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RESEARCH ARTICLE

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Perceived effects of the Covid-19 pandemic on educational progress and the learning of job skills: new evidence on young adults in the United Kingdom

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ABSTRACT

We present new evidence on the pandemic's effects on youth, for the first time focusing on perceived effects on the learning of job skills, as well as on education. The context is post-Brexit Britain. We find that 47% of young people in a representative sample perceive a loss of learning of job skills, while a sizeable minority (17%) judge that the pandemic improved matters. The perception of skill loss is worse among those encountering Covid directly, and far worse among those in school, college or university than among those in employment. Among those in education, loss of learning of job skills is higher among those experiencing only online learning, but lower for those who have had some work experience. Among those in employment, loss of learning is mitigated by training, which dropped sharply at the start of the pandemic but recovered and thereafter deviated little from its long-term trend. Neither the average amount of training, nor the perception of loss of learning, were affected by being placed on 'furlough' leave. Finally, perceptions of loss of learning of job skills were greater for women than for men, and greater in Wales and Scotland than in England and Northern Ireland.

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Education; training; Covid; youth; job skills

1. Introduction: perceptions of loss of learning of job skills

Even though the clinical consequences of the Covid pandemic have been generally worse for older people, young adults in many countries have been vulnerable in respect of their educational progress, their employment and their mental health (ILO 2020). This paper focuses on young people's education and work-related training. It aims to document and model the perceived effects of the pandemic on their acquisition of job skills.

Adults' learning has broad personal and external benefits (Schuller 2017). Effective learning of job skills, in particular, is widely accepted as important for young people's future employment, for raising organisational productivity and for economic growth, underpinning governmental skills strategies across many countries (OECD 2011; Martins 2021). Should the young be constrained from making good transitions into employment they risk long-term scarring (Arulampalam et al., 2001) – an outcome seen as a potential detriment for young adults (Henehan 2020). In many countries unemployment increased from the pandemic's onset notably faster among young people than for older workers.[1] The wider risk to the economy from lagging skills growth is especially salient in the United Kingdom (the focus of this paper) because the pandemic has coincided with withdrawal from the European Union (Brexit), with

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potential consequences for skilled labour shortages in sectors that used, pre-Brexit, to be staffed by a high proportion of migrant European workers. An understanding of Covid's effect on young people's learning of job skills is therefore of considerable importance.

It is hard to directly measure individuals' losses (or gains) in job skills from the pandemic. The typical approach to measuring the effect on learning outcomes has been to synthesise inspectors' or teachers' evaluations and sometimes parents' reports (Leahy, Newton, and Khan 2021), or examine the impact on educational assessments (Ardington et al. 2021). It has sometimes been possible to assess the impact on reading or maths using tests.[2] A more common approach has been to quantify lost inputs to learning: the extent of school closures, lost school days, pupil disengagement from learning, stressed teachers and poorly-equipped pupils (Thorn and Vincent-Lancrin 2022; Elliot Major, Eyles, and Machin 2021; Green, 2020). Job skills, however, are not so easily captured as educational outcomes. In this paper we take a different approach, measuring young people's perceptions of their own learning. Our focus is on the perceived loss of learning of job skills, which we analyse using data from a new nationally-representative sample of youth. While young people's attitudes and psychological well-being are often studied, we could find no previous studies of perceptions of lost learning of job skills.

It is recognised at the start that perceived and actual effects may differ. While individuals are generally best informed about their own circumstances, they may be prone to a number of subjective biases (Dunning et al. 2003; Dunning, Heath, and Suls 2004), and may not always be able to make accurate judgements about the causal effects of major events such as the pandemic because they may misjudge the counterfactual outcome of how their learning would have otherwise progressed. Nevertheless, the perception of a loss of learning, seen as a failure to reach a personal goal, could in its own right be expected to generate a loss of well-being (Lent 2004). In one recent Covid study from a developing country, for example, the fear of losing an academic year's worth of learning was found to have a significant impact on students' psychological distress (Hasan and Bao 2020). Moreover, it is of interest whether people's perceptions co-vary in line with theoretical expectations, which will lend some validity to the subjective measures. In the absence of objective measures of loss of job skills, our measure of perceptions is also informative as it uncovers significant differences among young individuals which could not be captured by group-level evaluations by inspectors or teachers.

2. Direct and indirect effects of the pandemic

The Covid pandemic could be expected to have had both direct and indirect negative effects on young people's acquisition of job skills. A direct Covid encounter, where a young person's close relative or friend becomes seriously ill or dies, is likely to interrupt learning and accompanying motivation. Britain followed a distinctive public health policy response to the pandemic, being relatively slow to bring in lockdown restrictions. Despite being among the leaders in introducing a vaccination programme, the outcome was a comparatively high Covid-induced cumulative death toll which in October 2021 stood at 208 cases per 100,000 population, a little below that of the US (221) but notably above that of the European Union as a whole (177).[3] By the beginning of 2021 over one in four Britons knew someone who had become severely ill from Covid.[4]

Indirect negative effects occur if, through either educational disruption or reductions in employment hours, young people's learning trajectories are degraded; alternatively, their transition between education and employment may be disrupted, with the further possibility of becoming unemployed or economically inactive. There could also be indirect positive effects, for example via efficient strategies for home learning.

For those young people in education (whether in school, college or university), the effect of the pandemic is likely to depend on the form, extent and quality of their teaching provision. Their acquisition of job skills may also be improved, and their perception of learning loss mitigated, if they are able to gain some relevant work experience. Yet the delivery of education during the pandemic

has been seriously compromised at all education stages, with threats to both the extent and quality of teaching (see Leahy et al, 2021 for a comprehensive review). During the first lockdown in April 2020 some two million children were receiving tuition for less than an hour per school day (Green, 2020). A common theme in many reports has been that the learning of those from less well-off households and areas was held back the most. Highly resourced private schools were able to mitigate the effects on education most successfully. There were somewhat greater losses of tuition time in Scotland and Wales than in England and Northern Ireland (Elliot Major, Eyles, and Machin 2021). For the large majority of young people in education institutional closures at all levels, reduced teaching, making do with online learning, and reduced opportunities for work experience all potentially contributed to a lowering of skill in the workforce of future years.

For those in employment the effect of the pandemic is expected to depend on the extent and quality of their access to training. The volume of training has been on a slow long-run downward trend since the 1990s, interrupted by a short-lived revival between 2011 and 2015 (Green et al. 2016; Green and Henseke 2019). More recent evidence confirms that investment in training per employee fell again between 2017 and 2019 (Winterbotham et al. 2020), while there has been a 10% reduction over the decade to 2019 in the proportion of adults participating in learning of all kinds (Aldridge, Jones, and Southgate 2020). Set against this trend, however, there is a question mark over the growth of informal training that may not all be recorded in national surveys (Felstead, Green, and Mayhew 1997; Taylor and Green 2021). The growth of online training materials could be significant (Demos 2020), though not enough is known about how much of online learning is for work, and how much for leisure. With the onset of the pandemic, training – a seemingly discretionary expenditure – might be expected to decline further, given the major decline in economic activity. Yet research on earlier recessions has tended to show that training is surprisingly resilient at such times, partly because some training is non-discretionary (required by regulation), and partly because of 'labour hoarding' (whereby employers retain underutilised skilled labour through recessionary periods) which lowers the training cost (Felstead and Green 1994, 1996; Felstead, Green, and Jewson 2012). Many young workers during the pandemic went on 'furlough', surviving through the Coronavirus Job Retention Scheme (or, for the self-employed whose business turnover had reduced by 30% or more, the Self-Employment Income Support Scheme). 'Furlough' is essentially state-subsidised labour hoarding, and its effect on training is uncertain. Employees on furlough could legally participate in training, but on-site training may have been impossible. Yet they could compensate by using the released time to undertake self-initiated training. On balance, the early evidence from the second quarter of 2020 indicated a small reduction in training participation among young people aged 16 to 25 (Li, Valero, and Ventura 2020). Some 60% of apprentices, in particular, faced learning disruptions or redundancy (Ventura 2020). Other than through training, young people in jobs that entail a good deal of skills gain through work experience – such as in management – are likely to indicate a more positive perception. Conversely, the effectiveness of on-the-job learning is compromised in industries that became virtually inoperable during lockdown – those which necessitated working on site (and not in exempt 'front-line' jobs).

Among all groups we can expect variation in the perceived effects of the pandemic, depending on young people's own circumstances. In particular, indicators of a potential lack of personal resources (of time and capability), such as accompany long-term health problems or low household income, would be expected to be associated with worsened perceptions of Covid's effects on learning. Women's learning is expected to be affected more than men's, given that women generally took the greater share of the additional home-schooling burden (Villadsen, Conti, and Fitzsimons 2020). Finally, lockdown restrictions have differed somewhat between the UK's nations, and changed over time.

Early global evidence from April/May 2020 of students' perceptions of their own learning confirm part of the above expected pattern of perceived skill loss (ILO 2020). In a survey of young people from 112 countries, 65% reported having learnt less since the start of the pandemic (ILO 2020). The proportion reporting having learnt less was relatively higher for those enrolled in first-level tertiary or

post-secondary non-tertiary degrees, for women compared with men, and for those who were not combining study with work. Widespread difficulties were reported with online learning, including lack of skills, equipment, internet access, ready materials and group contacts.

There are no studies of which we are aware, however, covering perceptions of the loss of learning of job skills. The cited studies have only partially addressed the changes in learning, training and educational progress, and mainly cover the early months of the pandemic. The cumulative effects on young people's acquisition of job skills have hitherto not been examined. Our new evidence, taken from the first 17 months of the pandemic era in Britain, should inform where the problem is greatest and most in need of remedial policies. We address the following questions:

RQ1, direct effects. How much, if at all, are young people's perceptions of their learning losses associated with having had a direct, personal experience of Covid-19?

RQ2, activity status. Do their perceptions vary according to whether they are in education, in work or non-employed?

RQ3, education experience. 3a: Among those still in education, how is their perception of Covid's effects associated with the way that their education is being delivered? 3b: Is the loss of educational progress and/or the diminished learning of job skills mitigated at all through exposure to work, such as through work placements? 3c: Do the same factors also affect pupils' and students' satisfaction with the education that they have received?

RQ4, employment experience. 4a: For those young people in work, how, if at all, did training participation change in the course of the pandemic? 4b: Did being placed on furlough adversely affect the amount of training undertaken, or their perception of skill loss? 4c: Are perceptions more pessimistic among those employed in industries hard hit by the lockdowns? 4d: Are they less pessimistic among those in managerial or professional jobs where learning is a high priority?

RQ5, personal. 5a: Are young people's perceptions of loss of learning and educational progress worse for those with low personal resources? 5b: Did young people's perceptions become more positive/ less negative as the UK moved out of lockdown? 5c: Do women differ in their perceptions from men?

3. Data

We use data from the UK's Quarterly Labour Force Survey (QLFS) to analyse training participation and duration: their path through the pandemic and their association with furlough. For data on perceptions of loss of learning we use the first three waves (in February, April and July 2021) of a new online survey – the Youth Employment and Health (YEAH) survey – of young adults in the UK aged 16 to 25. The questionnaire, which took approximately 10 minutes to complete, asked about the perceived effects of Covid-19 as reported by young people themselves, while also gauging their education or employment status, their learning experiences both in education and employment, their well-being and their hopes and expectations for the future.

The survey sampled 1000 young people in each wave (with 55% being interviewed in two or three waves). Respondents were taken from panels managed by Ipsos MORI and partners, with quotas set according to age within gender, working status and region. Additional weights were provided and used in all our analyses, ensuring representativeness within the UK according to these variables. A quota sample nevertheless has distinct limitations, including the possibility of biases deriving from unknown factors influencing selection that might be correlated with outcomes of interest. We discuss findings which would be statistically significant if the data were drawn from a probability sample, after accounting for longitudinal clustering of residuals stemming from the panel element, but recognise that statistical inferences for the UK population are strictly invalid since, being a quota sample, confidence intervals are unknown. We focus our discussion on differences and associations that would be large enough to be significant in a probability sample of the same size.

For our key dependent variable, all YEAH respondents were asked: 'Overall, to what extent do you think your progress in learning job skills has been affected by the coronavirus pandemic?'. The response scale was 'Worsened a lot'/ 'worsened a little'/ 'Remained the same as it would have done if there were no coronavirus pandemic'/ 'Improved a little'/ "Improved a lot".

Those in education were asked in addition: 'To what extent, if at all, do you think your overall educational progress has been affected by the coronavirus pandemic?' with the same response scale. They also reported their degree of satisfaction (on a scale of 1 to 10) with the learning resources and separately with the quality of teaching they were receiving from their school/college/university. These two satisfaction variables are highly correlated ($\rho = 0.84$), hence we derive an education satisfaction variable as the average of these two responses. For those in employment or non-employment, to capture training we ask: 'In the 4 weeks ending today, have you taken part in any education or any training connected with a job that you might be able to do in the future?', with follow-up questions as to whether the training is certified and its duration; this procedure is similar but not identical to that followed by the QLFS. Descriptions and descriptive statistics for these and for all other explanatory variables are given in Appendix

4. Analysis

4.1. A description of perceived lost learning

Table 1 presents our key measure of how respondents perceive that the pandemic affected their acquisition of job skills. As expected, many young people in the UK perceive a loss of learning of job skills (47%); perhaps it is more surprising to find that a sizeable minority (17%) judge that the pandemic improved matters. In response to RQ2, this more optimistic minority is mainly concentrated among those young people in employment where 27% think that their learning of job skills improved. Apparently, this minority made good use of the lockdown.

For those in education at the time of the survey, however, there is a major perceived loss of overall educational progress (Table 2), more dire than the perceived loss of learning of job skills. Three quarters of the sample perceived a loss of educational progress, including 34% of the sample judging that their progress had worsened a lot. Few – only about one in eight – reported high satisfaction

Table 1. Perceived Progress in Learning Job Skills, by Sex and by Main Activity Status.

	All	Females	Males	Education	Employed	Non-Employed
	(%)	(%)	(%)	(%)	(%)	(%)
Worse	46.9	51.9	42.2	61.4	33.7	50.0
Same	35.9	32.7	38.9	30.4	39.6	40.5
Better	17.2	15.4	18.9	8.2	26.6	9.5

Note:
Perceived progress is collapsed into a 3-point scale for this table, excluding 'don't know' and 'prefer not to say' (9%); n = 2721.

Table 2. Perceived Educational Progress and Satisfaction with Education.

Educational Progress(n = 1167)					Education Satisfaction(n = 1191)		
	All	Females	Males		All	Females	Males
	(%)	(%)	(%)		(%)	(%)	(%)
Worse	75.4	77.9	72.5	Low	26.0	29.4	22.2
Same	16.9	13.2	21.2	Medium	61.6	57.3	66.4
Better	7.7	8.9	6.2	High	12.4	13.3	11.4

Notes:
Applies to all in education at the time of interview.
Perceived educational progress is collapsed into a 3-point scale for the table; excluding 'don't know' and 'prefer not to say' (3%) n = 1167. Education satisfaction is an average of satisfaction with the quality of teaching and with the teaching resources at their educational institution, on a scale of 1 to 10. 'Low' is less than 5, 'Medium' 5 to 8, 'High' above 8; excluding 'don't know' and 'prefer not to say' (1%) n = 1197.

with their education, and more than a quarter expressed low satisfaction. Education dissatisfaction is well correlated with perceived loss of learning of job skills ($\rho = 0.27$), and more strongly still with the worsening of general educational progress ($\rho = 0.44$).

More females than males perceive progress on learning job skills has been worsened. In contrast, while overall educational progress was also deemed by more females than males to have been diminished, this is balanced by fewer males than females reporting better progress; on average, there is no significant difference between the males and females. The same holds for education satisfaction.

The above summarises three waves of the survey. Over time, as the country emerged from full lockdown, the proportion reporting that their learning of job skills barely changed. However, there was a marked improvement between February and July in perceptions of educational progress, with the proportion reporting that their educational progress had worsened because of Covid coming down from 82% to 72%, and the proportion expressing low satisfaction with their current education down from 32% to 19%.

Given the differences in the subjective experiences of young people according to their main activities – whether in education, employment or neither – we model the factors underpinning these experiences separately for those in education and those in employment. (We also ran models for the non-employed; we omit these from our presented findings, since owing to small numbers these were underpowered).

4.2 Perceived pandemic effects among those in education

Table 3 presents models of the determinants of each of our education outcome variables. Addressing RQ1, the direct effect of a personal encounter with Covid is associated with substantive effects on all education outcomes. In particular, the perceived loss of learning of job skills is impacted by a fifth of a standard deviation among those with a family member or friend either dying or becoming seriously ill.

Their perceptions of Covid's effects are also linked with the way that their education is being delivered (RQ3a). Those whose teaching in the previous four weeks has been all online have worse perceptions of their educational progress and lower satisfaction even than those who have received no teaching; while those who have received either face to face or hybrid teaching feel less pessimistic about their learning of job skills and their educational progress, and are more satisfied with their education. We ran two further models (not shown) to check whether mode of delivery, or any of the other independent variables, affected the two components of education satisfaction differently (despite their being highly correlated); the coefficient estimates in the two models were of the same sign and not significantly different in magnitude between the two models.

As expected, an experience of work (paid or unpaid) in the recent past is associated with a more positive perception of Covid's effect on learning of job skills (by about a fifth of a standard deviation) (RQ3b). However, work experience had no association with educational progress or education satisfaction.

A proportion (10%) of those in education reported that they were not mainly in education at the start of the pandemic, and therefore had returned to education since that time. Whether this return was voluntary, or prompted by lack of employment, is unknown. However, the significant negative coefficient estimates on the skills outcome and on education satisfaction indicate that this small group had distinctly more optimistic perceptions of the pandemic's effects on learning job skills, and greater satisfaction with their education, as compared with the large majority who had been in education from the start. One possible explanation is that some in this group will have seen the pandemic as propelling them back into education, and saw this as beneficial for their acquisition of job skills.

Looking at our personal variables designed to potentially capture (if indirectly) the effects of personal resources and resilience to adversity (RQ5a), we find that those from the lowest social group – where the person with highest income is non-employed – perceive the worst effects of

Table 3. Determinants of Perceived Pandemic Effects for those in Education, and of Satisfaction with Education.

	(1)	(2)	(3)
	Pandemic Effect on Learning Job Skills	Pandemic Effect on Educational Progress	Satisfaction with Education
Direct Covid Encounter	−0.232**	−0.152*	−0.468*
	(−3.33)	(−2.15)	(−2.58)
Teaching All Online [ref: no teaching]	0.0774	−0.194^{+}	−0.404^{+}
	(0.77)	(−1.94)	(−1.81)
Teaching Hybrid or Face-to-Face [ref: no teaching]	0.226*	0.207^{+}	0.564**
	(2.20)	(1.95)	(2.62)
Work Experience	0.188**	0.102	0.129
	(3.00)	(1.59)	(0.84)
In Education At Pandemic Start	−0.444**	−0.208	−0.657*
	(−3.39)	(−1.55)	(−2.23)
Much-limiting Long-term Health	−0.206	0.154	0.177
	(−1.41)	(0.95)	(0.43)
Low Social Grade	−0.162*	−0.0710	−0.756**
	(−2.12)	(−0.93)	(−3.99)
Male	0.0936	0.0446	−0.0509
	(1.36)	(0.66)	(−0.30)
Age	0.000979	0.0149	−0.0911**
	(0.06)	(0.98)	(−2.64)
April	0.0186	0.0125	−0.0112
	(0.27)	(0.18)	(−0.07)
July	−0.00698	0.0207	0.396*
	(−0.08)	(0.25)	(2.18)
Wales	0.193	0.160	0.462
	(0.96)	(0.77)	(1.08)
Scotland	0.109	0.140	0.193
	(0.98)	(1.10)	(0.67)
Northern Ireland	0.165	−0.139	−0.300
	(0.53)	(−0.74)	(−0.59)
Constant	2.491**	1.875**	8.299**
	(6.88)	(5.33)	(10.35)
Observations	1104	1167	1191
Mean of dependent variable	2.26	1.99	5.80

t statistics in parentheses $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; standard errors clustered at individual level.

Covid on learning job skills, and have the lowest education satisfaction. However, suffering from a long-term health condition that limits day-to-day activities does not appear to be associated with worse outcomes.

Broadly, the same factors affect education satisfaction as are found to affect perceptions of skill loss and educational progress (RQ3c). However, satisfaction with education decreased with age, and increased by the July wave of the survey in comparison to the February wave. Otherwise, estimates for our other outcomes show no significant changes over time, nor differences according to gender or nation.

4.3. Pandemic effects among those in employment

As noted above, Table 1, those in employment report distinctly better overall perceptions of their learning of job skills, when compared with those in education. Yet among those with jobs, there remains much variation in the perceived effects of Covid on the acquisition of job skills.

4.3.1 The pandemic and training: analysis using QLFS

We expect job skill loss to be more optimistic among those who are accessing job-related education or training, but training itself may have been affected by the pandemic. To investigate this possibility, we utilise the QLFS to track training through the pandemic. To do so, it is important to view those changes in the context of long-term trends in training.

We first describe visually the path taken by training both before and during the pandemic period. For young workers (aged 16 to 25), training participation during the pandemic has not deviated much from its long term trajectory, which shows a slow decrease since the early 2000s (Figure 1), and just a small uptick among younger women during the pandemic. This dynamic contrasts with the training experience of older workers (26 to 65): as expected, older workers participate less in training, but their participation rate has declined only a little over the same period, while showing signs of increasing in the last two years before and during the pandemic, especially among older women.

Consistent data on training hours is available since 2011, but only for the second quarter of each year; therefore it cannot be traced in detail over the course of the pandemic. Figure 2 shows a small upturn in the average volume of training for older workers to 2.0 hours in 2021. But for younger workers the average volume declined substantially since peaking in 2014 and then remained steady during the pandemic at around 4.3 hours per worker per 4-week period. Thus, in terms of both the participation rate and the volume we can conclude that the pandemic itself has, perhaps surprisingly, not occasioned any major disruption to the amount of training for young people who are in employment (RQ4a).

A small proportion (6.4% in 2021) of young employed people report that they are doing an apprenticeship, a job status that implies a weekly mix of both working on the job and participation in training. Figure 3 shows that, over the pandemic, the proportion of these self-perceived apprentices who reported job-related training over the previous four weeks dropped quite dramatically to just 40% in the early stages of the pandemic lockdown (2020_2 and 2020_3). The likely cause was that they could not access their place of work. The rate had recovered by the third quarter of 2020. Yet what is surprising is the long-term-rising and substantive minority from this group who report that they had not done any job-related training in the previous four weeks. It throws some doubt on young people's perception of what it means to be an apprentice, and on whether all employers are fulfiling all their training obligations.

To investigate the effects of being placed on furlough, we use the QLFS data covering the pandemic period to model its conditional association with training participation (Table 4) and with training hours per worker (Table 5), after controlling for gender, age and industrial affiliation.

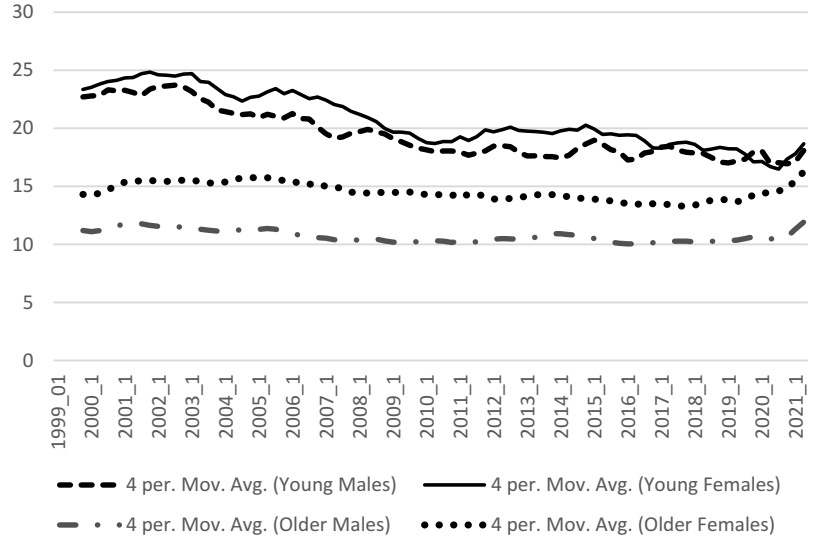

Figure 1. Training Participation Rate. Those In Employment.
Note: Rate of participation in job-related education or training in previous four weeks; 4-period moving averages from 2000_Q1 to 2021_Q2. The base population is those in employment (including on a government scheme) aged 16–25 ('young') or 26–65 ('older').

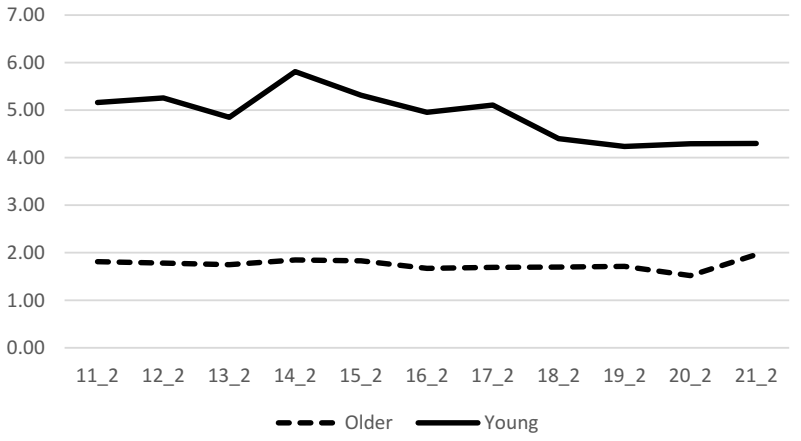

Figure 2. Volume of Training per Worker. Note: The diagram uses the average hours for all who participated in training as its estimate of hours per trainee from non-proxy responders, since proxy responses on training hours cannot be regarded as reliable. For this and other reasons (to do with the form of the question), the hours series, while indicative of long-term changes, needs to be interpreted with care. The figures relate to the second quarter of each year, 2011–2021. The base population is those in employment (including on a government scheme) aged 16–25 ('young') or 26–65 ('older').

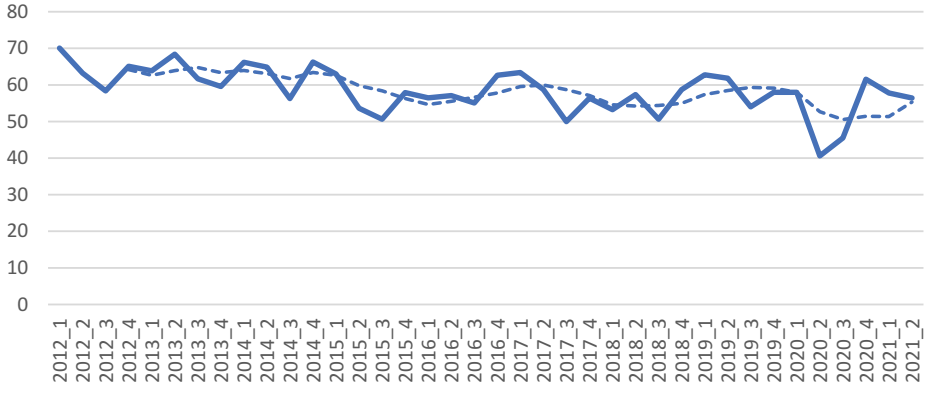

Figure 3. Training Participation Rate. Young Employed Apprentices (%).
Note: The base population is those in employment (including on a government scheme) aged 16–25; 2012_Q1 to 2021_Q2. The dotted line is the 4-quarter moving average.

'Furlough' is measured as being away from work or working fewer hours than usual, because 'laid off/ short-time/ work interrupted by economic and other causes'. Using this measure, over all five quarters (2020_Q1 to 2021_Q2), 8.5% of young employed people were on furlough.[5] This proportion varied over time, peaking at 17.5% in 2020_Q2 – around 726,000 – during the first, most severe, lockdown.

Table 4 includes dummies to capture the characteristic quarterly variation of training, both during and before the pandemic years. The coefficients named 2020_1, 2020_2 and so on track the course of training participation through the pandemic relative to equivalent quarters in pre-pandemic years. Conditional on the other variables there was a fall of 0.0257 in the participation rate in the first pandemic lockdown (2020_Q2) relative to what would have otherwise been expected in the second quarter. As can be seen, however, the participation rate recovered after that for both young and older workers.

Table 4. Furlough and Training Participation (Average marginal effects).

	Young	Older
Furlough	−0.0301*	−0.0224**
	(−2.40)	(−4.80)
Pre-pandemic (base)		
2020_1	0.000492	0.00336
	(0.07)	(1.41)
2020_2	−0.0257**	−0.00694**
	(−3.29)	(−2.80)
2020_3	−0.00269	0.00910**
	(−0.30)	(3.38)
2020_4	0.0121	0.0129**
	(1.47)	(5.12)
2021_1	0.0202*	0.0279**
	(2.41)	(10.71)
2021_2	0.0151^{+}	0.0214**
	(1.82)	(8.40)
Year	−0.00185**	−0.000146
	(−4.84)	(−1.14)
Quarters (base = Q1)		
Q2	−0.0116**	−0.00353**
	(−4.23)	(−3.82)
Q3	−0.0336**	−0.0128**
	(−11.97)	(−13.55)
Q4	−0.00337	0.00413**
	(−1.24)	(4.50)
Observations	185,170	1,308,205
Participation rate	0.188	0.132

Logit estimates, with t statistics in parentheses $^{+}$ p < 0.10, * p < 0.05, ** p < 0.01. Estimates include controls for age, sex, industry and nation. Estimations based on QLFS data on those in employment from 2011 on.

Table 5. Furlough and Training Hours.

	Hours Per Trainee	Hours Per Trainee	Hours Per Employee	Hours Per Employee
	Young	Older	Young	Older
On furlough	21.99**	2.609*	1.299	−0.0111
	(2.62)	(2.35)	(0.86)	(−0.07)
Pandemic	0.00819	−0.934*	−0.409	−0.0244
	(0.00)	(−2.17)	(−0.80)	(−0.33)
Year	−0.306	−0.0315	−0.0348	0.00416
	(−1.30)	(−0.66)	(−0.67)	(0.53)
Observations	2633	30,766	15,371	226,703
Mean training hours per 4-wks	27.2	14.0	4.66	1.90

t statistics in parentheses $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Estimates include controls for age, sex, industry and nation; based on non-proxy responses only; see notes to Figure 2. Estimations based on QLFS Q2 data on those in employment from 2011 on.

There was a significant negative effect of furlough on training participation of both young and older employees (columns (1) and (2)). A young person on furlough was three percentage points less likely to be participating in training. This effect is balanced, however, by a tendency for those on furlough who are training to do so for longer hours, as shown in Table 5. In the case of young workers that link is large: there is a conditional gap of 22.0 hours per 4-week period between the hours spent training by those on furlough, and the hours spent by those currently working. Taking the participation rate and hours together, the estimated association of furlough with training hours per worker is small and not statistically significant for workers young and old (RQ4b).

4.3.2 Modelling skill loss among the employed

In light of this understanding of the surprisingly modest effects of the pandemic on training, we next address the question of the perceived effect of the pandemic on the acquisition of job skills, and the role of training in mitigating the loss of learning of job skills among employed young people. Table 6 presents estimates of the determinants of this perceived effect. In model (1) we include training and other potentially relevant job characteristics. In model (2) we additionally include the Direct Covid Encounter indicator and some personal characteristics. Model (3) adds further controls for respondent's age, the survey wave month, and for nation.

We find that certified training participation is associated with improved perception of Covid-19 effects: in model (1), the effect is estimated as 0.277, against the null hypothesis of zero effect. This effect is reasonably large – 26% of the standard deviation of the response on the perception scale (1.06). The effect is slightly larger, and remains highly significant, in the other two models with additional control variables included.

Table 6. Determinants of Perceived Pandemic Effects on Young Employed Adults' Learning of Job Skills.

	(1)	(2)	(3)
Direct Covid Encounter		−0.185*	−0.194*
		(−2.44)	(−2.58)
Certified Training	0.277**	0.331**	0.308**
	(2.95)	(3.52)	(3.28)
Uncertified Training	0.0909^{+}	0.131	0.167*
	(1.07)	(1.54)	(1.97)
Managerial Occupation	0.497**	0.522**	0.511**
	(4.90)	(5.04)	(4.93)
Professional Occupation	0.102	0.0954	0.0830
	(1.25)	(1.21)	(1.06)
Apprentice	−0.234	−0.244	−0.232
	(−1.34)	(−1.37)	(−1.32)
Furloughed	−0.0333	−0.0371	−0.00170
	(−0.31)	(−0.34)	(−0.02)
Lockdown Industry	−0.186*	−0.181*	−0.180*
	(−2.26)	(−2.14)	(−2.09)
In Education at Pandemic Start	−0.0180	0.0360	0.0299
	(−0.23)	(0.43)	(0.35)
Long-term Health Constraint		−0.329^{+}	−0.312^{+}
		(−1.81)	(−1.73)
Low Social Grade		−0.120	−0.139
		(−0.47)	(−0.56)
Male		0.132^{+}	0.127^{+}
		(1.92)	(1.86)
Age		0.00156	0.000813
		(0.10)	(0.05)
April			0.114
			(1.57)
July			0.149*
			(2.03)
Wales			−0.305*
			(−1.99)
Scotland			−0.402**
			(−3.56)
N_Ireland			−0.144
			(−0.63)
Constant	2.778**	2.708**	2.690**
	(40.65)	(7.53)	(7.52)
Observations	1215	1213	1213
Mean of dependent variable	2.94	2.94	2.94

t statistics in parentheses $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; standard errors clustered at individual level. In 3% of cases the training data is missing; in these cases training is set to zero and we include a missing variable dummy as a control in all models; the pattern of estimates is unchanged if estimation is restricted to non-missing cases.

Uncertified training participation, however, has only a small, weakly significant effect on perceived skills outcomes, according to model (1). Yet once all controls are included in model (3), uncertified training carries a larger coefficient (0.167), which is significant at the 5% level.

In all models it is estimated that those working in management occupations also had a more optimistic perception of Covid's impact than those in non-managerial (including professional) occupations (RQ4d). For those on an apprenticeship the coefficient is negative as expected, but not significant. Being placed on furlough does not associate with perceptions of the learning of job skills, but working in a lockdown industry is associated with a substantial worsening of job skill learning (RQ4c).

Models (2) and (3) both show an unequivocal substantive direct negative effect on job skill acquisition from a direct Covid encounter. Moreover, having a long-term health constraint is associated with lower perceptions, consistent with this being an indicator of lower resilience to the emergency. Females perceive significantly worse effects from Covid on their learning (RQ5b). There is a small improvement in the perception of skill loss over time between the first and third waves (February to July 2021) (RQ5c). Finally, perceptions varied across nations, with employed respondents from Wales and Scotland having significantly worse perceptions of loss of job skill learning.

5. Discussion

We have analysed young people's perceptions of their loss of learning of job skills up till July 2021 resulting from the pandemic in the United Kingdom. In partial validation of our approach to measurement of skill loss, the fact that 91% of all young people were able and willing to make a judgement is re-assuring. In addition, their judgements conform to expectations in several ways. For example, the job skill learning of those directly affected through serious illness or death among close family or friends was significantly more adversely affected than others not so affected. We therefore maintain that the perceptions data are meaningful. Since they provide the only available data about lost learning of job skills, they are informative for Britain's post-Brexit skills policy. In addition, we find that pupils' and students' perceptions of their own learning losses from Covid provide relevant additional data to supplement the assessments of education inspectors, teachers and lecturers, while recognising the potential for subjective bias.

We find that, among those in work at the time of interview, the perceived effect of the pandemic on the learning of job skills has been – on average – perhaps surprisingly restrained. There are more who report loss than improvement to their learning of job skills, but the gap is modest (34% versus 27%). Despite misgivings, the training of young employed people persisted after only a small dip in the early stages of lockdown. Much like in earlier recessions (Felstead, Green, and Jewson 2012) any feared collapse of training failed to materialise. As expected, training (especially if it was certified) significantly mitigated against perceptions of skill loss from Covid. And while we have found that participating in training was lower by three points among furloughed individuals, this was compensated by the increased time that those on furlough that did train could devote to it. On average, furlough had no discernible association either with average training volumes or with the perceived loss of learning from Covid.

Set against this optimistic finding, training participation and volumes have been on a long-term slow decline for several years. Though there are several possible explanations, we do not yet have a satisfactory account for this fall (Green et al. 2016). With the additional need to replace the skills of emigrating skilled workers after Brexit, policy-makers have a challenging task to address the historic problem of decline. The training levy, introduced in 2017, had been successful before the pandemic in raising apprenticeships (especially at higher level), and did not displace other training (Patrignani et al. 2021). Consistent with early fears (Ventura 2020), the apprentices' training rate curve took a dive in the early months of the pandemic, but recovered. For others, the UK government announced a 'Lifetime Skills Guarantee' operative from April 2021, giving those with low-level qualifications

access to a free training course, supplemented by reforms to university finances, changes to the technical qualifications system, and funds to reverse earlier cuts in educational funding (including for FE) since 2010. For those young people on benefits (Universal Credit) deemed at risk of long-term unemployment, the government funds temporary (6-month) minimum-wage work placements for those aged 16 to 24 (the Kickstart scheme). While this new focus on skills is generally welcomed, calls for extending eligibility for the Lifetime Skills Guarantee stem from a recognition that the challenge is large, including a need to ensure a fairer disposition of training funds (Walker, Florisson, and Wilkes 2020).

Indeed, concern remains for the sizeable minorities whose acquisition of job skills have been hindered despite holding down a job. Those working in industries most affected by the lockdowns were more adversely affected. Those in Scotland and Wales also reported more adverse effects, compared with those in England. While this nation-level gap could stem from cultural differences in the manner with which respondents respond to questions, the gap could alternatively have arisen from varied employment experiences in response to nation-specific pandemic lockdown regulations. Finally, young employed women reported more adverse effects on their learning of job skills, but there were no substantive gender differences among those in education; this finding only partly confirms the gender gap in loss of general learning that was reported across many countries at the start of the pandemic (ILO 2020).

Among those whose main activity is in education the perceived consequences of the pandemic were substantially more severe: the gap between perceived worsening and improvement was 61% to 8%. This large gap appears to mirror the enormity of the learning losses predicted from school closures and documented in the reports of teachers and inspectors. Those whose recent education had been all online fared worse in terms of their perceived overall educational progress and their satisfaction with teachers and educational resources. Hybrid modes of learning are perceived most favourably. Satisfaction with education decreases with the age of students. Consistent with what one might expect, among those in education some recent experience with the world of work appears to have mitigated perceptions of loss of learning of job skills to a modest extent. There is, however, no evidence that perceived learning losses among those in education are worse for those in Wales and Scotland, despite earlier reports that both countries experienced greater losses of learning time (Elliot Major, Eyles, and Machin 2021).

According to UNICEF one in three countries have not been taking any action to remedy education losses from Covid once schools re-open.[6] Policies to address learning losses vary across the UK's nations (which have devolved education ministries); they include a mix of additional funding for teachers and to minimise ongoing school closures, and curriculum and qualification changes. Evidence suggests mitigation of lost time in education in schools is often best left to local leaders (Harmey and Moss 2021). Our evidence suggests that policies to address the learning of job skills should take account of the particular enhanced needs of women, those who work in lockdown industries, and those from the lowest-income households whose job skill learning has been most affected by Covid. Given that young people's perceptions have been central to our enhanced understanding of Covid's effects, in survey wave three we solicited the views of our sample as to whether they were satisfied with how the problems of learning loss in education were being addressed. A substantial minority – 30.2% – reported low satisfaction (<5 on the 1–10 scale) with efforts to recover their lost learning; most (81%) of these dissatisfied people were students. This level of dissatisfaction would imply that, as of July 2021, there was a long way to go. It is hard, for example, to see how it could be a realistic goal for students to entirely undo the harms done to their university experience.

We also asked the sample's opinion on which two remedies would make the biggest contribution towards making up for lost learning. For both university and school students, the most frequent preferred remedies are 'one-to-one or small group tuition' (21%), 'provide laptops or tablets to students who can't afford a personal computer' (23%) and 'work with employers to offer more work experience placements' (21%), this last solution being favoured more by FE college students. In

contrast, policies which receive most support among the general public (Elliot Major, Eyles, and Machin 2021) – extending the school day, and allowing pupils to repeat whole years – received more modest priority support from young people, at 9% and 16% respectively.

In addition to already-noted limitations to the study deriving from the use of a quota sample and the focus on perceptions rather than objective data on skills learning, the survey sample remains relatively small. This means that only some cuts of the data are possible, in order to investigate inequalities in the experiences of the pandemic. In future research with subsequent waves of the survey it will be possible to distinguish further nuances in young people's perceptions as well as track them through time as they evolve with the dynamic of the pandemic and policy responses. Our study demonstrates that perceptions data about adults' own learning losses could contribute more widely to the understanding of the enormity of the Covid crisis in learning and mental health among young people, not as a substitute for data on learning inputs or grades from teachers, inspectors or employers, but as complementary information that can help shape policy responses. In this instance, perceptions data have proved invaluable for capturing, however imperfectly, the loss of learning of job skills, which could otherwise not be measured.

Notes

1. https://www.europeactive.eu/news/forecast-COVID-19-impact-affects-youth-employment. This rise in youth unemployment varied considerably across countries: https://www.iab-forum.de/en/youth-unemployment-in-germany-and-the-united-kingdom-in-times-of-covid-19/ .
2. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1000352/6803-5_Learning_during_the_pandemic-_review_of_international_research.pdf
3. Coronavirus chart: see how your country compares | Free to read | Financial Times (ft.com)
4. https://yougov.no/news/2021/01/28/global-study-how-many-people-know-someone-who-has-/
5. By contrast, in pre-pandemic years, the proportion of workers in this category was just 0.7%. In 2021 the QLFS asked respondents on furlough (by this measure) whether this was because of the coronavirus, with 97% indicating yes. Therefore we are reasonably confident that this measure properly captures the furlough phenomenon.
6. www.unicef.org.uk/press-releases/1-in-3-countries-are-not-taking-action-to-help-students-catch-up-on-their-learning-post-covid-19-school-closures

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Appendix: Descriptive Statistics for YEAH Sample

Variable	Variable description	Scale	Mean (sd)	n
Effect on Job Skills	Perceived effect of pandemic on learning of job skills	1–5	2.60 (1.06)	2733
Effect on Education	Perceived effect of pandemic on overall educational progress	1–5	1.99 (0.96)	1171
Education Satisfaction	Satisfaction with teaching and resources	0–10	5.80 (2.36)	1197
Direct Covid Encounter	Death or serious illness of close family member or friend	0/1	0.263 (0.440)	3000
Teaching mode	Teaching mode in last 4 weeks, (excl. homework)			
	All online	0/1	0.498 (0.500)	1207
	Hybrid or Face-to-Face	0/1	0.365 (0.482)	1207
	No teaching available	0/1	0.137 (0.344)	1207
Any Work Experience	Work placement/ internship or paid work in last 3 mths or volunteer at least once a month	0/1	0.457 (0.500)	1207
In Education At Pandemic Start	Status in weeks before first lockdown (23/3/2020)	0/1	0.565 (0.496)	3000
Much-limiting Long-term Health	Long-term health condition which reduces a lot respondent's ability to do daily activities	0/1	0.065 (0.246)	3000
Low Social Grade	Highest income earner in household is non-employed	0/1	0.156 (0.363)	3000
Gender	Female = 1	0/1	0.510 (0.500)	2982
Any Training	Job-related education or training in last 4 weeks	0/1	0.344 (0.475)	1664
Certified Training	Above, certified	0/1	0.178 (0.382)	1664
Managerial occupation	Senior, middle and junior manager	0/1	0.190 (0.392)	1369
Professional occupation	Modern or traditional professional	0/1	0.394 (0.489)	1369
Apprentice	Doing apprenticeship	0/1	0.058 (0.234)	1369
Furlough	Currently on furlough	0/1	0.104 (0.305)	1369
Lockdown industry	Working in Hospitality, Food & Beverage or Retail, where >50% of work must be on site.	0/1	0.250 (0.433)	1377