. They have similar prior attainment and characteristics to the benefit cycling pathway, but are more likely to be male [Table 1].

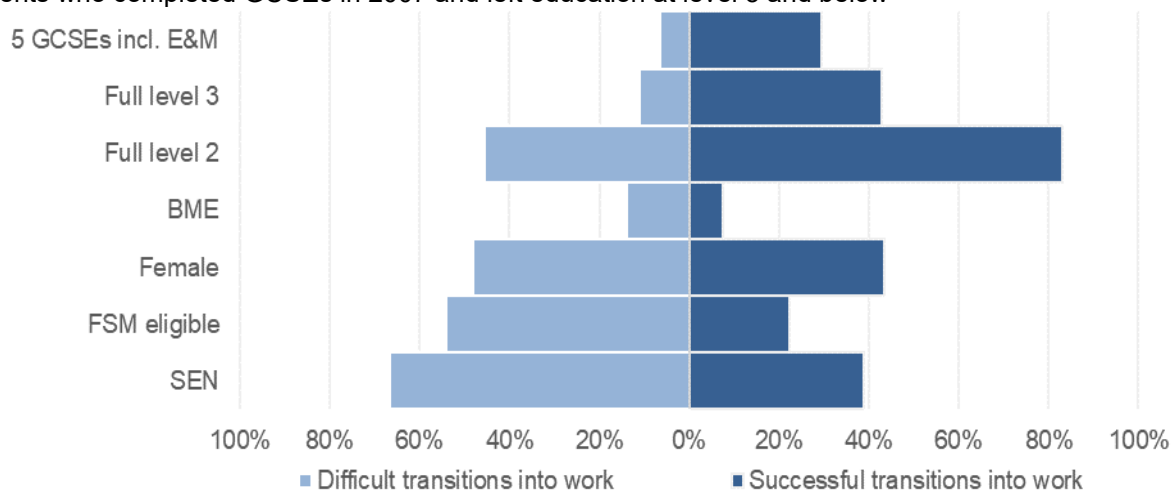
Around two thirds (70%) of students who leave education at level 3 and below experience a smooth transition into work after completing post-16 education:

- 19% follow a **mainly employment** pathway – these are students who start work straight after GCSEs, or who move quickly from post-16 education into employment. Level 2 apprenticeships and technical courses at level 2 and 3 are the most common education activities.
- 35% follow an **education to employment** pathway – this is characterised by a spell of two or three years in education at level 2 or 3 followed by a successful transition to sustained employment.
- 17% follow an **extended education to employment** pathway – this is characterised by a longer spell in education at level 2 or 3 followed by a successful transition to sustained employment in later years.

Compared with difficult transitions into work, students who experience smooth transitions are less likely to have been eligible for free school meals, less likely to have had special education needs, and more likely to have performed well at GCSE and achieved a full level 2 or full level 3 by age 25 [Figure 2].

Figure 2: post-16 pathway groups: characteristics and prior attainment

Students who completed GCSEs in 2007 and left education at level 3 and below



Source: Longitudinal Education Outcomes (LEO) study

Table 2 shows that the labour market patterns outlined in the pathway descriptions persist into later years. Pathways where students are mainly NEET or cycle between education, benefits and employment are also associated with lower earnings and a lower chance to be in employment in later life when compared with successful transitions into work. Within the difficult transitions group, however, the employment cycling pathway has better outcomes than the mainly NEET and benefit cycling pathways – 64% of females are in sustained employment vs 30% for benefit cycling and 13% for mainly NEET.

Outcomes for pathways with successful transitions into work are broadly comparable despite the differences in prior attainment and characteristics mentioned above [Table 2].

Table 1: post-16 pathways: prior attainment and demographic characteristics of students

Students who completed GCSEs in 2007 and left education at level 3 and below

Pathway	Female	BME	FSM eligible	SEN	5 GCSEs incl. E&M	GCSE point score	Students
Mainly Neet	52%	15%	60%	74%	4%	145	2,300
Cycling-benefit	52%	14%	47%	59%	10%	214	1,100
Cycling-employment	38%	12%	49%	60%	8%	202	1,300
Mainly employment	41%	5%	24%	42%	20%	251	3,000
Education-employment	46%	7%	20%	36%	35%	291	5,400
Extend. education-employment	42%	11%	25%	41%	28%	278	2,600
Difficult transitions into work	48%	14%	54%	67%	7%	177	4,700
Successful transitions into work	43%	8%	22%	39%	29%	277	11,000
Total (sample, weighted)	45%	9%	32%	47%	22%	247	15,700
<i>Population total</i>	45%	9%	31%	47%	23%	248	327,200

Source: Longitudinal Education Outcomes (Leo) study; notes: volumes are rounded to the nearest 100, na = not applicable, “-“ represents base volumes below 3.

SEN = students with special education needs at any point in school; FSM = eligible for free school meals at any point in school

Table 2: post-16 pathways: labour market outcomes in FY201718

Students who completed GCSEs in 2007 and left education at level 3 and below, outcomes at age 27

Pathway	Females median earnings	Males median earnings	Females sustained employment	Males sustained employment
Mainly Neet	£7,000	£12,000	13%	13%
Cycling-benefit	£8,000	£15,000	30%	34%
Cycling-employment	£10,000	£17,000	64%	62%
Mainly employment	£16,000	£21,000	82%	80%
Education-employment	£17,000	£22,000	80%	75%
Extended education-employment	£16,000	£22,000	78%	75%
Difficult transitions into work	£9,000	£15,000	28%	34%
Successful transitions into work	£16,000	£22,000	80%	77%
Total (sample, weighted)	£15,000	£21,000	63%	65%
<i>Population total</i>	<i>£15,000</i>	<i>£21,000</i>	<i>64%</i>	<i>64%</i>

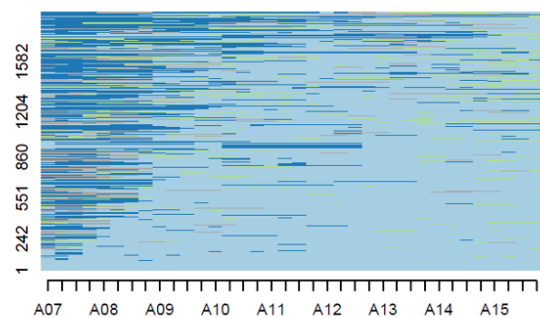
Source: Longitudinal Education Outcomes (Leo) study; notes: volumes are rounded to the nearest 100, na = not applicable, “-“ represents base volumes below 3.

Pathway group 1: difficult transitions to work

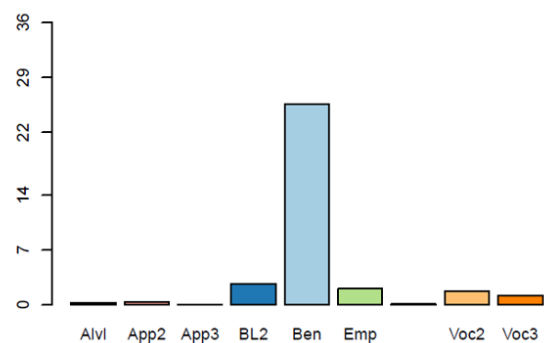
1. Mainly NEET:

Long periods of claiming out-of-work benefits and limited education and employment.

Activity in each quarter: all students (A07 = August 2007)



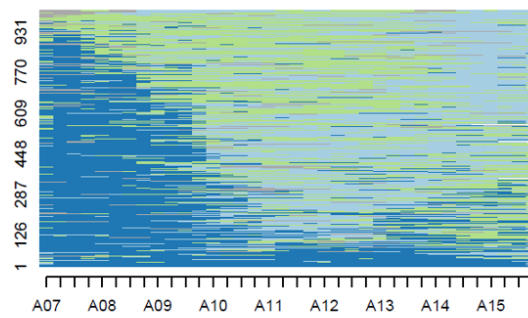
Average time in activity: quarters



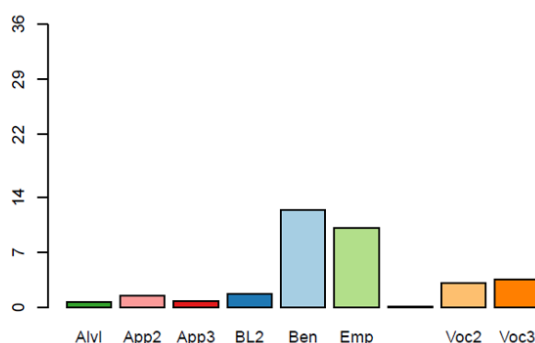
2. Cycling: mainly benefits

Cycling between learning, benefits and employment; no progression to sustained employment.

Activity in each quarter: all students



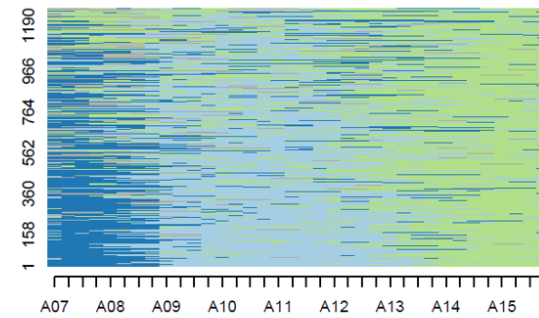
Average time in activity: quarters



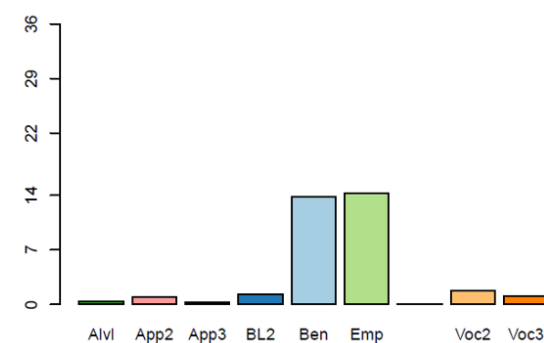
3. Cycling: ending in employment

Cycling between learning, benefits and employment that results in sustained employment.

Activity in each quarter: all students



Average time in activity: quarters

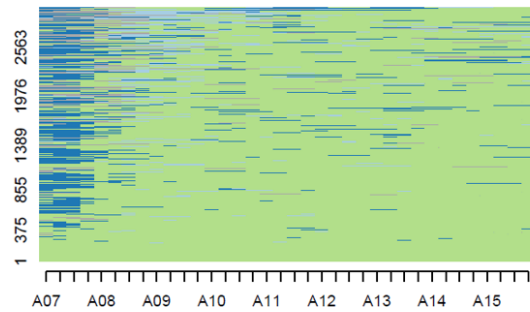


Pathway group 2: successful transitions to work

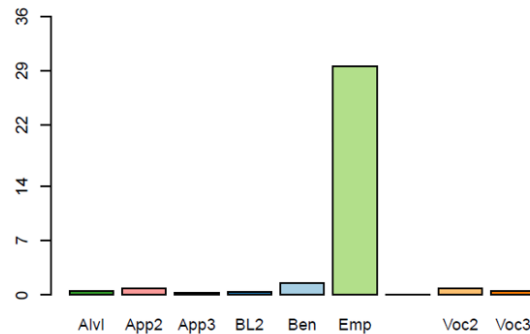
4. Mainly employment

Students who start work after GCSEs, or who move quickly from post-16 education and into employment.

Activity in each quarter: all students (A07 = August 2007)



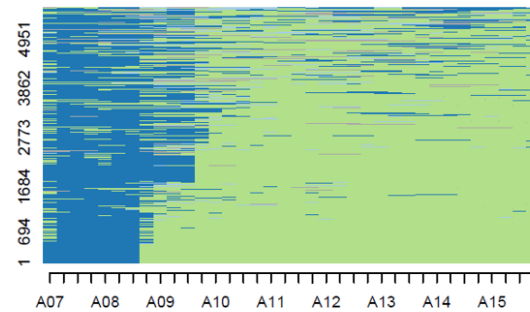
Average time in activity: quarters



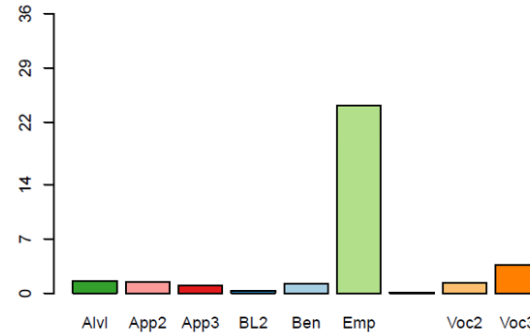
5. Education and employment

A spell of two or three years in education followed by a successful transition to sustained employment.

Activity in each quarter: all students



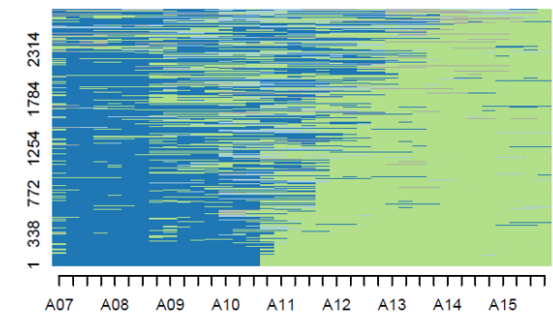
Average time in activity: quarters



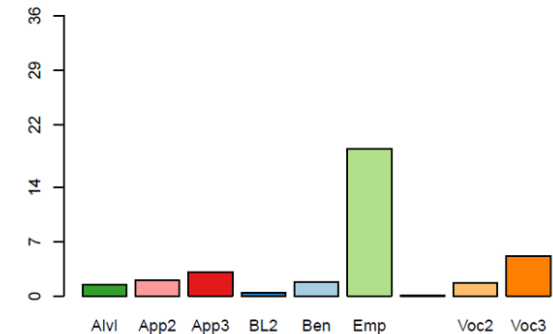
6. Ext. education and employment

A long spell in education followed by a successful transition to sustained employment in later years.

Activity in each quarter: all students



Average time in activity: quarters



Pathways, qualifications and subject areas

Figure 3 and Table 3 show that students who achieve a highest qualification of level 2 or level 3 by age 25 are more likely to make a successful transition into work than students who remain at below level 2.

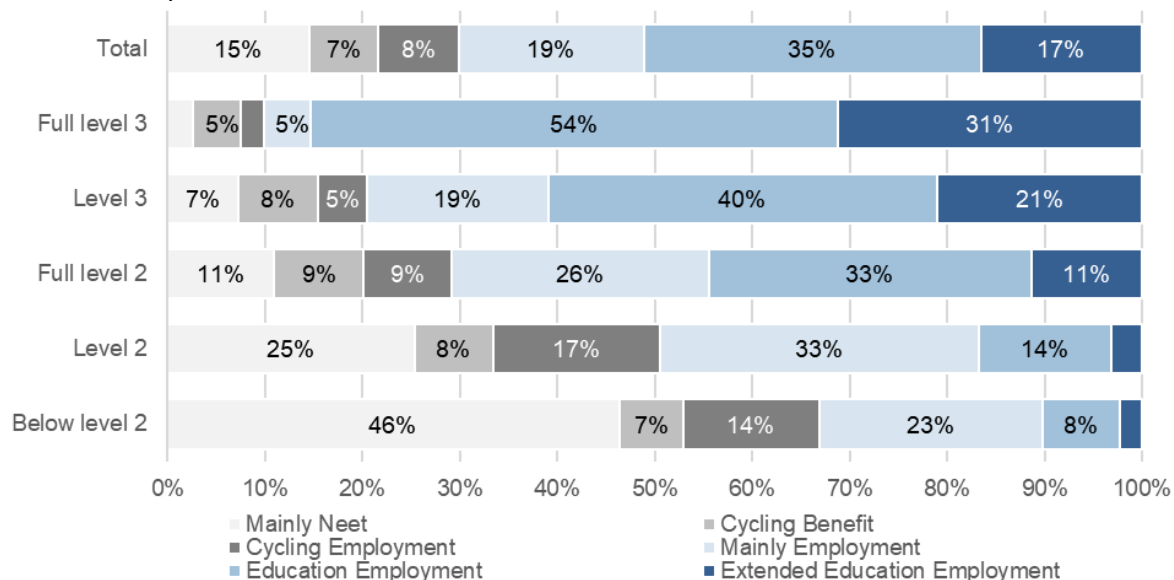
Apprenticeship programmes and classroom-based courses at full level 2 or higher are associated with pathways that involve a successful transition into work [Table 3]:

- Students who reach full level 2 are more than twice as likely as those at below level 2 to follow a successful transition into work (71% vs 33% respectively).
- Students at full level 3 are more likely to follow a successful transition into work than those at full level 2 (90% vs 71% respectively).
- Students whose highest qualification is an apprenticeship are more likely to experience successful transitions into work than students with a classroom-based technical qualification (87% vs 64% respectively).

Students who reach at least full level 2 are unlikely to follow the mainly NEET pathway – just 11% of these students are in the mainly NEET pathway compared to 46% of those who remain at below level 2.

Figure 3: post-16 pathways by highest level achieved age 25

Students who completed GCSEs in 2007 and left education at level 3 and below



Source: Longitudinal Education Outcomes (LEO) study

There is also variation in transitions into work across different sector subject areas (SSAs). The results for full level 3 and apprenticeships show that:

- Across all SSAs included in the report, 80% or more of students with a full level 3 experienced a successful transition to work [Figure 5].
- For each SSA at full level 2 and 3, students with an apprenticeship as their highest qualification are more likely to experience a successful transitions into work than

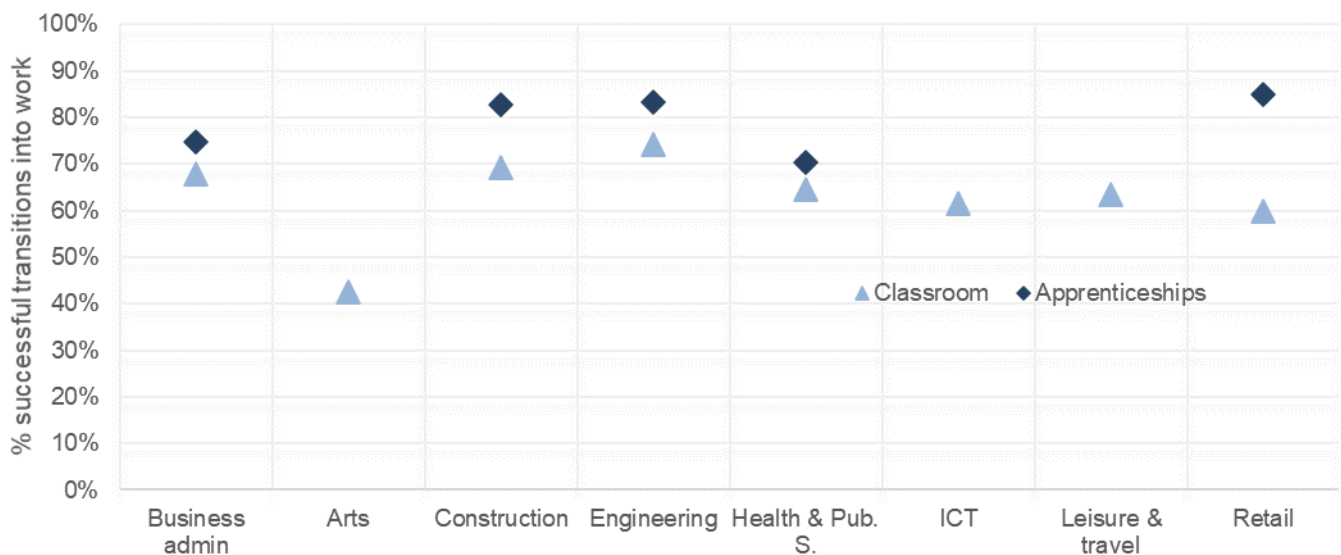
those with classroom-based courses [Figures 4 and 5].

Results at full level 2 are more mixed [Figure 4]:

- Engineering and construction tend to have high successful transitions into work relative to other SSAs.
- For apprenticeships, the SSA with the lowest successful transitions into work was health, public services and care (70%).
- For classroom-based courses, arts, media and publishing had the lowest successful transitions into work (43%).

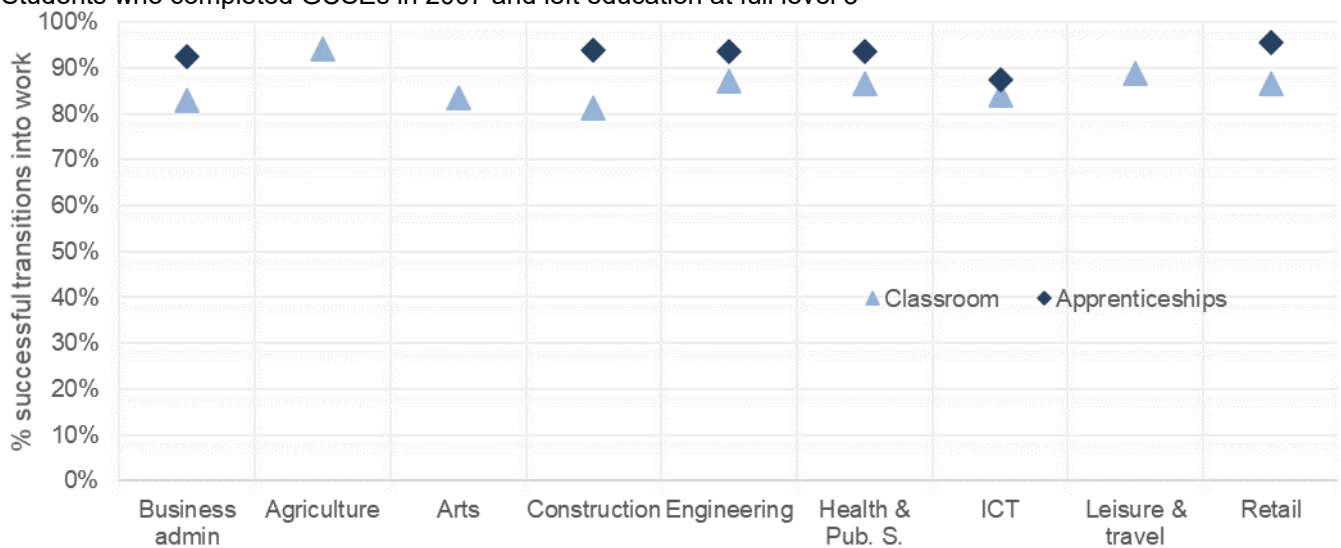
SSA results based on fewer than 100 students are removed.

Figure 4: successful transitions into work by sector subject area: full level 2
Students who completed GCSEs in 2007 and left education at full level 2



Source: Longitudinal Education Outcomes (LEO) study

Figure 5: successful transitions into work by sector subject area: full level 3
Students who completed GCSEs in 2007 and left education at full level 3



Source: Longitudinal Education Outcomes (LEO) study

Modelled chance of successful transitions into work

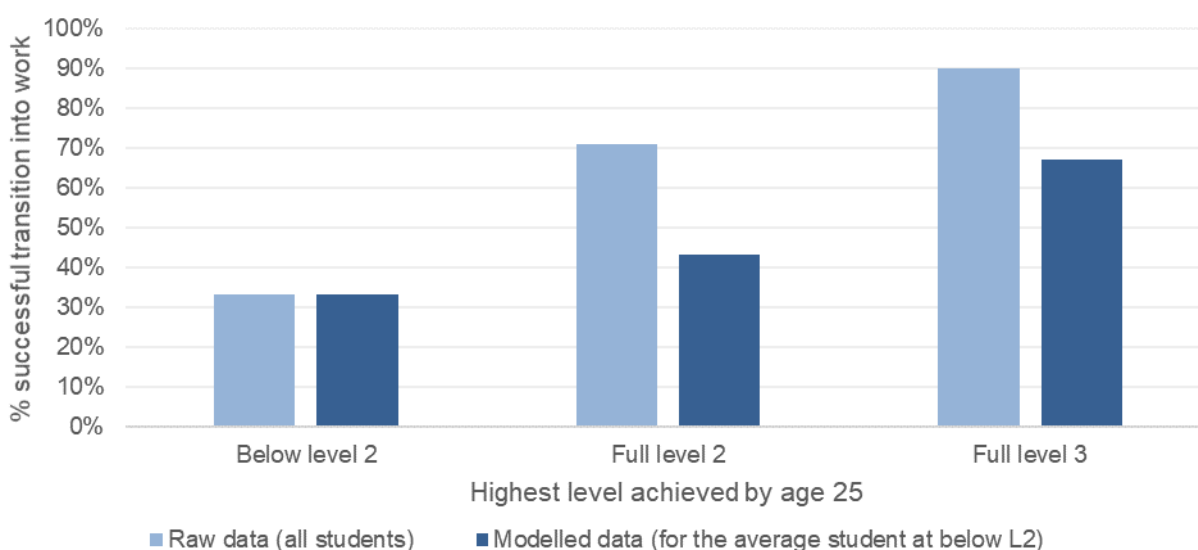
The analysis presented so far has shown that the difference in students' chances of following a successful transition into work are due to differences in:

- Education – highest qualification level and type,
- Prior attainment (i.e. GCSE results)
- Individual characteristics (i.e. social disadvantage)

Some of the difference could also be due to additional factors that are not observed in the data.

This section reports findings from a logistic regression model which estimates the impact of qualification level on a student's chances of successfully transitioning into work. By controlling for other factors such as prior attainment, characteristics and subject choice, the model is able to isolate the difference that achieving a full level 2 or a full level 3 could make on a student's transition into work, compared to remaining at below level 2. See Box 2 in Annex B for a description of the modelling.

Figure 6: observed and modelled probability of successful transitions into work
Students who completed GCSEs in 2007 and left education at level 3 and below



Source: Longitudinal Education Outcomes (LEO) study

The results in Figure 6 show that, for the average below level 2 student³:

- Achieving a full level 2 could increase the probability of following a successful transition into work from 33% to 43% - this student would be 30% more likely to experience a successful transition into work.
- Achieving a full level 3 qualification would increase the probability of following a successful transition into work from 33% to 67% - this student would be twice as

³ Assuming a student who has the below level 2 average chance of a successful transition to work, and holding student characteristics, prior attainment and course selection constant.

likely to experience a successful transition into work.

Results from the regression analysis should be treated with some caution as there may be factors not observed in the data that impact on a student's chance to successfully transition into work.

Table 3: post-16 pathways by highest level and qualification type

Students who completed GCSEs in 2007 and left education at level 3 and below

Qualification type	Qualification level	Mainly Neet	Cycling-Benefit	Cycling-Employment	Mainly Employment	Education-Employment	Extended Education-Employment	Successful Transition	Students
Academic	Below level 2	39%	5%	15%	31%	8%	1%	40%	1,200
	Level 2	19%	6%	16%	40%	15%	3%	58%	1,300
	Full level 2	8%	5%	7%	58%	20%	2%	80%	500
	Level 3	5%	5%	5%	25%	44%	16%	85%	500
	Full level 3	1%	3%	2%	5%	72%	17%	94%	1,200
	Total	17%	5%	10%	29%	31%	8%	68%	4,700
Apprenticeship	Below level 2	na	na	na	na	na	na	na	na
	Level 2	na	na	na	na	na	na	na	na
	Full level 2	4%	8%	7%	25%	40%	15%	80%	1,500
	Level 3	na	na	na	na	na	na	na	na
	Full level 3	1%	4%	2%	7%	40%	46%	93%	1,600
	Total	3%	6%	4%	16%	40%	31%	87%	3,100
Technical (incl. other classroom qualifications)	Below level 2	57%	8%	12%	12%	8%	3%	23%	800
	Level 2	32%	10%	19%	24%	12%	3%	39%	1,100
	Full level 2	16%	10%	11%	21%	31%	11%	63%	2,400
	Level 3	9%	10%	5%	15%	38%	23%	76%	1,100
	Full level 3	4%	7%	3%	3%	54%	29%	86%	2,500
	Total	18%	9%	9%	14%	34%	16%	64%	7,900
Total	Below level 2	46%	7%	14%	23%	8%	2%	33%	2,000
	Level 2	25%	8%	17%	33%	14%	3%	49%	2,400
	Full level 2	11%	9%	9%	26%	33%	11%	71%	4,400
	Level 3	7%	8%	5%	19%	40%	21%	79%	1,600
	Full level 3	3%	5%	2%	5%	54%	31%	90%	5,200
	Total	15%	7%	8%	19%	35%	17%	70%	15,700

Source: Longitudinal Education Outcomes (Leo) study; notes: volumes are rounded to the nearest 100, na = not applicable, "-" represents base volumes below 3.

Table 4a: post-16 pathways by sector subject area: Level 2 apprenticeships

Students who completed GCSEs in 2007 and left education at level 2

Sector subject area	Mainly Neet	Cycling-Benefit	Cycling-Employment	Mainly Employment	Education-Employment	Extended Education-Employment	Successful Transition	Students
Business, Administration, Finance and Law	5%	10%	10%	34%	30%	11%	75%	300
Construction, Planning and the Built Environment	2%	8%	6%	4%	60%	19%	83%	200
Engineering and Manufacturing Technologies	3%	6%	7%	24%	40%	20%	83%	200
Health, Public Services and Care	8%	10%	12%	30%	28%	12%	70%	200
Retail and Commercial Enterprise	3%	8%	4%	27%	42%	16%	85%	500

Source: Longitudinal Education Outcomes (Leo) study; notes: volumes are rounded to the nearest 100, na = not applicable, "-" represents base volumes below 3.

Table 4b: post-16 pathways by sector subject area: full level 2 technical

Students who completed GCSEs in 2007 and left education at full level 2

Sector subject area	Mainly Neet	Cycling-Benefit	Cycling-Employment	Mainly Employment	Education-Employment	Extended Education-Employment	Successful Transition	Students
Business, Administration, Finance and Law	9%	11%	13%	32%	26%	10%	68%	200
Arts, Media and Publishing	30%	13%	15%	15%	20%	7%	43%	200
Construction, Planning and the Built Environment	10%	10%	11%	12%	41%	16%	69%	400
Engineering and Manufacturing Technologies	9%	8%	8%	18%	44%	12%	74%	300
Health, Public Services and Care	16%	10%	9%	27%	28%	9%	64%	300
Information and Communication Technology (ICT)	18%	8%	13%	32%	20%	9%	62%	200
Leisure, Travel and Tourism	15%	12%	9%	27%	27%	10%	63%	200
Retail and Commercial Enterprise	20%	13%	7%	15%	35%	10%	60%	400

Source: Longitudinal Education Outcomes (Leo) study; notes: volumes are rounded to the nearest 100, na = not applicable, "-" represents base volumes below 3.

Table 5a: post-16 pathways by sector subject area: level 3 apprenticeships

Students who completed GCSEs in 2007 and left education at level 3

Sector subject area	Mainly Neet	Cycling-Benefit	Cycling-Employment	Mainly Employment	Education-Employment	Extended Education-Employment	Successful Transition	Students
Business, Administration, Finance and Law	-	4%	3%	17%	44%	32%	93%	300
Construction, Planning and the Built Environment	2%	4%	-	-	36%	58%	94%	200
Engineering and Manufacturing Technologies	-	5%	1%	3%	25%	65%	94%	400
Health, Public Services and Care	-	3%	3%	9%	47%	38%	94%	300
Information and Communication Technology (ICT)	7%	5%	-	9%	48%	30%	87%	100
Retail and Commercial Enterprise	-	2%	-	9%	47%	40%	96%	200

Source: Longitudinal Education Outcomes (Leo) study; notes: volumes are rounded to the nearest 100, na = not applicable, "-" represents base volumes below 3.

Table 5b: post-16 pathways by sector subject area: full level 3 technical

Students who completed GCSEs in 2007 and left education at full level 3

Sector subject area	Mainly Neet	Cycling-Benefit	Cycling-Employment	Mainly Employment	Education-Employment	Extended Education-Employment	Successful Transition	Students
Business, Administration, Finance and Law	6%	7%	3%	2%	54%	27%	83%	200
Agriculture, Horticulture and Animal Care	-	3%	-	5%	61%	28%	94%	100
Arts, Media and Publishing	5%	8%	3%	2%	53%	28%	84%	500
Construction, Planning and the Built Environment	3%	11%	4%	6%	29%	46%	81%	100
Engineering and Manufacturing Technologies	4%	6%	3%	9%	38%	41%	87%	100
Health, Public Services and Care	5%	6%	3%	5%	54%	27%	87%	600
Information and Communication Technology (ICT)	5%	10%	-	-	47%	36%	84%	200
Leisure, Travel and Tourism	3%	5%	3%	1%	64%	24%	89%	400
Retail and Commercial Enterprise	4%	7%	3%	1%	64%	22%	87%	300

Source: Longitudinal Education Outcomes (Leo) study; notes: volumes are rounded to the nearest 100, na = not applicable, "-" represents base volumes below 3.

Annex A: data and methodology

Data sources and coverage

The analysis in this report covers a cohort of students who:

- Were in the school census at age 15.
- Completed GCSEs in the 2006/07 academic year (turned 25 in 2015/16).
- Left post-16 education with a highest qualification of level 3 or below, and didn't participate in level 4+ courses.
- Have post-16 education records in the ILR, the school census, HESA or have employment or benefit spells recorded in LEO.

The analysis follows the same cohort of students over time between 2006/07 and 2015/16, and labour market outcomes are observed in 2017/18. Once individuals with persistent missing activity are removed, the cohort is 268,300, from which we draw a random sample of 15,700 students to cope with the demands of sequence analysis.

Earnings and employment estimates are based on information recorded through Pay As You Earn (PAYE) and P45 employment records. HMRC self-assessment returns, for those in self-employment, are not included in these statistics. Estimates for the number of benefit claimants are based on DWP records of out-of-work benefit claimants. Part-time earnings are not adjusted to full-time equivalent amounts as records in LEO do not include information on hours worked.

Methodology

Sequence analysis is a data-driven approach to categorising and analysing the pathways people take after leaving school at age 16. It involves three steps:

- **Step 1:** derive students' education and labour market activity into a set of quarterly sequences. This process results in activity categories of education, employment and benefits.
- **Step 2:** calculate distances between students based on the sequencing of their activities using an optimal matching algorithm. We draw a sample to overcome computational limitations associated with this method.
- **Step 3:** group students with similar sequences into pathways using cluster analysis. Pathways are then used as the basis for statistics included in the report.

Data processing

In step 1, we combine education spells, employment spells and benefit spells in LEO, the ILR and the school census to identify each student's "main activity" in each quarter from August 2007 to July 2016. This activity will either be classified as "education", "employment", "benefits" or "unknown".

Main activity is defined by the activity with the most days over a quarter. Where this is tied, education is preferred to employment and employment is preferred to benefits. Education activity is represented by the “highest and latest” learning aim within an overarching education spell (i.e. a period where the student is in education and may complete multiple qualifications). Apprenticeships fall under education activity.

Missing information

Some sequences suffer attrition and contain quarters of activity with missing information, which could result from students leaving the country, or students who are out of work for long periods without using the benefit system. We follow a three-step process to deal with missing data:

- **Impute** – if a student has a single quarter of unknown activity between two quarters of the same activity, then we impute activity using the activity in the previous quarter.
- **Remove** – students with missing data for the final 3 years of the study period, or with more than 75% of quarters missing, are removed (18% of the cohort).
- **Weight** – inverse probability weights are generated to account for potential bias introduced by removing students (see Annex B for more information).

Sequence analysis and cluster selection

In step 2, the distances between sequences are calculated using the optimal matching algorithm contained in the r package TraMineR.

In step 3, agglomerative hierarchical clustering, using Ward’s method, is used to group students with similar sequences, based on the distances from step 2, into a manageable, overarching typology of pathways. This method starts from each student forming a single cluster, and sequentially combines students into larger groups that minimise the within cluster variance.

The final six clusters chosen to represent students’ pathways through education are based on judgement and assessing the stability of pathways across repeated samples.

Clustering is a simplification and includes an element of subjectivity; it does not provide an absolute reflection of all possible pathways through post-16 education and into the labour market. Specifically, subjective judgement is used to select the optimal number of pathways that best reflect the context of post-16 education. In addition, clustering results in borderline cases where students do not fit neatly into the chosen pathways, meaning there is some uncertainty in pathway membership.

Related publications

- [Statistics: destinations of key stage 4 and 16 to 18 \(KS5\) students](#): Data on key stage 4 (KS4) and 16 to 18 (KS5) student destinations.
- [Statistics: outcome based success measures](#): Statistics on employment and continued education of adults finishing funded further education training.
- [Post-16 education: highest level of achievement by age 25](#): Research showing how school leavers progress through education and into the labour market.
- [Post-Compulsory Education Pathways and Labour Market Outcomes](#): Research on the education-employment transitions of young people.

Annex B: regression modelling and weighting for missing data

The two logistic regression models used in this analysis are summarised in Box 2 and 3.

Box 2: logistic regression: modelled chance of successful transitions into work
<p>The following equation estimates the relationship between qualification levels and successful transitions into work:</p> $\text{logit}(\pi_i) = \beta_0 + \beta_1 Lev_i + \beta_2 QualSSA_i + \beta_3 X_i + \beta_4 Z_i + \varepsilon_i$ <p>Where π_i is the probability of following a successful transition into work (estimated from the pathway groups: difficult transitions into work and successful transitions into work); Lev_i is the highest qualification level a student reaches by age 25; $QualSSA_i$ is a series of dummy variables describing the qualification type and sector subject area of the student's highest qualification; X_i is a vector of student characteristics, including gender, free school meals eligibility, region and special education needs; Z_i is a point score representing the student's GCSE attainment.</p> <p>For the average below level 2 student, the probability of successful transitions into work with a full level 2 or full level 3 are given by the following equation:</p> $p_n = \frac{OR * p_b}{1 + OR * P_b - P_b}$ <p>Where p_n is the probability of a successful transition should a full level 2 or 3 be achieved, p_b is the base probability for below level 2 students, OR is the odds ratio for achieving a full level 2 or full level 3 over below level 2 (derived from the model above).</p>

Box 3: logistic regression: probability of inclusion
<p>To predict the likelihood that students are included in the data after the removal of some students due to missing information, we estimate the following:</p> $\text{logit}(\pi_i) = \beta_0 + \beta_1 Lev_i + \beta_2 QualSSA_i + \beta_3 X_i + \beta_4 Z_i + \beta_5 Out_i + \beta_6 Lev_i * Out_i + \beta_7 X_i * Out_i + \varepsilon_i$ <p>Where π_i is the probability of inclusion in the data; Lev_i is the highest qualification level a student reaches by age 25; $QualSSA_i$ is a series of dummy variables describing the qualification type and sector subject area of the student's highest qualification; X_i is a vector of student characteristics; Z_i includes variables measuring student's prior attainment; Out_i includes variables measuring labour market outcomes in 2017/18 tax year – these labour market variables are interacted with students' highest level achieved.</p> <p>The inverse probability weights are then $1/\pi_i$. These weights are smoothed by grouping into deciles and taking the median of each decile as the final weight.</p>



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