ORIGINAL ARTICLE

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Exploring students' experiences of technical and vocational learning in University Technical Colleges during the pandemic

Divya Deepthi 🆔 | **Sonia Exley**

Department of Social Policy, London School of Economics and Political Science, London, UK

Correspondence
Divya Deepthi, Houghton Street, London, WC2A 2AE, UK.
Email: d.deepthi@lse.ac.uk

Abstract

University Technical Colleges (UTCs) are newly established (since 2010–11) technical and vocational secondary schools in England, catering for young people aged 14–19. The schools focus strongly on delivering vocational, alongside Science, Technology, Engineering and Mathematics (STEM)-focused academic, qualifications. The colleges have been introduced as a new means of improving technical and vocational education and training—a sector which in England has faced problems of low quality and low esteem—and in a wider international context of STEM-trained worker shortages. University Technical Colleges have been advertised as offering state-of-the-art vocational learning, involving access for students to the latest equipment and technologies in key industrial sectors, alongside extensive project-based learning in partnership with employers. However, how have UTC students fared in these respects since the beginning of the coronavirus pandemic and associated lockdowns in 2020? In this paper we report on results from a survey of 252 students across two UTCs in England, exploring the technical and vocational learning experiences of these students during the exceptional 2019–20 academic year. Findings from the survey reveal lost learning and training opportunities during the pandemic, particularly where courses with practical elements relied on specific equipment and facilities that became inaccessible during lockdown. The

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survey also highlights disruptions to apprenticeship arrangements, work experience plans and other engagement with employers. Students in some instances have been effectively forced to stay on in education owing to reduced apprenticeship and employment opportunities for school-leavers. We find evidence of students adapting their aspirations and career goals to the new economic circumstances.

KEYWORDS
pandemic, STEM skills, technical education, vocational education

Key insights

What is the main issue that the paper addresses?

University Technical Colleges are newly established (since 2010–11) technical and vocational secondary schools in England, catering for young people aged 14–19. This paper explores students' experiences of technical and vocational learning during the pandemic, based on a survey completed by 252 students during the 2019–20 academic year.

What are the main insights that the paper provides?

Findings from the survey highlight lost learning and training opportunities, particularly owing to the disruption in the delivery of practical vocational and technical courses that rely on equipment and facilities, which were inaccessible during the lockdown. We find evidence of students adapting their aspirations and career goals to the new economic circumstances.

INTRODUCTION

The need to ensure quality initial technical and vocational education and learning (TVET), leading to good job opportunities, has long been a challenging issue facing liberal market economies. Young people undertaking TVET[1] in these economies have historically faced distinct labour market vulnerabilities, relating partly to what is often poorly financed, narrow training, but also to the low esteem in which employers regularly hold vocational qualifications. Governments internationally have dedicated growing priority to boosting Science, Technology, Engineering and Mathematics (STEM) skills among workforces to promote innovation and growth (OECD, 2020a, 2020b). TVET is a key part of such skill development, but it has received fluctuating and uneven policy attention cross-nationally. Definitions of what constitutes high-quality TVET are complex, but it is for example usually considered important that students have good contact with employers and with practitioners in their future line of work. Good-quality TVET often requires, also, access to high-quality technical equipment, allowing meaningful practice-based learning.

England is a country which has long faced problems in its TVET sector. Field (2022) describes this sector for school-leavers today as comprising 'a fragmented and volatile landscape of programmes and institutions' with 'weak funding of technical pathways' (p. 1). Considering the provision of TVET in secondary education specifically, one recent initiative in

England promoted by Conservative governments and intended to boost prospects for young people undertaking TVET has been the University Technical Colleges (UTCs) programme.

UTCs, of which there are 48 today, are a new type of secondary school catering for students aged 14–19, designed in large part to attract students seeking TVET (DfE, 2013). The schools offer both vocational and academic qualifications, focusing on 'areas where industry desperately needs technical skills' (Baker Dearing Educational Trust, 2022). UTCs work with universities and local industry partners to offer 'sought-after technical qualifications taught by specialist staff with industry standard equipment'. Priority is attached to employer engagement, and to ensuring students become familiar with 'professional environments' and with 'real-life project-based learning' (Baker Dearing Educational Trust, 2022).

To what extent, however, might UTCs' efforts to provide quality TVET have been affected by the coronavirus pandemic? Research more broadly on the pandemic's impact since 2020 has uncovered major disruptions to young people's schooling. While such research has highlighted many respects in which learning losses have been experienced unequally across social groups, there have been few studies so far regarding distinct ways in which TVET students may have been impacted upon (although this literature is growing—see below).

In this paper, we report the experiences of one particular subgroup of students undertaking TVET during the pandemic—those of young people studying at UTCs. We focus on UTC students who were undertaking technical and vocational learning as either part or all of their qualifications portfolio during 2019–20. The paper reports on a survey of 252 UTC students aged 14–19 in two case study UTCs during August–September 2020. In our findings we present first some quantitative data outlining students' reasons for having chosen UTC education in the first instance. We then report on qualitative data from open-ended questions in the survey. This data includes rich information about students' experiences of technical and vocational learning during the pandemic. We learned how the pandemic was impacting not only directly on experiences at the time of the survey, but also relatedly on students' future aspirations.

LITERATURE REVIEW

TVET—Vocational pedagogy and vulnerabilities in liberal skills regimes

TVET, focusing as it does on preparation for work, has long been a branch of learning associated with the acquisition of specific skills as opposed to more abstract knowledge.[2] In turn there are distinct vocational pedagogies. TVET students typically require, for example, access to specialised physical materials and to workplace-like settings, to engage in authentic practice-based learning (Lucas et al., 2012). TVET students typically also benefit from having extensive contact with practitioners in their future line of work (Colley et al., 2003). Watching, imitating and receiving mentoring are important as TVET students prepare to work in particular trades and employment sectors (Lucas et al., 2012; Nylund et al., 2017).

Students pursuing TVET have long also faced certain vulnerabilities. While initial TVET for school-leavers often aids short-term transitions into work, later in life, individuals whose education has been primarily vocational face heightened risks of skill obsolescence. This contributes to poorer average lifetime earnings relative to others pursuing academic education (Forster & Bol, 2017; Hanushek et al., 2017). Moreover, in countries historically displaying the features of liberal skills regimes in particular, initial TVET has long been considered as having 'lowly standing' (Billett, 2014, p. 1). Governments internationally stress the importance for economies of promoting STEM training (OECD, 2020a, 2020b). At the same time, within liberal skills regimes,[3] employers have strongly prioritised job candidates possessing general skills

and knowledge (including STEM knowledge) gained through higher education (Busemeyer & Trampusch, 2011). Employers in such countries have been reluctant to offer financing for vocational education and there has been an absence of a strong public sector TVET strategy. This has contributed to a low vocational skills equilibrium overall (Finegold & Soskice, 1988), and while inequalities within the TVET sector do also exist (Esmond & Atkins, 2022), there is a broad association between lower socio-economic status and undertaking TVET.

TVET in England

England is a prime example of a country where, historically, difficulties with low quality and low demand in initial TVET have been endemic (Field, 2022; Finegold & Soskice, 1988; Fleckenstein & Lee, 2018; Richardson, 2007). Considering specifically government efforts to boost TVET within schooling, it is for example well known that even during the 1930s, government aims for tripartite secondary education included plans for a national expansion of secondary technical schools (Board of Education, 1938); however, such schools never did grow substantially in number (Sanderson, 1988). In 1982, a Conservative Government introduced the Technical and Vocational Education Initiative (TVEI) in English schools. This was an early curricular intervention intended to advance quality TVET, but it too waned as government priorities changed (Yeomans, 1998). In 1988, the England and Wales Education Reform Act introduced City Technology Colleges. These new secondary schools were expected to have industrial sponsors and to prioritise technical education. However, partly owing to limited interest from sponsors, only 15 were ever established (Whitty et al., 1993).

Other attempts to improve TVET in England have been manifold. They have included efforts to standardise and create reputable vocational qualifications to rival academic education,[4] including at tertiary-level (Burgess & Thompson, 2019; Hodgson & Spours, 2010), and to improve hybridity and permeability between TVET and general education. Nevertheless, problems with quality and poor demand have remained (Esmond & Atkins, 2022; Fleckenstein & Lee, 2018). In a 2011 review of English vocational education, Wolf (2011) lamented that between a quarter and a third of young people aged 16–19 achieve only 'low level vocational qualifications, most of which have little to no labour market value' (p. 7). Beyond the clear impact of such a situation on these young people specifically, it is also worth noting that England in recent years has experienced acute shortages of workers possessing STEM skills at 'technician level'—a situation deemed to have been produced by 'an undersupply of people with level 3 to 5 vocational qualifications over the last 20 years, due to lower participation in vocational education' (NAO, 2018, p. 21).

University Technical Colleges

In the above context, the development of UTCs in England has been significant. UTCs constitute newly established technical and vocational secondary schools in English education (DfE, 2013). The schools cater for students aged 14–19 and are academically non-selective. The first UTC opened in 2010–11 and there are currently 48 in operation, enrolling upwards of 12,500 students (DfE, 2020a).

UTCs admit pupils at ages 14 and 16,[5] delivering a combination of technical, vocational and STEM-focused academic qualifications. The schools blend classroom-based learning with practical courses and employer engagement. They are supported by universities and industrial partners to help ensure learning aligns with industry needs (Dominguez-Reig & Robinson, 2018). UTCs deliver core elements of the National Curriculum in combination with technical and vocational qualifications relating to the schools' subject specialisms and

industrial links. Learning is supported by state-of-the-art facilities and workshops equipped with professional technical equipment. Notably, over 60% of UTCs specialise in Engineering, having close ties with Engineering companies (Dominguez-Reig & Robinson, 2018). Academic qualifications offered include GCSEs and A-levels. Technical and vocational qualifications offered include Cambridge Technicals, Cambridge Nationals and BTEC qualifications. Since 2020–21, some UTCs have begun offering T-levels, considered a technical equivalent to A-levels (Baker Dearing Educational Trust, 2022).

UTCs sit within a context of policies promoting choice and diversity in English education. Legally they are Academies—schools funded by government but run by independent trusts (West & Bailey, 2013). Academies' legal independence affords UTCs significant curricular autonomy, enabling innovations as described above. Overall responsibility for UTCs lies with the Baker Dearing Educational Trust. UTCs bear similarities to Career and Technical education providers in the USA, which also provide hybrid academic and vocational education involving employer engagement (Jacob, 2017).

Research carried out pre-pandemic notably found that UTCs had been quite successful in placing students onto apprenticeships, probably attributable to the schools' close links with employers and their strong emphasis on project-based, employment-focused learning (Long et al., 2020; Machin et al., 2020). Department for Education (DfE) evidence (Figure 1) has shown that, pre-pandemic, some 21% of UTC school-leavers at the end of Key Stage 5 progressed onto an apprenticeship programme, compared with just 7% of school-leavers nationally.

UTCs and the pandemic

Educational research since 2020 has naturally focused on the impacts of the coronavirus pandemic, which caused major disruption to students' lives and learning. It is well documented that reduced instruction time and time spent out of school are linked to poorer academic outcomes (Lavy, 2015; Pischke, 2007). Since 2020, research has shown that educational disruptions caused by covid-19 have led to significant learning losses for students in England and internationally (Blainey et al., 2020; Howard et al., 2021; Maldonado & De Witte, 2022).
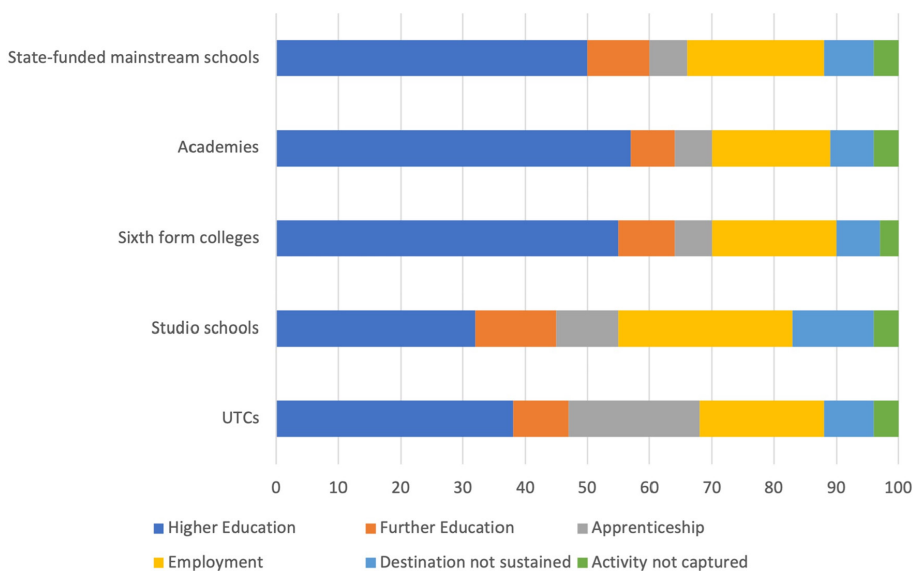

FIGURE 1 Student destinations after Key Stage 5 by school type. Source: DfE (2019).

Additionally, studies have noted widening educational inequalities emerging from shifts to remote learning during the pandemic, generated by factors including unequal access to technology, differential home learning environments and variable support from teachers and parents (Andrew et al., 2020; Eliot-Major et al., 2020).

Research examining impacts of the pandemic on learning has so far focused mostly on students taking academic qualifications. There is nevertheless an emerging body of research on how students undertaking TVET have also been affected. A rapid evidence review by Spours et al. (2021) examining the impacts of the pandemic on UK further education (FE) has highlighted major disruption to learning generated by FE college closures and associated shifts to remote learning. Crawley et al. (2021) relatedly document experiences of FE practitioners in England and Wales during the pandemic. One key theme reported is difficulties for practitioners in transitioning to online teaching in contexts of inadequate training or time to prepare. Practitioners did report adapting over time to delivering online lessons; however some noted that while teaching online enabled delivery of theoretical teaching content, they faced severe difficulties in delivering vocational curriculum components owing to students' and teachers' lack of access to facilities and equipment during college closures. Similarly, a report by the Edge Foundation (2020) states that the unprecedented teaching and learning environment in FE created by the pandemic led to a need to rethink technical, professional and vocational education delivery. Avis et al. (2021) notably highlight cross-nationally that particular difficulties in delivering TVET online have been experienced in many countries during the pandemic.

Disruptions to apprenticeships and broader school-to-work transitions have been another theme emerging from research on TVET and the pandemic. These have been disrupted across many countries (Avis et al., 2021; Cedefop, 2020), and Spours et al. (2021) note for the UK in 2020 a 46 percentage point decline in apprenticeship starts, compared with the previous year (see also Ventura, 2020). Sectors worst affected included health and social care, business management and hospitality. Similarly, Doherty and Cullinane (2020) surveyed employers in England in April 2020, finding that only '39% of apprenticeships were continuing as normal' (p. 1), and that approximately 60% of apprentices had lost out on learning and work experience opportunities (see also AELP, 2020).

Spours et al. (2021) report pandemic-related damage to attainment within, and completion of, vocational qualifications, and also damage to the ongoing uptake of vocational qualifications (see also AoC, 2021), probably contributing to lower economic participation among young people (ONS, 2021). At the same time, students taking academic qualifications during 2019–20 notably benefited from temporary changes to assessments and 'generous' grading, leading to a surge in university applications and admissions (Spours et al., 2021).

Aiming to contribute to these discussions by reporting specifically on TVET in English secondary education, and also by contributing new primary empirical data on student experiences, in this paper we explore disruption caused by the pandemic to UTC students in an unprecedented 2019–2020 school year. While TVET is, as noted above, not the only form of education that UTCs provide, UTCs are nevertheless major sites of school-based TVET in England. Our focus in this paper is also expressly on aspects of UTC students' experiences during the pandemic relating to their *technical and vocational learning and associated career plans*, among those undertaking such learning.

RESEARCH QUESTIONS

Our research questions are as follows:

1. Why, in the first instance, do students choose to enrol at a UTC?
2. What are the main aspirations of UTC students?

3. What challenges, if any, did UTC students face in relation to their technical and vocational learning as a result of the pandemic?
4. How, if at all, has the pandemic impacted on UTC students' future education and career plans, where these have been related to students' technical and vocational learning?

STUDY DESIGN AND DATA DESCRIPTION

We administered an online questionnaire to UTC students between August and September 2020. The questionnaire aimed to uncover students' experiences during lockdown and to explore how far the pandemic had disrupted students' learning and future plans. The survey additionally collected information on students' reasons for attending UTCs, as opposed to a conventional secondary school. In designing questions, we drew partly on themes that were emerging in early published work on how students in England more broadly were experiencing the pandemic. Also feeding into question design were themes that had emerged in one of the author's fieldnotes gathered during attendance at multiple virtual UTC open days.

The sampling strategy employed was a combination of convenience sampling and purposive selection of two schools which were broadly representative of 'typical' UTCs. Detail on the two schools sampled, and how these compared with UTCs nationally, is provided in Table 1. Notably both schools specialise in Engineering, which is characteristic of UTCs.

The anonymous online questionnaire was sent to two UTCs in the West Midlands and was completed by 252 students (42% response rate). All students in the schools were sampled (years 10–13). This picks up on students who were meant to sit standardised exams during 2019–20 and the following year. It also picks up on students who would be progressing onto further study, training programmes or the labour market at the end of 2019–20.

The questionnaire gathered both quantitative and qualitative data through a combination of closed and open-ended questions. Qualitative data were analysed thematically while quantitative data were analysed descriptively. Findings in this paper report primarily on emerging dynamics which were uncovered in qualitative data. Supplementary qualitative data arising from virtual UTC open day fieldnotes have also been drawn upon.

It is important to acknowledge that since we do not have a random sample of all UTC schools and students, survey findings are not generalisable. However, generalising widely was not the aim in this paper which, as noted above, is based primarily on a thematic analysis of data from open-ended survey questions. Rather, the aim is to gain qualitative understanding of dynamics and experiences among UTC students regarding how the pandemic has affected them in their technical and vocational learning and associated career plans. We also acknowledge that there may have been some differential non-response in our study, given that our questionnaire was voluntary. It is nevertheless our hope that we were able to capture a good range of diverse student voices within UTCs.

TABLE 1 Student characteristics.

	(1) UTC survey sample	(2) All UTCs in England	(3) State-funded secondary schools
Male	76.05	78.25	50.20
White	64.28	67.02	73.10
BAME	28.98	25.70	23.70
Free school meal eligible	11.39	13.45	15.90

Note: Data in column 1 are obtained from the University Technical College (UTC) pupil survey and data in columns 2 and 3 are sourced from the School Census (DfE, 2020a, 2020b, 2020c).

SURVEY FINDINGS

Reasons for applying to a UTC and students' aspirations

To gain insights into students' reasons for choosing UTCs relative to a mainstream secondary school, the survey asked: 'Why did you apply to study at a University Technical College?' Students' responses are presented in Figure 2.

A majority of students, over 65%, applied to study at a UTC because they were interested in the curriculum and subjects offered. Relatedly, 58% of students felt that attending a UTC would help them pursue their career goals. The next most common reason reported was that students felt they would benefit from employer interaction and practical hands-on learning, contributing to the development of their employability skills. Over a third of students cited access to state-of-the-art facilities and learning to use technical equipment as a reason for applying to a UTC. Some 28% of students stated that studying at a UTC would help them secure an apprenticeship.

A relatively small fraction of students, around 15%, appeared to pay attention to Office for Standards in Education (Ofsted) school ratings, which rank schools following inspections as either Outstanding, Good, Requiring Improvement or Inadequate. Interestingly, distance to school did not seem to factor into the decision to attend a UTC, as less than 1% reported that they applied because it was their closest secondary school. Parents and friends did appear to contribute to decisions to attend UTCs. A small minority of students, roughly 3%, chose to attend UTCs on the advice of their teachers.

Among other reasons reported, we gather that reasons for applying were aligned with students' professional aspirations and the close connections that UTCs have with employers. One student stated: 'This school looked amazing and I really liked the idea of becoming an engineer for the RAF and this looked like the best option for me as it has awesome
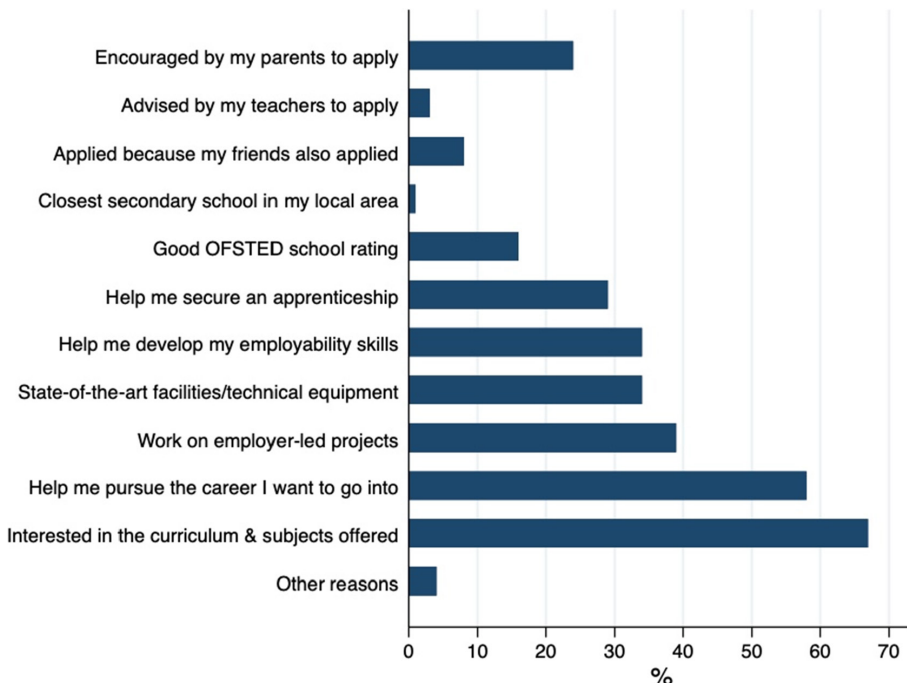

FIGURE 2 Reasons for applying to study at a UTC.

facilities'. Another stated that they applied to study at a UTC because of its close 'links to Engineering companies'. Students remarked that choosing a UTC had meant that they benefitted from mentoring by employers and working on employer-led projects, which in turn opened the door for some to apprenticeships, jobs and networking opportunities. Relatedly, we find that some students were attracted by the distinct vocational pathways and prospects that UTCs offered. One student expressed 'no interest in pursuing an academic track' and had 'no intention of going onto university or further education'. Similar findings emerged among some families at virtual UTC open days. For instance, one parent attending an open day remarked that their child was not academically inclined, rather they exhibited an interest in gadgets, technology and engineering and would prefer a more vocationally oriented education.

For some students, issues of finance were also a concern. For example, one student reported that they intended to pursue an apprenticeship because 'university tuition fees were too high'. Another stated that apprenticeships offered the 'opportunity to earn while you learn'.

In order to learn more about students' aspirations, the survey asked: 'If you were to stay in education or training beyond age 18, what subjects would you like to study?' The responses are illustrated in Figure 3. Most students wanted to pursue STEM subjects. Specifically, over 50% chose Engineering; roughly 20% chose Technology and Physics each; 17% chose Mathematics; 13% chose Computer Science; 9% chose Biology; and roughly 10% chose Chemistry. A small minority of students planned to pursue Medicine, Dentistry or Veterinary Science and other social sciences. In the 'other' category, students reported architecture, art and product design, graphic design, food technology, history, geography and music.

In short, the results suggest that most students were motivated by the distinct curriculum and the technical and vocational aspects of the education and training they would receive at UTCs, which would help them pursue their career goals. The survey results indicate that students' aspirations and future career goals were STEM-oriented, with a majority reporting an interest in pursuing education, training or a career in Engineering.

The impact of the pandemic on students' vocational education and training

In this section, we explore the extent to which the pandemic disrupted students' education and training, with a particular focus on findings relating to students' more technical and vocational learning. We report on a number of key themes which emerged from the open-ended responses gathered in the survey.

Disruption to technical and vocational courses

Qualitative responses from the survey have uncovered that, within UTCs in 2019–20, there were significant disruptions to the delivery of vocational and technical courses. Students reported receiving minimal instruction and guidance from teachers in vocational and technical courses that involved practical elements, owing to inaccessibility to workshops and equipment during the lockdown. For instance, a student remarked:

> [The pandemic] has set back my learning as my lessons have to be online with no hands on face to face learning which is massively disruptive to my learning.

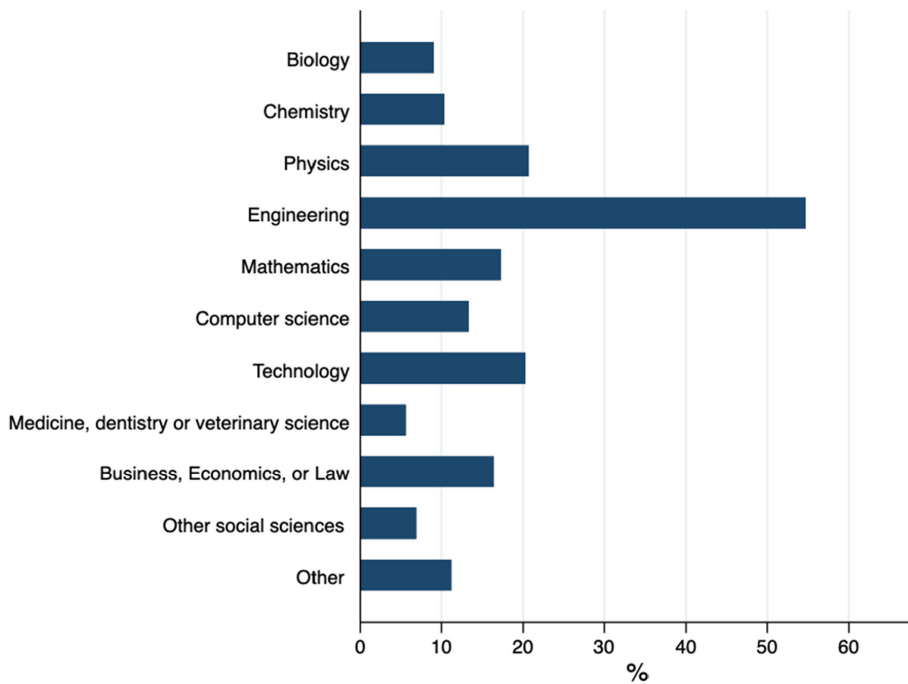Other respondents expressed similar sentiments, such as:

FIGURE 3 Students' aspirations—subjects students chose to pursue beyond age 18.

> Online schooling is not even near as productive as usual schooling. A lot of the information in all subjects has been either not understood correctly or either not given because it was practical.

> I struggled with online lessons in technical subjects and would have benefitted from face to face instruction.

> I have had little or no support from teaching in practical courses and I fear that the six-month gap in knowledge will negatively affect me.

Students identified limited access to facilities as particularly disruptive to their vocational learning and, consequently, some were unable to complete practical elements of their coursework or practical units required for their technical and vocational courses. One student wrote: 'I could not access the workshop equipment for my engineering and product design courses. I could not complete all of the practical units required for the course', while another stated: 'I don't have access to all the facilities required for continuation of my education at home'. Another respondent wrote: 'For learning physics and the theory side of engineering, it has been no different in terms of progress. However I miss the facilities that the college has to offer such as the workshop equipment and being able to ask teachers for help or advice easily'.

Students were allowed to return to school following the gradual lifting of lockdown restrictions in June and July 2020. However, in the survey, students reported restricted access to workshops and equipment as the 'Covid-safe restrictions and guidelines prevented [them] from sharing equipment'. Additionally, various measures implemented to reduce risks of in-school transmission of covid infection meant that certain year groups were prioritised over others in terms of being able to access workshops and facilities. Students felt that limited

access to workshops and not being able to learn to use professional equipment would hinder or even halt the development of their practical skills needed for their future training and career plans.

Overall, the survey findings have uncovered a pattern of reduced quality and quantity of education and training received by students. This is particularly evident in the case of practical technical and vocational courses that relied on access to specialist equipment and facilities in the delivery of the curriculum, which was disrupted due to school closures.

Limited employer engagement

As a result of the pandemic, students reported that they no longer benefitted from employer interaction, mentoring and the opportunity to work on employer-led projects. A student wrote:

> Covid-19 has robbed me of my chances to interact with employers. Invaluable networking opportunities lost, which given the chance I would have used to get my foot in the door.

Short-term work experience opportunities and work placements were also delayed or cancelled. Students felt that without work experience opportunities on their CVs, they were less attractive to prospective employers, and this diminished their career prospects. A student wrote: 'I have been unable to do any work experience which I believe will make people not want to take me on as I don't have any such experience'. Another student reported:

> [I have had] cancelled work experience placements at two separate places, where the employers have not made any plans to reschedule or provide alternative experience, decreasing the opportunities I may have because of that later in life.

From the responses we gather that there was a marked sense among students that they were unable to capitalise on key elements of technical and vocational training advertised and, under normal circumstances, offered by UTCs. One student reported that they had planned to use their 'work experience opportunity in Airbus and Cadent Gas to establish links and contacts with the engineering industry' but were unable to do so because their work experience had been cancelled owing to the pandemic. Another stated:

> Overall, education during Covid 19 hasn't negatively impacted me, however enrichments, practical work, work experience and engagement with other companies has set me back. Which could have a negative impact long term in the future.

Some who *had* been able to undertake work experience opportunities during the pandemic reported that employer interaction time had been restricted because of social distancing guidelines and because fewer workers were allowed to be present at the worksite and on business premises, although school leaders at virtual open days did comment that they were attempting to ensure continuity by providing online alternatives where feasible. Covid-safe restrictions also meant that students were unable to work with equipment, not just at school but during work experience placements, with one student reporting that owing to this they were yet further 'missing out on the unique opportunity to learn and train'.

The impact of the pandemic on UTC students' progression, future plans and aspirations

We find evidence that students experienced particularly significant disruptions in progressing onto an apprenticeship programme, vocational training programmes or employment. Specifically, students reported that their apprenticeship programmes and jobs had been suspended, delayed or cancelled as a result of the pandemic. Students highlighted that there were limited vacancies or a lack of opportunities for apprentices, school-leavers and young people in general. A student wrote: 'Most places aren't looking for young people to hire at the moment'. Another notes that 'The economy has become increasingly unstable, with many businesses making large job cuts or shutting down completely. The job market has dwindled (for now), and I only hope it recovers soon'.

Students stated that owing to business closures and layoffs, employers were looking first and foremost to retain their existing employees and were in turn cutting down on apprenticeships or other training programmes for new entrants. Students expressed that they were anxious that the chances of securing an apprenticeship or work experience opportunity were quite low. A student stated: 'I fear that now there is a recession and businesses are declining and reducing jobs I worry I won't be able to get a career in what I want when I leave'. Another wrote, 'I believe the virus may reduce potential opportunities due to the economic crash and many companies becoming bankrupt, this will therefore increase the competition for existing apprenticeships and courses'.

Some students reported directly that they were having to put their plans on hold owing to the economic situation. For example, one student stated:

> I was intending to go to aviation school in Oxford. I progressed through all the tests and have been given a place to study. I passed all my exams and was hand selected to go to an interview abroad with easyJet on a sponsored course, I was the only person without a degree. The same day they grounded all aircraft and the need for pilots was diminished the market has been destroyed so I am delaying my studies.

Students who were seeking employment or apprenticeship programmes directly upon leaving school also reported disruptions to application procedures. Students reported delays and cancellations to Interviews and Assessment Centre days, for example, creating yet further disruption to their plans.

As a result of overall disruption to apprenticeships and jobs, some students reported that they were effectively being forced to stay on in education, pursuing further or higher education or alternative training. A student stated: 'An apprenticeship I was meant to attend got cancelled so it's changed my plans as I will be going to college now'. Other students conveyed similar experiences through statements such as: 'Many companies have a hiring freeze and this has left me with no option but to go to uni' and 'I was hoping to get a job or apprenticeship after sixth form, but this looks doubtful so I think I will now go to university'. The cancellation of exams, and the subsequent awarding of teacher predicted grades for academic and vocational qualifications, has introduced additional uncertainty and disruption in progressing onto further education and training for some students.

The overall disruption to apprenticeships was an issue also reported by school leaders at virtual UTC open days. They commented that there were fewer apprenticeship opportunities available during the 2019–20 academic year, and that many more students had gone to university compared with the previous academic year. School leaders also noted that in

the current climate, apprenticeships were difficult to find, apart from in the healthcare sector, which saw an increase in labour demand following the coronavirus outbreak.

In view of the changing labour market and economic situation, some UTC students reported adapting their aspirations, ambitions and career plans to the new economic circumstances. With jobs in short supply in certain sectors, students reported that they had been unable to secure an apprenticeship or employment, and this had urged them to reconsider their career goals. For instance, some students who had previously been aiming to pursue careers in the aviation sector (e.g. aviation engineering or pilot training), which was hard hit by the pandemic, reported that they were having to rethink their aspirations:

> It has made me question what I want to do in the future. Also with covid it has meant that more jobs have been lacking in demand which makes me want to pursue them less, like being a pilot for example.

Other students expressed similar sentiments:

> With everything going on uncertain economic environment, business closures, fewer jobs and training opportunities, it's made it more difficult to make plans for the future. I'm reconsidering my ambitions.

> It has really affected my future plans. it has made me rethink my career goals. I might not be able to do what I wanted to do.

In contrast, some students did note that although the pandemic had negatively affected the economy, it had not stopped them from pursuing their ambitions. One respondent stated that 'It has not affected my future significantly because I can still go to school and the industry I intend to go in has had significant impact from covid-19 but it is unlikely to for it to not recover.' Others expressed similar views with statements such as: 'I don't believe it has affected my future plans or education as the career I want to pursue still has offers and is likely to remain in business' and 'The job market has contracted but I don't intend to let that affect me'.

Overall, we find that the pandemic has disrupted UTC students' plans in various ways, as well as their progression onto the labour market. In light of the changing economic situation, we find evidence of students staying on in education and adapting their aspirations and career goals to the new economic circumstances.

DISCUSSION AND CONCLUSIONS

Findings above highlight lost learning and training opportunities, particularly owing to disruption in the delivery of practical vocational and technical courses that relied on equipment and facilities, which were inaccessible during the lockdown. Students identified restricted engagement with employers and lost mentoring opportunities as impeding the development of their practical and employability skills. UTCs' unique curricular offering, which includes practical elements and opportunities for employer engagement, had notably been among students' main reasons for attending UTCs in the first instance. The survey also found significant disruption to students' progression and future plans, as students reported suspended, delayed or cancelled apprenticeships and job opportunities owing to the pandemic.

Our findings as summarised above, particularly on disruptions to apprenticeships and vocational learning in UTCs, are themes that notably reinforce findings in prior national and international research about how the pandemic has affected students in the TVET sector more broadly (again see e.g. Avis et al., 2021; Spours et al., 2021; Crawley et al., 2021).

Building on this existing literature, one novel finding emerging from our own study was that higher education for some UTC students seemed to be serving almost as a 'safety net' during a period of external economic shocks, made possible partly by the hybrid and permeable nature of vocational and academic pathways offered at UTCs. Such flexibility provided students with options to stay on in education, at a time when they were being confronted with limited apprenticeship and employment opportunities.

This may have averted the short-term risk of unemployment for some; however it does also raise questions about students' preparedness for university, given that, for some, higher education had not been a goal they were previously working towards. While some students engaging in STEM-based technical learning at UTCs may well resemble what Esmond and Atkins (2022: 33) describe as a TVET 'upper strata' destined to become 'technical elites', often via tertiary progression routes, for others it may be harder to cope.

Students' preparedness for higher education may in some instances be mediated by the particular university students attend and the curriculum they follow, given that higher education is a diverse sector where institutions vary in their entry requirements, teaching content, quality and prestige. It may also be mediated by the types of TVET qualifications students undertake—for example Terry and Orr (2021) note rigorous selection processes currently being faced by students keen to pursue new T-levels in England. This may in turn have implications for students' higher education preparedness (although notably, while the rollout of T-levels across UTCs commenced in September 2020, the two UTCs studied in this paper are yet to offer them). We know that, even in 2018–19, 6.8% of new university entrants in the UK did not continue for more than a year (HESA, 2020). We also know that certain students (e.g. those from low-participation neighbourhoods) are at greater risk than others of poor results and degree non-completion (Crawford et al., 2017). Progression onto further study also has financial implications, requiring students to spend more and take out loans, particularly to attend university, raising questions over how worthwhile such education may be for some (Field, 2022). Attending university also generates opportunity costs, as students forego earnings from apprenticeships or employment (had they secured these). Such issues seem particularly important given our study findings showed the importance to some of being able to 'earn while they learn' and to avoid major debts associated with attending higher education.

From the survey responses, we find evidence of students changing plans and goals in order to adapt to the changing economic situation. While this may seem innocuous in the short term, students potentially diverting away from industrial sectors where there are known skills shortages (Committee of Public Accounts, 2018; NAO, 2018) may also not only overwhelm universities (Tidman & Devlin, 2022) but also worsen labour market inefficiencies and intensify talent and skills mismatches in the longer term. Nations worldwide are grappling with these issues (ILO, 2020; OECD, 2021) and they have implications too for workers' job satisfaction and for labour turnover.

Policy responses to covid-19 for schools in England have involved the funding of various catch-up programmes in order to address learning losses. Schools have each been allotted a Recovery Premium and school leaders have autonomy over how this is spent, offering 'flexibility to decide who needs support, what they need and how best to provide it' (Lewis & Bolton, 2022, p. 39). Policy efforts do otherwise however seem to have been focused strongly on the National Tutoring Programme and funding of subsidised supplementary tutoring for students in general academic subjects (DfE, 2022). There is a 16–19 Tuition Fund (DfE, 2020b; Sibieta, 2021), which schools can use to help students catch up with TVET. Some UTCs notably have used the 16–19 Tuition Fund to this end.[6] However, total spending to facilitate students' catch-up has also been criticised for being inadequate (Crenna-Jennings et al., 2021; Field, 2022; Sibieta, 2021). It is worth noting too that average costs of delivering technical education are higher relative to those for general educa-

tion (Field, 2022). Some support for employers to help boost training and apprenticeships, after a period of major disruptions, has been introduced, for example the Kickstart scheme. However the rollout of this scheme was limited (Spours et al., 2021) and it has now ended (DWP, 2022). Such initiatives also sit in a wider English context where government training subsidies for employers (and funding for technical education more broadly) have for years lagged behind levels in leading European nations (Robinson & Dominguez-Reig, 2020). In England between 2010–11 and 2020–21, overall spending on adult education and apprenticeships also fell by 38% (Sibieta et al., 2022, p. 2).

The issues discussed above have serious implications for a significant fraction of UTC students in England who are pursuing technical and vocational educational pathways. In this regard, our results point to additional mechanisms by which the pandemic has probably intensified inequalities. This is consistent with findings reported by Spours et al. (2021) for students within the broader FE sector. It is important to highlight undoubtedly wider relevance too, given that, in 2018–19, participation in higher education among young people aged 17–30 was just 51.9% (DfE, 2020c), and that those not attending university are more likely to come from less affluent backgrounds.

Problems outlined also have implications for government policy strategies for a thriving TVET sector, imperative to meet the needs of a changing labour market characterised by increased automation and adoption of green technologies (BEIS, 2021; OECD, 2019; World Bank, 2019). 'Building Back Better' initiatives (HM Treasury, 2021; OECD, 2020b) by governments and international organisations also call attention to the importance of skills training in promoting productivity, innovation and growth, raising questions about the ongoing provision and future directions of the TVET sector.

FUNDING INFORMATION

CONFLICT OF INTEREST STATEMENT
No conflict of interest to report.

DATA AVAILABILITY STATEMENT
The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions

ETHICS DECLARATIONS
This study received ethical approval granted by the University of Warwick IRB (HSSREC 223/19–20).

ORCID
Divya Deepthi https://orcid.org/0000-0002-1258-044X

ENDNOTES
[1] We use the term TVET given technical and vocational education overlaps and also given UTCs' explicit reference to 'technical' education while offering a range of vocational qualifications. We do however also recognise TVET to be a diverse and unequal domain (see e.g. Esmond & Atkins, 2022).

[2] Although this can also be critiqued for being a somewhat reductive, narrowly productivist conceptualisation (Avis, 2014). Moreover, denying VET students good access to theoretical 'powerful knowledge' has been critiqued as serving to reproduce social inequalities (Wheelahan, 2015).

[3] In an increasingly post-industrial age where all countries face some heightened pressure to liberalise (albeit mediated by domestic contexts), there is also evidence in countries outside of classic liberal skills regimes of academic–vocational divisions becoming exacerbated, and of vocational education being viewed as primarily for the lowest-achieving students. See e.g. Esmond & Atkins (2022), Tarabini et al. (2022), Nylund et al. (2017) and Nylund & Rosvall (2019).

[4] See e.g. National Vocational Qualifications, introduced in 1986, General National Vocational Qualifications, introduced in 1992, Vocational GCSEs, introduced in 2002 and T-levels, introduced in 2020.

[5] Most English secondaries admit students at 11 and/or 16. Some UTCs now also admit students at 11.

[6] https://www.waterfront-that.org.uk/catchupfunding

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How to cite this article: Deepthi, D., & Exley, S. (2023). Exploring students' experiences of technical and vocational learning in University Technical Colleges during the pandemic. *British Educational Research Journal*, *00*, 1–18. https://doi.org/10.1002/berj.3857