



Evaluation of university technical colleges

Report - Year One

November 2017



**Evidence for
Excellence in
Education**

Evaluation of university technical colleges

Royal Academy of Engineering
Edge Foundation

November 2017

Authors:

Tami McCrone, Kerry Martin, David Sims, Chloe Rush,
National Foundation for Educational Research, The Mere,
Upton Park, Slough, Berkshire SL1 2DQ

www.nfer.ac.uk

Registered Charity No. 313392

ISBN: 978-1-909327-36-8

© National Foundation for Educational Research 2017

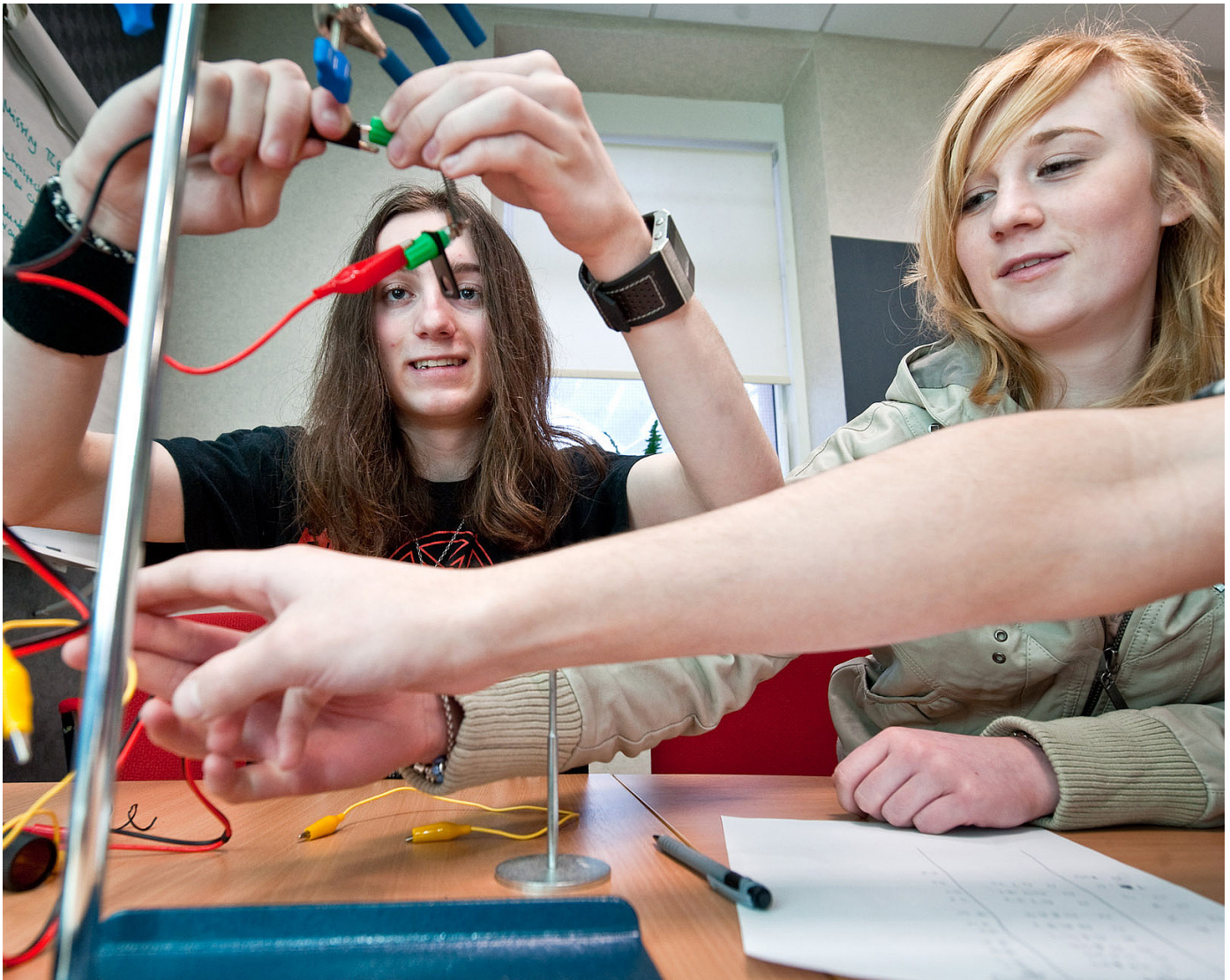
Available to download from:

www.edge.co.uk/research/research-programme

www.raeng.org.uk/publications/reports/evaluation-of-university-technical-colleges

How to cite this publication:

McCrone, T., Martin, K., Sims, D. and Rush, C. (2017). *Evaluation of University Technical Colleges (UTCs)*. Slough: NFER.



Contents

Executive summary	1
1 Introduction	1
2 Research aim and objectives	1
3 Research Methodology	1
4 Key findings	2
1 Introduction	5
1.1 Background	5
1.2 Aims and objectives	5
1.3 Methodology, sample and attainment characteristics	5
1.4 Structure of report	7
2 Employers', governors' and HEIs' engagement	9
Key findings	9
2.1 Levels of employer involvement	9
2.2 Types of employer activities	10
2.3 Project-based learning	11
2.4 Governors' and HEIs' engagement	11
3 Young people's views	13
Key findings	13
3.1 Reasons for enrolling	13
3.2 Attitudes towards education, home life and the future	14
3.3 Attitudes towards employer input	15
4 Perceived impact on young people	17
Key findings	17
4.1 Impact on academic learning and technical skills	17
4.2 Impact on transferable 'work ready' skills	18
4.3 Impact on other attitudes and attributes	19
4.4 Impacts on future destinations and pathways	20
5 Challenges	23
Key findings	23
5.1 Engaging and maintaining quality employer input	23
5.2 Recruitment and retention of students and staff	25
5.3 Other challenges	27
6 What works well	29
Key findings	29
6.1 Learning relevance	29
6.2 Employer input	29
6.3 Students' employability	30
7 Advice for other UTCs and future priorities	31
Key findings	31
7.1 Advice for other UTCs	31
7.2 Future priorities	32
8 Conclusions	33
9 References	35

Forewords



As the skills gap widens, the digital revolution continues to transform the labour market and Brexit reduces our access to skilled labour from abroad, there has never been a more important time for us to get technical education right.

The Edge Foundation champions the very best of technical and professional education. University Technical Colleges (UTCs) mark a radical departure from previous models, operating on a working day, focusing on one or two technical specialisms and incorporating employer-led project based learning.

Seven years after the first UTC opened, this is the perfect time to take an independent look at the work that UTCs do to engage with employers and provide project based learning opportunities for young people.

Alice Barnard
Chief Executive, Edge Foundation

We were delighted to commission this research in partnership with colleagues at the Royal Academy of Engineering.

The lessons and reflections contained in this report, and that will come out of the second year of this research, will undoubtedly be invaluable for the future of the UTC movement. We want to go further by encouraging all schools to focus on the best practice exhibited by meaningful employer engagement and industry-led learning so that all young people can benefit as they prepare for work.



The UK needs more skilled technicians and engineers.

The development and success of new apprenticeship standards and improved technical education will help meet increasing demand for a qualified technical workforce while at the same time widen access to a whole range of professions and in doing so, contribute to social mobility.

There are multiple pathways to progression in engineering and many other professions. Many students will take an academic route, through A levels to higher education undergraduate degrees.

Other students will take a technical route, studying full time in a post-16 education establishment, which provides a more applied learning approach. Others will take on an apprenticeship and learn while at work.

For too long however, the narrative of the education system in the UK is the academic route is for successful students and technical vocational pathways are for those who don't quite make the grade. Yet we know from experience that many young people thrive in different learning environments and through different learning styles.

Professor Jonathan Seville FEng
Chair of the Education and Skills Committee,
Royal Academy of Engineering

That is why, since 2010 University Technical Colleges (UTC) have been an important addition to the UK education system.

This report undertaken by the National Foundation for Educational Research on behalf of the Royal Academy of Engineering and the Edge Foundation examines, for the first time, the UTC approach to teaching and learning to understand whether it is providing an effective model of technical education for students in a 14-19 cohort. The study also provides further information on the challenges facing UTCs within the current education system.

This independent and thorough evaluation examines the key features which set UTCs apart from other types of institution, particularly focusing on their project-based learning opportunities and employer engagement.

The Academy is grateful to the authors for providing insight into what works well in UTCs and key issues they are facing in preparing young people for the world of work.

Executive summary

1 Introduction

The Royal Academy of Engineering (the Academy) and the Edge Foundation commissioned the National Foundation for Educational Research (NFER) to evaluate University Technical Colleges (UTCs) between January 2017 and December 2018. This is an interim report focusing on phase 1 of the research. These are preliminary findings and the final report will be published in 2018.

UTCs are schools for 14 to 19 year olds that deliver an education which combines technical, practical and academic learning. Students can study a technical specialism alongside core academic subjects at GCSE and A-level. There are 49 UTCs open in England at the time of this report.

2 Research aim and objectives

The overall aim of the study is to understand effective practice and lessons that can be learned from the approaches currently being adopted, particularly in relation to curriculum design and employer engagement, as well as the broader challenges facing UTCs. More specifically the objectives of the research are to:

- ascertain the use of project-based learning and employer engagement in the development and delivery of the curriculum within UTCs at Key Stage 4 and post-16
- share the most effective practice and identify lessons learned, including areas that have been less successful, in order to inform future sector-wide practice.

3 Research Methodology

We have used a case-study methodology supplemented with management information on the schools (see section 1.3.2) and a survey of young people's views on education in general and UTCs specifically.

We visited ten UTCs, three in the north of England, three in the midlands and four in the south of England. In total we interviewed ten senior leaders; ten members of staff with responsibility for liaising with employers; 20 other members of school staff; 16 employers; ten governors; and six higher education institutions (HEIs). We also conducted nine focus groups with young people in Year 10, and 11 focus groups with young people in Year 12.

We asked the young people who took part in the focus groups to complete the survey. In addition we asked a senior leader if they would administer the survey with the rest of their Year 10 and 12 students. We received 466 completed questionnaires from eight UTCs. As 414 were from four UTCs (and the remaining 52 were from the remaining four UTCs) caution should be exercised in the interpretation as not all UTCs were equally represented.

In Year 2 (2018) we will carry out three in-depth UTC case studies in the spring of 2018 and will interview college staff and young people; carry out further surveys with young people; and conduct short interviews with young people and/or college staff gathering data on young people's destinations in the autumn of 2018. We will then produce a final report and a practitioner guide.



4 Key findings

4.1 Employer engagement

The findings from phase one of this research indicated that there is a range of approaches currently being used by the case-study UTCs to engage and liaise with employers and to utilise their input into the design and delivery of the curriculum.

At its most profound level, some UTCs have developed relationships with employers where they are co-developing and delivering projects, with employers taking ownership of units or modules of the curriculum. This is associated with project-based learning whereby specialist theoretical, practical and applied learning is informed by an employer providing an “authentic, engaging and complex question, problem, or challenge”. The research findings indicated considerable employer awareness and presence at all the UTCs we visited. All ten case-study UTCs demonstrated moderate and contextual employer input into young people’s learning. For example, through activities such as real life application of theoretical learning into the practical world of work; informing the curriculum with current industry skills’ needs; observation and experience of every day industry activity; genuine, authentic challenges or problems for young people to solve; ongoing, regular input into projects; provision of visits to employers’ workplaces; employer talks; resources and facilities; and specialist sector expertise. Governor and university interviewees were supportive of UTCs’ close links with employers and, where possible, helped to focus on progressing the UTCs’ strategy to develop further young people’s technical knowledge and skills in alignment with industry’s current needs.

4.2 Perceived impact on young people

Most young people were motivated to enrol at a UTC for positive reasons such as interest in the specialism or to find out more about the world of work. On the whole, they were optimistic about the future, recognised that qualifications are important and that their UTC was providing them with the skills they need for the future. Interviewees believed that attending a UTC had benefitted young people in terms of: improved academic learning; enhanced technical skills and knowledge; increased transferable skills and readiness for the world of work; increased engagement with education and learning and motivation to succeed; greater awareness of and confidence in post-UTC pathways and increased likelihood of securing and maintaining chosen post-UTC destinations.

4.3 Challenges

The main challenges the case-study UTCs faced were ensuring that they secured and managed a suitable range of employers providing high-quality input into the curriculum; recruiting and retaining appropriate students with an interest in the specialism and who are motivated to engage and succeed; and recruiting and retaining high-calibre staff with appropriate knowledge and skills. Additionally, interviewees indicated that external curriculum changes, accountability frameworks and funding posed further challenges. Bearing in mind that UTCs are funded at the same rate as other schools, interviewees felt that the delivery of the UTC curriculum with associated costs such as more teaching hours, the purchase of specialist equipment and resources, and the cost of transport for work placements and workplace visits was demanding.

4.4 What works well and advice for other UTCs

In addition to the perceived positive impact on young people (see section 4.2 above), UTC staff and their key partners felt that young people are typically better prepared for the world of work as a result of attending a UTC than other students their age. They noted young people's enhanced levels of confidence, motivation and engagement.

The findings suggest that when UTCs are working at their best they are successful at: providing real-world application of theoretical concepts; working with employers to realise a common vision; and having dedicated time for staff to work with employers. When asked to provide advice to new UTCs, interviewees' suggestions included: develop a clear vision and mission; raise the UTC's profile and reputation among all stakeholders; ensure pupils develop meaningful, relevant and appropriate skills; invest in building and maintaining quality relationships with employers; and provide regular and sustained exposure to a range of industry partners.

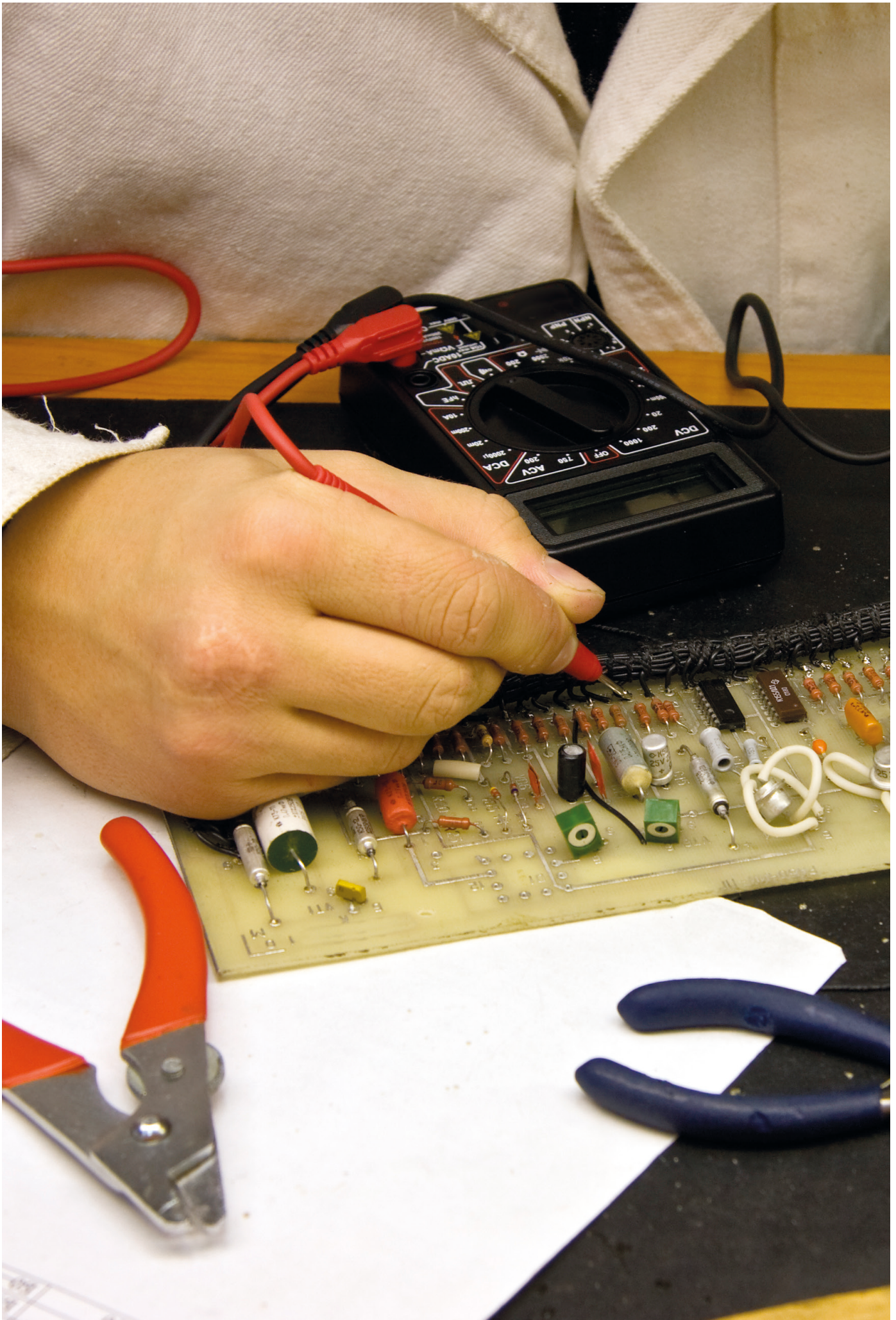
Although challenging to engage enough employers, most case-study UTCs believe that they are securing genuine and meaningful contact and experience with employers for their students, so that they can apply theoretical concepts to the real world. Additionally, they are supporting young people to develop meaningful and relevant skills and to navigate their way successfully to future destinations. UTC interviewees recognised the importance of investing in building and maintaining quality relationships with employers and providing young people with sustained and regular exposure to a range of industry partners.

Advice from the case-study UTCs suggest that, in terms of recruiting the right students and staff they identified the importance of raising the profile and reputation of their UTC among all stakeholders (as mentioned above) so that they can attract high-calibre students and staff.

4.5 Next steps

In phase two of this research we will carry out three in-depth case studies with phase one UTCs that demonstrated profound engagement with employers in project-based learning. We will explore: the lifecycle and different levels of projects displaying profound employer input; what facilitates profound employer input into project-based learning; different models of business liaison and employer engagement strategies (and how these are funded); and the impact on young people and their post-UTC destinations.

The final report, due to be published in winter 2018, will systematically draw together findings from phases one and two of this research, will share the most effective practice and will identify lessons learned in order to inform future sector-wide practice.



1 Introduction

The Academy and the Edge Foundation commissioned the NFER to evaluate University Technical Colleges between January 2017 and December 2018. This is an interim report focusing on phase one of the research. These are preliminary findings and the final report will be published in 2018.

1.1 Background

UTCs are schools for 14 to 19 year olds that deliver an education that combines technical, practical and academic learning. Students can study a technical specialism alongside core academic subjects at GCSE and A-level. There are 49 UTCs open in England at the time of this report.

1.2 Aims and objectives

The overall aim of the study is to understand effective practice and lessons that can be learned from the approaches currently being adopted, particularly in relation to curriculum design and employer engagement, as well as the broader challenges facing UTCs. More specifically the objectives of the research are to:

- ascertain the use of project-based learning and employer engagement in the development and delivery of the curriculum within UTCs at Key Stage 4 and post-16
- share the most effective practice and identify lessons learned, including areas that have been less successful, in order to inform future sector-wide practice.

1.3 Methodology, sample and attainment characteristics

1.3.1 Methodology

We have used a case-study methodology supplemented with Management Information on the schools (see section 1.3.2) and a survey of young people's views of education in general and UTCs specifically.

We visited ten UTCs, three in the north of England, three in the midlands and four in the south of England. In total we interviewed ten senior leaders; ten members of staff with responsibility for liaising with employers; 20 other members of school staff; 16 employers; ten governors; and six higher education institutions (HEIs). We also conducted nine focus groups with young people in Year 10 and 11 focus groups with young people in Year 12.

We asked the young people who took part in the focus groups to complete the survey. In addition we asked a senior leader if they would administer the survey with the rest of Year 10 and 12 students. We received 466 completed questionnaires from eight UTCs. As 414 were from four UTCs (and the remaining 52 were from the remaining four UTCs) caution should be exercised in the interpretation as not all UTCs were equally represented.

In Year 2 (2018) we will carry out three in-depth UTC case studies in the spring of 2018 and will interview college staff and young people; carry out further surveys with young people; and conduct short interviews with young people and/or college staff gathering data on young people's destinations in the autumn of 2018. We will then produce a final report and a practitioner guide.

1.3.2 Sample and attainment characteristics

Table 1 provides key background data for our sample of 10 UTCs. For example, the overall absence rates, in 2015/16 amongst our sample of ten UTCs varied between four and 11%.

Table 2 provides comparison background data on our sample of ten UTCs, all UTCs and all schools. For example, in terms of students eligible for free school meals (FSM), the sample UTCs had 32% eligible students compared to 30% amongst all UTCs and all schools.

Table 1: Background data for our sample of 10 UTCs

Background data for University Technical Colleges selected for the sample												
UTC	KS2 APS for Year 10 intake in 2014/15	Average Progress 8 measure (2015/16)	Average Attainment 8 score per pupil (2015/16)	Average point score per academic KS5 entry (2015/16)	Average point score per tech level KS5 entry (2015/16)	Average point score per applied general KS5 entry (2015/16)	Pupils eligible for FSM at any Mme during the past 6 years (2015/16)	Pupils with English not as first language (2015/16)	Percentage of girls on roll (2015/16)	Percentage of eligible pupils with SEN support (2015/16)	White British ethnic background (2015/16)	Overall absence rate (2015/16)
1	26.00	-0.41	42.20	17.87	40.69	26.97	55%	29%	10%	15%	13%	6%
2	28.00	-0.69	44.60	4.75	37.36	31.33	20%	0%	28%	4%	99%	7%
3	27.00	0.22	50.90	14.55	28.44	*	43%	7%	15%	14%	29%	7%
4	28.00	-0.29	51.50	28.40	**	36.72	46%	9%	63%	10%	68%	7%
5	27.00	-0.53	45.20	22.19	30.72	40.33	13%	2%	17%	3%	84%	6%
6	28.00	-0.76	43.50	24.62	41.53	40.91	29%	2%	60%	9%	73%	11%
7	28.00	-0.44	48.10	23.42	29.62	31.96	0%	2%	15%	19%	91%	5%
8	27.00	-0.27	46.50	10.26	37.97	*	24%	3%	9%	14%	90%	7%
9	29.00	-0.19	50.30	29.25	41.76	29.44	26%	18%	12%	13%	59%	4%
10	**	**	**	**	**	**	33%	3%	39%	5%	84%	7%

*Suppressed - where pupil numbers are less than 5, values are suppressed in DfE statistical releases
**No entries - UTC 10 opened at the beginning of the 2015/16 academic year so did not have any exam entries at KS4 or KS5
i) KS2 APS were calculated from pupil level data for individuals in the Year 10 2014/15 cohort using the National Pupil Database

Table 2: Background data

Table comparing all schools, to all university technical colleges, to university technical colleges in the sample				
		All schools	All UTCs	Sample UTCs
Pupils eligible for FSM at any time during the past 6 years (2015/16)	Mean	30%	30%	32%
	Valid N	3159	36	9
Pupils with English not as first language (2015/16)	Mean	16%	10%	8%
	Valid N	3160	37	10
Percentage of girls on roll (2015/16)	Mean	49%	23%	27%
	Valid N	3161	37	10
Percentage of eligible pupils with SEN support (2015/16)	Mean	12%	14%	11%
	Valid N	3161	37	10
White British ethnic background (2015/16)	Mean	71%	65%	69%
	Valid N	3160	37	10
	Total N	3210	48	10

i) The table above includes data for all through, middle deemed secondary and secondary schools in England of the following types: Academy Converter, Sponsored Academy, Community School, Foundation School, Free School, Studio School, University Technical College, City Technical College, Voluntary Aided School, Voluntary Controlled School. Schools were removed if high statutory ages were below 16. Similarly if schools existed in the sample with low statutory ages above 16, these were removed. This ensured that all schools included were able to have a KS4 cohort.
ii) Data refers to all schools open as of the beginning of the 2016/17 summer term (24/04/2017). Where schools were new, and had no data for the 2015/16 academic year, they appear in the 'Total N' statistic but have no 2015/16 data for calculation of averages. The 'Valid N' statistic indicates the number of schools with background data included in calculations. Schools which had converted type since data was released were matched to their predecessor school to reduce the amount of missing data
iii) Pupil characteristics data was downloaded from the January 2016 Schools, Pupils, and Characteristics statistical first release.

Table 3 Attainment characteristics

Table comparing the attainment of all schools, to all university technical colleges, to university technical colleges in the sample				
KS4 Attainment		All schools	All UTCs	Sample UTCs
Average Progress 8 measure (2015/16)	Mean	-0.01	-0.72	-0.37
	Valid N	3007	25	9
Average Attainment 8 score per pupil (2015/16)	Mean	50.73	42.05	46.98
	Valid N	3013	25	9
Total N		3020	26	9
KS5 Attainment		All schools	All UTCs	Sample UTCs
Average point score per academic KS5 entry (2015/16) (all academic qualifications, including A levels)	Mean	28.25	17.64	19.48
	Valid N	1955	25	9
Average point score per tech level KS5 entry (2015/16) (vocational qualifications)	Mean	36.72	34.59	36.01
	Valid N	632	22	8
Average point score per applied general KS5 entry (2015/16) (broad general qualifications)	Mean	37.56	31.18	33.95
	Valid N	1462	16	7
Total N		3186	45	9
<p>i) The table above includes data for all through, middle deemed secondary and secondary schools in England of the following types: Academy Converter, Sponsored Academy, Community School, Foundation School, Free School, Studio School, University Technical College, City Technical College, Voluntary Aided School, Voluntary Controlled School. Schools were removed if high statutory ages were below 16. Similarly if schools existed in the sample with low statutory ages above 16, these were removed. This ensured that all schools included were able to have a KS4 cohort.</p> <p>ii) Data refers to all schools open as of the beginning of the 2016/17 summer term (24/04/2017). Where schools were new, and had no data for the 2015/16 academic year, they appear in the 'Total N' statistic but have no 2015/16 data for calculation of averages. The 'Valid N' statistic indicates the number of schools with background data included in calculations. Schools which had converted type since data was released were matched to their predecessor school to reduce the amount of missing data.</p> <p>iii) Attainment figures were downloaded from the DfE Performance Tables. Where 5 or fewer students were entered for exams in a school, these were not included in calculation of averages. If the 2015/16 KS4 or KS5 cohorts had no pupils, these schools had no 2015/16 attainment data.</p> <p>iv) No attainment data exists for one UTC in the sample since it opened at the beginning of the 2015/16 academic year. One UTC (not in sample) was not new, but had no KS4 pupils in 2015/16 so has no attainment data here.</p>				

Table 3 indicates that our sample of ten UTCs are performing better than all UTCs, but not as well as all schools in terms of 2015/16:

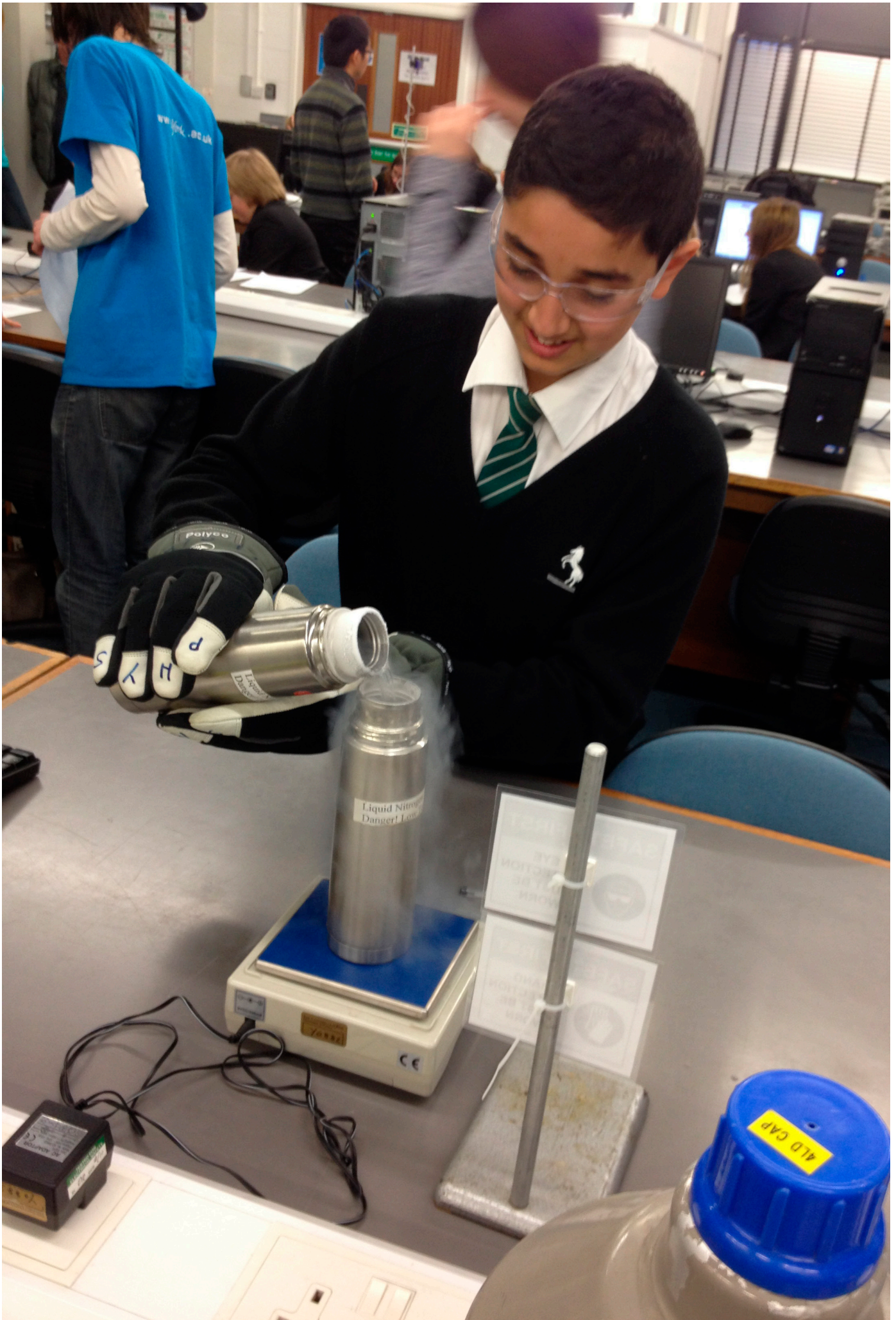
- KS4 Progress 8 measures and Attainment 8 scores
- KS5 academic, tech level and applied general point scores.

For example, in terms of average KS4 Attainment 8 scores per pupil (2015/16), the sample UTCs (46.98) achieved slightly higher mean scores than all UTCs (42.05) but not as high as all schools (50.73). Additionally, in terms of average point score per tech level KS5 entry (2015/16), the sample UTCs (36.01) were performing slightly

better than all UTCs (34.59) but not as well as all schools (36.72).

1.4 Structure of report

After the executive summary and the introductory chapter above, Chapter 2 discusses employers' and other partners' engagement in UTCs; Chapter 3 presents young people's views; and Chapter 4 outlines the perceived impact of studying at a UTC on young people. The challenges facing UTCs are covered in Chapter 5 and what works well in UTCs is described in Chapter 6. Finally, advice for other UTCs and the future priorities for our sample of ten UTCs are outlined in Chapter 7. Chapter 8 concludes the report.



2 Employers', governors' and HEIs' engagement

Key findings

- The findings indicate that employers contribute at different levels to the development of young people's technical and transferable skills in the ten case-study UTCs. *Profound* involvement was associated with co-development and delivery of projects and employers taking ownership. *Moderate* involvement was where employers contributed significantly to projects but with less emphasis on project development and ownership. *Contextual* involvement requires a commitment to provide information about the workplace and activities that help to inform young people about technical and employability knowledge and skills required by industry.
- Employer activities in UTCs include: real-life application of theoretical learning into the practical world of work; informing the curriculum with current industry skills' needs; observation and experience of every day industry activity; genuine, authentic challenges or problems for young people to solve; ongoing, regular input into projects; provision of visits to employers' workplaces; employer talks; resources and facilities; expertise.
- The findings from this study indicate that project-based learning is linked closely with profound employer involvement and that different models exist within UTCs. Exploring these in more depth will be the focus of phase two of this study.
- The role of universities and governors was perceived to be a supportive one that provides direction and focus in order to progress a UTC's strategy to develop young people's technical knowledge and skills in alignment with industry's current needs.

2.1 Levels of employer involvement

Interviewees from across the ten case studies provided many examples of employer engagement in UTC courses. They reported a considerable variety of employer activities and their responses indicated that employers contribute to the development of young people's technical and transferable skills at different levels.

Profound involvement

Interviewees felt that those employers most involved in UTCs had often contributed to the curriculum planning and development process

for a considerable length of time, often from UTC inception. Where there was most profound employer engagement, employer-led projects were recognised to constitute a part of the curriculum on an ongoing basis. The findings indicate that UTC staff and employers co-develop projects using UTC staff's educational and pedagogical expertise, and their knowledge of qualifications' assessment criteria, and employers' knowledge of current technical skills and industry requirements. For example, a governor described how: "Employers are strategically involved in the UTC and the curriculum development" (UTC A). A senior leader from another UTC explained:

“The challenges [projects] are known [by the employer’s name]. The employers take ownership of them. They are delivering their challenge and they want it to be great with the kids. That’s a completely different dynamic to getting employers to come in and do stuff for schools. It is very important to the employers to make them successful. This is profound employer engagement”

(UTC 1)

Profound involvement is characterised by employers as:

- taking ‘ownership’ of a project for example by using their company branding to identify the qualification module or unit
- inputting into formative assessment and feedback to students
- influencing the delivery of curriculum modules/units, for example employers suggest their ideas for live briefs and UTC staff make sure they meet the qualification requirements
- informing teaching and learning with specialist, current, technical skills and knowledge.

For profound engagement to work it requires firstly, mutual understanding of how employers and educators operate, for example the pattern of working days and weeks and daily commitments that determine the frequency with which emails are read. Secondly, it needs mutual respect for, and value of, what each bring to the table such as educators’ detailed understanding of qualifications’ assessment criteria and employers’ awareness of current skills’ needs in the workplace. Lastly, it requires UTC senior leaders to be open to working in new and innovative ways for example being prepared to give employers ownership of projects.

The findings from phase one of this study indicate that there is profound employer involvement present in three UTCs from the sample of ten. Understanding this process in more detail will be the focus of phase two of this study.

Moderate involvement

Where there is moderate employer involvement, projects typically form an important – but not central – part of the qualification achievement. Employers do not have ‘ownership’ of the project and responsibility for driving projects forward to completion is usually more distributed between employers and UTC staff. For example, an employer may brief the young people at the outset of the project and then return at the end for presentations from the young people.

The UTC will usually lead project development and employer input is normally a substantial part of the learning and the achievement of qualification units or modules. One UTC staff member described how: “We put together a model of the curriculum and in doing so we talk to our employer partners” (UTC B).

The findings from phase one of this study indicate that there is moderate employer involvement present in all ten UTCs.

Employer involvement that provides a contextual contribution

This involvement requires a commitment from employers to provide information about the workplace and activities that help to inform young people about technical and transferable knowledge and skills required by industry. For example, one UTC member of staff described how employers provide talks that “tell young people about the jobs in their sector and what knowledge, qualifications and skills are needed” (UTC H). Another explained how “the students did some work in school with school staff and then went to [the employer] to look at their equipment” (UTC A). The research findings from this study indicate that there are contextual contributions from employers in all ten UTCs.

2.2 Types of employer activities

The case-study UTCs indicated that employers were providing a range of activities and experiences, including:

- real-life *application* of theoretical learning into the practical world of work by, for example enabling teachers to relate lessons to the world of work
- informing the curriculum with *current* industry skills' needs
- observation and experience of *every day* industry activity
- *genuine, authentic* challenges or problems for young people to solve
- *ongoing, regular* input such as weekly input throughout the life of a project or at the briefing/set up and final stages of a project
- visits to employers' workplaces; employer talks; resources and facilities such as engineering workshops and media recording studios; sector specialist expertise.

Furthermore, through these activities employers shape transferable skills such as: social skills; communications skills; the ability to listen; problem-solving and creativity; team-working; planning and time-management; and confidence.

2.3 Project-based learning

The Buck Institute for Education (2017) defines project-based learning (PBL) as:

"A teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to an authentic, engaging and complex question, problem, or challenge."

This research discovered that PBL is linked closely with profound employer involvement. Specialist theoretical, practical and applied learning is informed by an employer providing an "authentic, engaging and complex question, problem, or challenge".

One senior leader in a UTC demonstrating profound employer engagement explained what PBL means at their institution:

"Since the beginning [of the UTC], we made it very clear to governors that we were going to take a project-based approach to curriculum delivery. We

approached a range of employers and sold them a concept - the concept was that they would work with [us] on designing and delivering the curriculum. Employers are totally involved. They co-develop, and deliver the employer challenges. Employers 'own' the challenges that are named after them - the company reputation is important. Employer challenges lead to qualifications as they are core elements of the curriculum"

(UTC I)

This research suggests that there are different models of PBL and profound employer engagement, as demonstrated in another UTC. The UTC identified that young people needed a particular qualification in order to work in the profession linked to the UTC specialism. The senior leader described their approach to PBL:

"The UTC delivers all the theory in the PBL sessions and then they go out on placement to [the employer] partner for six weeks and do the work-based assessment. By the time the young people in the UTC have completed this qualification they are 17 and-a-half years old. They don't need to get part-time jobs in a shop or a bar as they can work in the sector and get more experience. The [employers] go on to employ these students so they all value it - that's how we know it works"

(UTC C)

The research findings suggest that PBL is characterised by a strong focus on making students work-ready and gaining the skills that employers need. Students acquire the skills, knowledge and qualifications directly informed by active employer engagement in real-world projects and activities. Understanding the different PBL models in more detail will be the focus of phase two of this study.

2.4 Governors' and HEIs' engagement

2.4.1 Role of governors and HEIs

The role of universities and governors was perceived to be a supportive one

that provides direction and focus on progressing a UTC's strategy to develop young people's technical knowledge and skills in alignment with industry's current needs.

The governing board (GB) has a responsibility to input into the strategic direction of the UTC, and to support and challenge the leadership and ensure that it is financially viable. Beyond that, UTC governors reported that they have a responsibility to develop a strategy to align the development of its young people's technical skills with industry needs and to contribute to the development of a curriculum offer that is informed by industry and offers practical applied learning.

In order for governors to fulfil their responsibility, cohesive governance where the governors and the senior leadership team work successfully together was viewed as necessary. For example, one governor pointed out that the GB requires the full support of the UTC principal and the senior leadership team. Another governor, also an employer partner, summarised the strength of the strategic power of the GB in his UTC: "There is an outstanding, holistic understanding of what is going on within the governing board and that has a very powerful influence over everything that is going on in the school" (UTC F).

Representatives from the sponsoring universities described their UTC involvement to include:

- informing and contributing towards planning the curriculum
- linking employers to the UTC where appropriate
- providing motivational experiences for the UTC students.

One example of motivational experiences was what one university interviewee described as their 'scholar scheme'. The scheme provides university student mentors for UTC students with little understanding of university life. The mentors provide information on university life and provide guidance on subjects and courses. Additionally, universities hold events such as subject taster days;

provision for UTC students to use their specialist facilities; and access for UTC students to the university's massive open online courses (MOOC) such as courses on robotics.

Some of the case-study UTC principals felt visible connection with a university is important, particularly for students with low family participation at university. It also provides academic credibility to UTCs. Additionally, working with a university provides opportunities for mutually beneficial activities. For example, one university representative described how they input and inform the IT and digital curriculum at the UTC and provide continuing professional development (CPD) for the UTC teachers. In exchange, the UTC provide elective placements for the university's PGCE students: "We input what is in the University curriculum so it can inform the pipeline leading into university, that is the content of the curriculum. In exchange the UTC provides elective placements, so they take University PGCE students. The University also provides training for UTC teachers" (UTC F).

2.4.2 Governors' and HEIs' views on employer engagement in UTCs

Governors and university representatives recognised the challenge that UTCs face in not just engaging employers but, more fundamentally, in developing partnerships where employers: take ownership of projects; fully appreciate that there are benefits for them in terms of their talent pipeline; and achieve profound influence on young people's education and preparation for the world of work.

Governors and universities conveyed an understanding of the complexity of achieving this gold standard and described the incremental journey that UTCs are travelling. For example, one governor said: "Our UTC is very proactive in engaging employers - we're now thinking more strategically to get employers to run projects" (UTC A). Another explained: "The priority now is to get employers involved who can provide more projects and curriculum leadership" (UTC H).

3 Young people's views

Key findings

- Most young people enrolled at their UTC because they were interested in the specialism that the UTC was offering. Additionally, many liked the opportunity to gain more experience of the world of work.
- The majority of UTC students were generally positive about education, school life, their home life and life in general. A minority expressed concern about reaching their full potential and other people doing things 'better than I do'. Just under a third said they felt anxious or stressed most of the time.
- The majority of students felt positive about the future, recognised that qualifications are important and that their UTC is providing them with the skills they need for the future.
- Generally, young people appreciated that it is important to link their academic and theoretical learning to the world of work and that the application of what they learn in the classroom to the practical use of their technical skills is very important to their progress and to their future employment. They observed that many of the teachers in UTCs have direct experience of the industry sectors and believed that this enhances their teaching.
- More careers education and guidance might be appreciated as approximately one in five young people disagreed or strongly disagreed with the statements 'adults in my school help me to plan for my future' (20%) and 'I know where to get careers advice' (24%).

3.1 Reasons for enrolling

We asked young people why they enrolled at the UTC. Reasons included:

- They were interested in the specialism that the UTC offered. This was the most frequently cited purpose for joining the UTC.
- Linked to the genuine interest in the specialism, some students said that attending their UTC offered the opportunity to gain more experience of the world of work. For example, one Year 12 student viewed the UTC environment as more like the "real working world". He explained: "We have an employment-focussed curriculum in a work-related environment" (UTC E). Similarly another Year 10 student felt that the UTC offered links to the world of work through the experience and links teachers have with the specialist industry: "The teachers are from industry. They know what they are talking about" (UTC I).
- Some students in Year 10 and Year 12 said they were either not happy in their old school or they (and /or their parents) were not satisfied with the standard of teaching in their old school.
- Several students said that they were recommended to apply to the UTC. In some cases this was linked to their interest and/or talent in a subject area and the recommendation came from either a teacher, family member or friend. In a few cases students indicated that they were encouraged to apply for less positive reasons, for example one student said: "They [his previous school] wanted me to move" (UTC G).

Staff in two UTCs pointed out that they believed that as their reputation was becoming more established young people were enrolling for more positive reasons such as those cited above.

3.2 Attitudes towards education, home life and the future

Young people who completed the survey were generally positive about education and school life (see Chapter 4 for more detail on the perceived impact of attending a UTC on young people). For example, the majority either agreed or strongly agreed with the following statements:

- Most of the time I like being at school/college (62%).
- I am doing well at school/college (64%).
- My teachers tell me where I need to improve (66%).
- It is important to do my homework/coursework (86%).

It is worth noting that although nearly half (45%) of the Year 10 and Year 12 students surveyed agreed that 'I think

that I am reaching my full potential at school/college', one third (32%) were not sure and a further 22% disagreed or strongly disagreed.

In terms of attitudes to homelife and life in general most young people were positive. For example, the majority either agreed or strongly agreed with the following statements:

- I get on well with my family (82%).
- Most of the time I enjoy my life (73%).
- Most of the time I feel happy (65%).
- Most of the time my family are supportive (84%).

However, in line with the Prince's Trust Youth Index 2017 that reports low levels of wellbeing amongst young people, over a quarter expressed concerns with aspects of their life by agreeing or strongly agreeing with the following statements:

- Other people always do things better than I do (28%).
- Most of the time I feel stressed or anxious (30%).



The majority of students recognised the importance of qualifications (86% agreed or strongly agreed with the statement 'it is important to get qualifications to get on in life' and 75% agreed or strongly agreed that their school is 'giving me the skills I need for my future'). Furthermore, the majority of students indicated that they were positive about the future by agreeing or strongly agreeing with the following statements:

- I feel positive about my future (70%)
- I know what sort of job I want (67%)
- I'll be able to get the sort of job I want (57%).

Most students indicated that they know what they want to do when they reach 18 years old. For example, around one quarter (27%) want to stay in full-time education and about a third (34%) want to do work-based learning such as an apprenticeship. However, more careers education and guidance might be appreciated as approximately one in five disagreed or strongly disagreed with the statements 'adults in my school help me to plan for my future' (20%) and 'I know where to get careers advice' (24%).

3.3 Attitudes towards employer input

Generally, young people indicated that they felt it was important to link their academic and theoretical learning to the world of work. They appreciated that the application of what they learn in the classroom to the practical use of their technical skills is very important to their progress and to their future employment. They observed that many of the teachers in UTCs have direct experience of the industry sectors and they believed that this enhances their teaching.

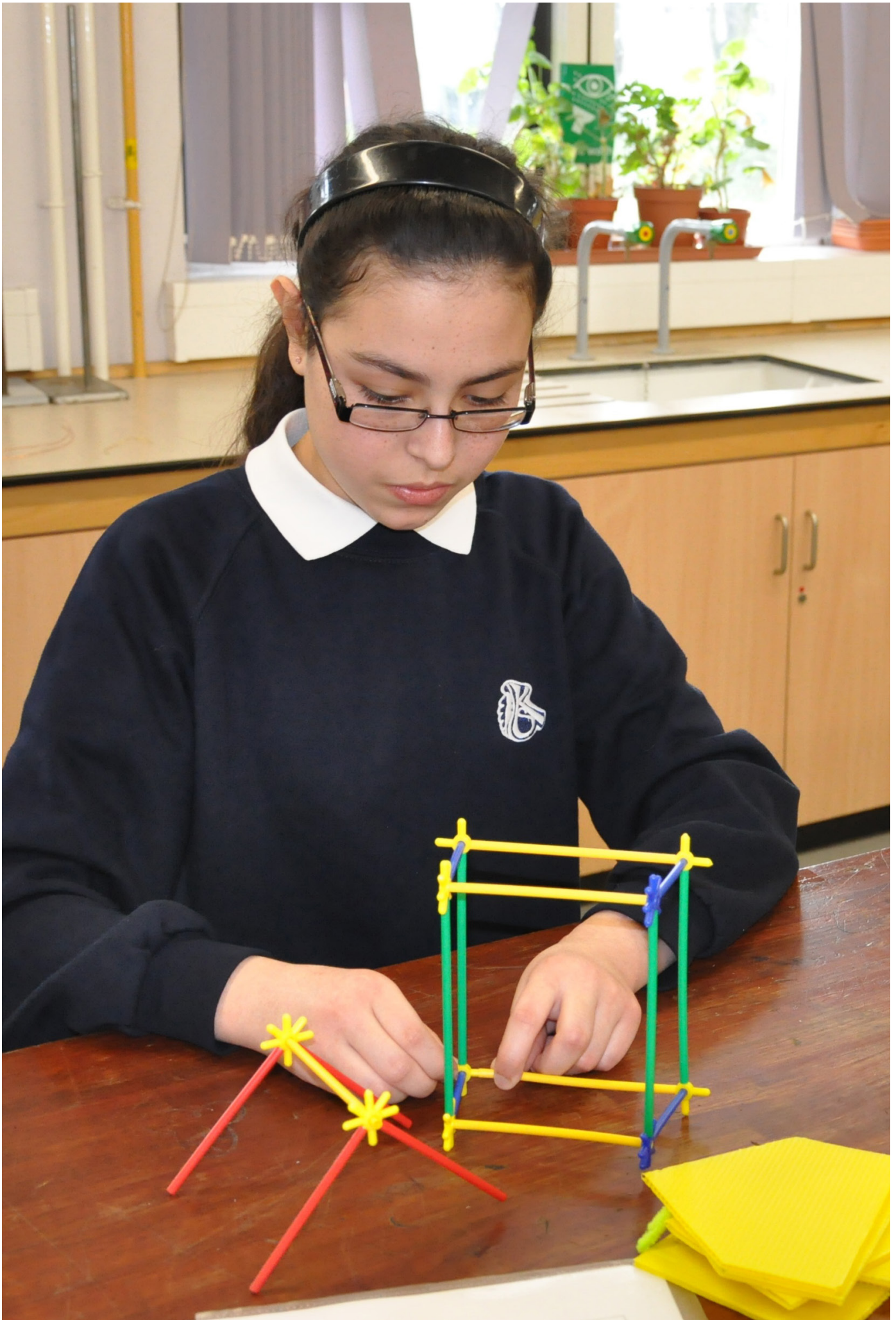
Year 10 students valued employer input but clearly had less experience of interaction with employers than their Year 12 counterparts. They appreciated staff explaining the relevance of their learning to the world of work. For example, one Year 10 student explained: "The school tries to link business and engineering back to everything that we learn" (UTC I). They also understood the importance of links to future employment, as one student indicated: "Here they tell you how what you are learning can help you find a job" (UTC A). Another student emphasised: "It's important to get a job as well as being good at engineering subjects" (UTC I).

There was more awareness of employer input and more direct accounts and insights of experiences that prepare young people for the world of work from Year 12 students. For example, one student explained how he felt the UTC was providing him with an advantage (over students from other schools):

"Coming here is giving me a head start. Everything they do here is to do with real life and it's preparing me for the reality of the world of work. If you do a BTEC Level 3 extended Diploma the health and safety unit is the health and safety qualification that the employer would need to pay for you to do before you could start work, so you are going in one step ahead"

(UTC C)

Although most of the young people appreciated the enriched connections with employers, and a considerable number pointed out that they were benefiting more than in their previous schools, some felt their experiences were limited and wanted even more exposure to the world of work.



4 Perceived impact on young people

Key findings

This study indicates that attending a UTC is perceived to have a range of positive outcomes for students. Across the ten case studies perceived benefits for young people included:

- Improved academic learning and enhanced technical skills, particularly in the area(s) of specialism adopted by each institution.
- Increased transferable skills (including employability skills such as communication, teamwork and problem solving skills) and readiness for the world of work.
- Transformed personal attitudes and attributes, including increased engagement with education and learning and a motivation to succeed.
- Greater awareness and confidence about post-UTC pathways and an increased likelihood of securing and maintaining chosen post-UTC destinations.

Exploring these impacts in more depth will be the focus of phase two of this study.

4.1 Impact on academic learning and technical skills

The case-study UTCs acknowledged that they face some challenges in delivering high academic outcomes as a result of their relatively recent establishment and the diverse characteristics of their student intake. Despite this, they reported that many students make significant progress – often performing better than expected on arrival. Interviewees related this to a range of factors including: smaller learning environments; higher teacher-to-student ratios; high-quality teaching (particularly in technical subjects); input from industry experts; longer school days that allow for increased teaching time; effective pastoral support; and the opportunity to follow unique curriculum pathways that are better suited to students' needs and interests. Across all ten UTCs, academic successes were perceived to be predominately in the area(s) of specialism adopted by each institution, including science,

engineering, and digital and creative industries.

UTC staff, employers and HEIs reported that one of the main impacts for students as a result of attending a UTC is the acquisition of enhanced technical skills and abilities. Central to this is the delivery of relevant and appropriate curricula and PBL opportunities, which are typically informed by a range of industry partners (see Chapter 2 for details of employer engagement). The development of students' practical skills was associated with the well-equipped 21st century learning environments that UTCs provide, as well as opportunities to learn in other spaces and places, including for example, onsite with employers and in university laboratories. The mastery of students' sophisticated technical skills is often underpinned by opportunities to use industry standard technical equipment and materials as part of their everyday learning. Employers and HEIs acknowledged that in their experience, it is these technical skills

in particular that set UTC students apart from their contemporaries. One employer explained:

"The outcomes have been quite amazing because employers seem to recognise this additional very specific technically biased additional curriculum on top of the core curriculum gives [UTC students] skill sets which they can't find in normal schools and colleges. And it gives them a head start. And the outcomes are for the students themselves very positive, and for the employers it's a win-win because they get employees that don't have typical deficits which so many of us [employers] complain about when we finally get students to come into our organisations from other environments. [UTC students] are well-rounded, they are confident, they are used to employer contact, they can hit the ground running far quicker than typical young people"

(UTC C)

Furthermore, in our survey of students from the ten case-study UTCs, students recognised the enhanced opportunities for 'hands-on' learning and improved confidence in using technical equipment as a key benefit of attending a UTC. As **Figure 4.1** shows, 67% agreed that attending a UTC had increased their practical experience.

4.2 Impact on transferable 'work ready' skills

UTC staff and their key partners felt that young people are typically better prepared for the world of work as a result of attending a UTC than other students their age. For example one university interviewee commented: "I think that the skills the pupils learn will help them in a science-focussed career. They [UTC students] are better prepared than the average student by far" (UTC C).

This finding is also reflected in the results of the student survey, which showed that 66% of young people felt that attending a UTC had helped them develop their transferable employability skills.

The development of these skills was reported to relate to the ethos of the

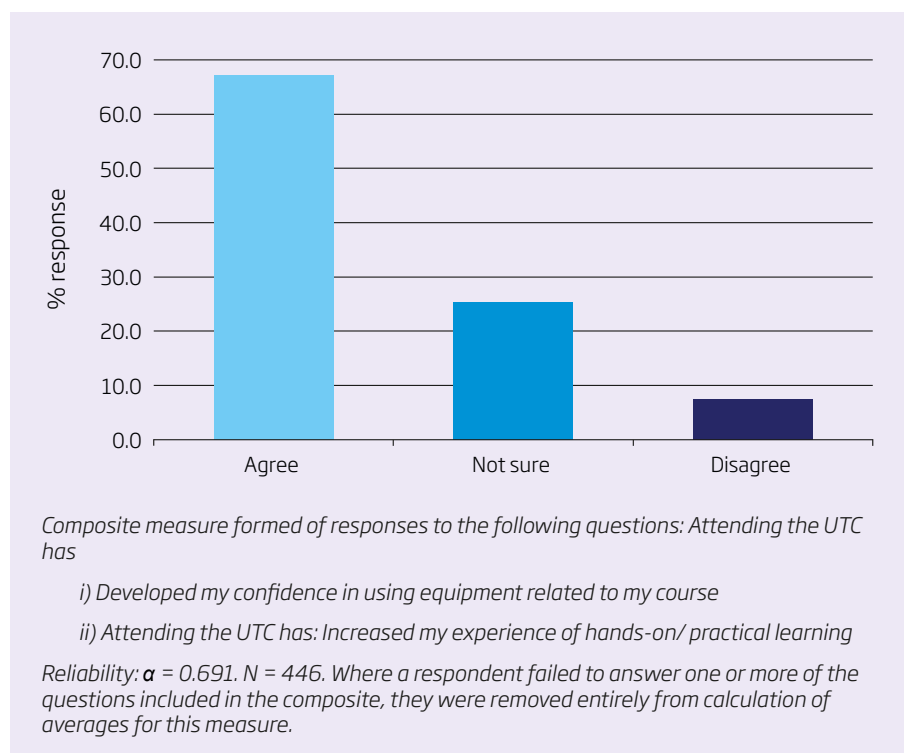
UTC, the extent to which transferable skills are embedded across the curriculum and the opportunities students have to engage in regular and sustained contacts with a range of employers (such as via PBL activities, enhanced/extended work experience, talent pools, showcase events, employer talks). Interviewees reported, for example, that UTC students typically experience a culture of independent learning where they are encouraged and given the freedom to both undertake self-study and work in teams - replicating how employees operate in the workplace rather than students in traditional education settings. As a result, students were perceived to have enhanced problem-solving, critical-thinking and decision-making skills. Describing the benefits for students, one principal said:

"One of the reasons the students were given apprenticeships with [one organisation] was because they understood the maths and physics but also because they could do the practical problem-solving tasks when students from other schools struggled"

(UTC J)

UTC students were also said to have gained effective time management capabilities, such as working to deadlines and performing under pressure, and were described as competent in both team leader and team member roles. Employers in particular perceived UTC students to have enhanced communication and interpersonal skills, including: the ability to: 'look people in the eye'; hold two-way conversations and ask relevant and appropriate questions; deliver effective pitches and presentations; and perform well in interviews. Further positive impacts for students attending UTCs were reported to include the development of independent travel skills (as a result of using public transport to get to and from the UTC, partner university campuses and employers' premises) and increased awareness and understanding of appropriate business attire and workplace conduct. In some cases, employers noted that they place greater value on students' highly developed transferable skills than their

Figure 4.1 Extent to which students agree that attending a university technical college increased practical experience



academic outcomes. For example, one employer partner noted:

"A lot of people in industry are taking students with lower academic grades - 'Ds' instead of 'Cs' if they are the right person... diligent and conscientious. We can teach them maths and physics and welding - what we can't teach them is the personal skills"

(UTC I)

4.3 Impact on other attitudes and attributes

Across the ten case studies, staff, students and key partners described a range of impacts on young people's attitudes and attributes, particularly their levels of confidence, motivation and engagement. One employer enthused: "UTC students came across as less like school children and more like young professionals. And clearly they had more confidence working with adult engineers..... [they] are

not treated like children, so when they go into the workplace they are already 90% of the way there [ready for work]" (UTC F). A university interviewee commented: "Feedback from employers this year is good- six out of 12 apprentices taken on by [an organisation] are from a UTC. This suggests the UTC is doing something right. My understanding is that the young people have a good attitude, aptitude and skills" (UTC B).

Our survey of students, for example, showed that around three-fifths of young people felt that attending a UTC helped them to: participate more in lessons (60%); feel more confident about what they can achieve at school (60%) and feel more positive about learning (59%).

Interviews with UTC staff highlighted that for some young people, joining a UTC at the age of 14 is an opportunity for a 'fresh start'. Those who had poor educational experience in previous schools can 'reinvent' themselves and

be successful. By electing to attend a UTC, students have made a conscious decision to change schools and are often very focussed on what they want to do and achieve. They are brought together with students who have similar academic interests and career ambitions, which motivates them to do well. According to one assistant principal: "They are among likeminded individuals and that breeds a certain degree of success" (UTC B).

Findings from this part of the study indicated that positive relationships with teachers, based on mutual respect, leads to increased student engagement. This is particularly the case where students believed that school staff treat them as adults, professionals or employees. Teachers have high standards and expectations of students, which motivates them to achieve. Students are inspired by 'credible' teachers who have previously worked in industry and their ability to contextualise learning by providing examples of how subject knowledge can be applied in a real-world setting. Similarly, access to a range of relevant industry and employer representatives helps to build student confidence and keeps students engaged in learning if these opportunities are sustained throughout their time at a UTC. Potential opportunities for employer sponsorship for further study or offers of future employment/apprenticeship also results in increased determination to do well.

Students felt stimulated by studying a technical curriculum that interests them and by a desire to gain qualifications in relevant subjects that will support their future career choices. For example, one student enthused: "I'm more motivated now. I was lazy before, I love the subjects I am doing now" (UTC G). Students appeared to be driven by opportunities to participate in activities that develop their employability skills and make them 'work ready' and they acknowledged that these opportunities are unique and are likely to make them stand out in university, apprenticeship and job applications.

4.4 Impacts on future destinations and pathways

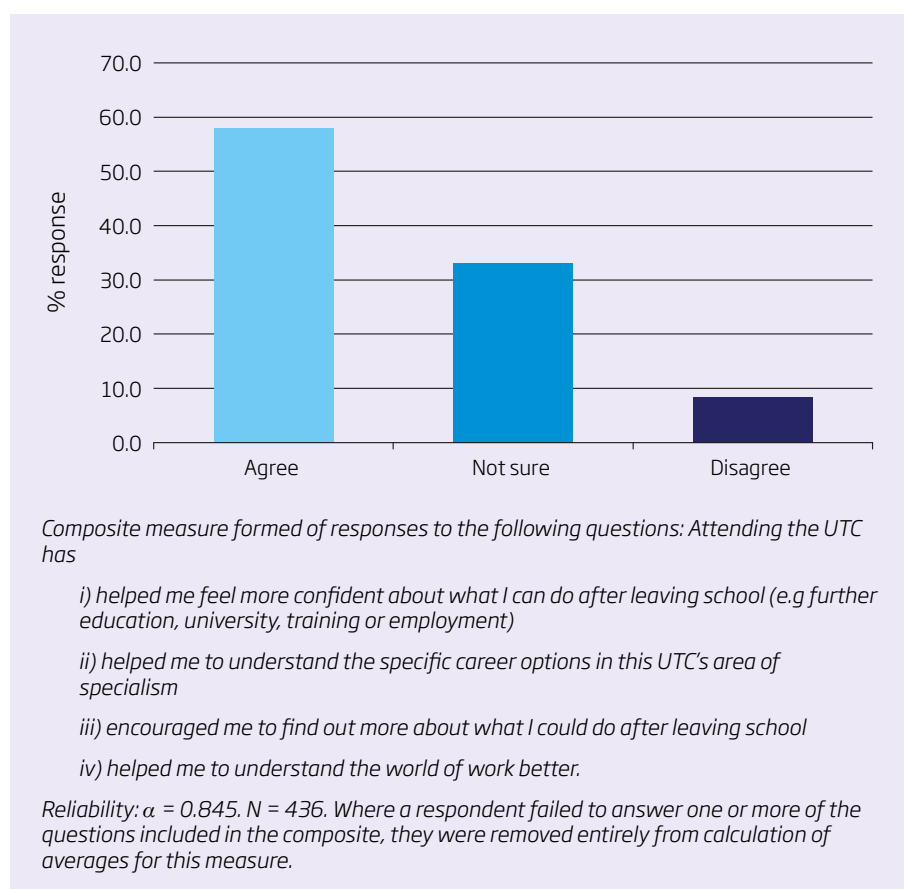
Our survey of students from the case-study UTCs showed that over half have improved awareness and confidence about what they can do at the end of statutory education as a result of attending a UTC (see Figure 4.2.) This includes a better understanding of the world of work (65%) and of specific career options in the UTC's area(s) of specialism (63%). Furthermore, 60% of students said that attending the UTC helped them to feel confident about what they can do after leaving school (e.g. further education, university, training or employment).

Interviews with staff, students and key partners identified a range of mechanisms through which UTCs support young people's knowledge, understanding and aspirations for post-UTC education, training and employment. Some students joined a UTC with a desire to pursue a career in a certain sector and teachers (particularly those who have worked in industry previously) were reported to inform and guide students' career choices so that they can be successful. Employers were also said to give students greater insights into particular technical/industrial areas and provide opportunities for work experience in real world settings. Students can be inspired by key individuals in the workplace and by observing particular job roles. They gain a better understanding about what qualifications, skills and experience are required to secure a particular job. Their experiences help them to decide on their preferred pathways and formulate plans for further study/training so that they can achieve their goals. According to one staff member:

"Everything [we do for students] is focused on either getting a job, apprenticeship or doing a degree. Students know what they want to do at the end of Year 11 or 13, and know what they need to get there unlike students in schools who have less understanding of employability [routes]"

(UTC D)

Figure 4.2 Extent to which students agree that attending a university technical college has improved awareness and confidence about what they can do after leaving school



Staff and key partners across the case-study UTCs said that, even though it was still relatively 'early days' given their recent establishment, there are emerging findings of students securing positive post-UTC destinations. UTC students are said to be better equipped to successfully apply for and obtain further education/training places and positions of employment due to the unique skills and learning experiences that they acquire during their time at a UTC. Students are able to draw on a range of practical experiences rather than just academic examples and as a result have enhanced CVs and are more likely to stand out to employers and universities. Extended work placement opportunities and other contacts and connections with employers can also lead to direct offers of higher and degree apprenticeships, further education sponsorship and future employment. One senior leader noted:

"The employer partners have invested time in them, they know they work well in their teams, they know they are good kids. This means that these students get work they wouldn't have usually"

(UTC C)

It was also suggested that UTC students make easier and more successful transitions to further education, training and employment as they are better equipped to succeed and are more likely to remain in post-19 destinations as a result.



5 Challenges

Key findings

The main challenges experienced by the case-study UTCs were:

- Engaging a suitable range of employers and managing relationships with them to achieve sustainable high-quality inputs that add real educational value.
- Recruiting enough students with the interest and capability to study at the UTC who can derive maximum benefit from its core educational offer.
- Recruiting and retaining high-calibre staff with appropriate knowledge and skills that they are committed to updating and upgrading on a regular basis.
- Responding to external curriculum changes and making project-based learning fit productively with updated course content and qualifications.
- Working within an accountability framework whose measures are not wholly appropriate for the type of education and outcomes that UTCs provide.
- Operating with a funding model that makes it difficult to function in a financially-viable way without affecting adversely the education provided.

5.1 Engaging and maintaining quality employer input

The evaluation identified several challenges to engaging and maintaining quality employer input to UTCs' educational provision. Interviewees said that while these challenges were not insurmountable, addressing them took continuing time and effort. Trying to connect the different cultures of industry and education, which can lead to a lack of a common understanding between employers and schools about what engagement entails, was identified as an overarching challenge. One UTC senior leader advocated taking a positive proactive approach to engaging employers, saying that when he meets a company manager he asks "what can we do for you?" The challenge he articulated was negotiating a partnership approach that offered employers something in return and did not over-burden them:

"Employer input is an expensive thing for companies to do. They do understand the need, but having staff off-site eats into profits. UTCs need to keep showing employers what we are giving them - time invested now will give them a more skilled and enthusiastic employee - students will remember and want to work with these people"

(UTC D)

This approach had helped the UTC to recruit employers and engage them in the planning and delivery of PBL.

The other challenges identified by the research were the result of both external and/or internal factors. The local industrial structure and availability of employers with the capacity and commitment to offer UTCs a value-added contribution was an important external factor. For example, where UTCs were located in a local economy with an industrial profile of predominantly small and medium-sized

employers (SMEs), there were fewer large employers that had the capacity to work with a UTC. This was highlighted by one senior leader who remarked that the challenge facing his UTC was: "Finding enough employers with capacity to get involved. The media industry is a 'cottage industry' so [there are] no larger employers" (UTC G). Where UTCs had engaged SMEs, some noted that it can be difficult to get them to offer sustained support over time rather than undertake one-off visits, owing to their limited capacity.

Another external factor was the belief that the curriculum and qualifications on offer to UTCs do not meet industry's needs, as noted by one UTC senior leader: "Products from awarding bodies don't align with the needs of employers" (UTC F). Some of the UTC senior leaders and employers we interviewed considered that the external education environment was steering UTCs to deliver a more academic curriculum 'to the detriment of skills development'. This made the employer engagement process more challenging.

UTC senior leaders pointed out that some employers' interests, which sometimes only involved achieving narrow Corporate Social Responsibility targets or recruiting future employees, were barriers to gaining quality employer involvement. This comment from a UTC senior leader encapsulates the issue: "Some employers just want to tick a box to say they have worked with the UTC and don't fully commit or engage" (UTC A).

Internal challenges were related to capacity within UTCs. Some of the senior leaders explained that their UTCs did not have enough adequately experienced staff with the skills to recruit employers or did not have staff with enough time to focus effectively on engaging employers. The challenge was illustrated by one UTC senior leader who said that there was:

"A need to change the culture. If you want teachers to be good at employer engagement, give them a day a week to do it. [It] doesn't happen ... [there is] no wish and desire to get teachers

to stop teaching. The UTC idea was that teachers would want to do the engagement ... but they haven't got time to do it"

(UTC E)

A member of staff in another UTC reported that employer engagement had become more coordinated since the UTC had part-funded with employer partners a dedicated role for this function. She explained the benefit of this role in addressing the previous deficit:

"There was no sort of real coordination and it then becomes very difficult... for employers as well in terms of contacting the school, and different people lead on different aspects, and it just became a bit tricky to maintain the key contacts ... what I've done is pick up all of the loose ends ... this year has been an accumulation of trying to find out what's been done before but also [making] loads of new contacts and getting people in to do lots of different things"

(UTC J)

Building and nurturing working relationships with employers were identified as key to achieving effective employer engagement. In some cases this meant working with employers to ensure that projects were pitched at the right level for students and in others encouraging employers to be more proactive about what they had to offer. A senior leader noted the tension involved in balancing what employers have to offer and planning the UTC's educational provision:

"I guess there's a strength and a challenge between employers coming to us and saying 'would your students like to do this for us?' If too much sits outside the curriculum it puts pressure on them [teachers] to fulfil their academic curriculum and to deliver the work experience. But equally, it's those extra experiences that are getting them employment or further education after they leave the UTC"

(UTC E)

A UTC senior leader observed that: "Managing employers can be difficult.

The [UTC] knows what works best but employers don't always see that and the [UTC] needs to keep employers engaged. Each of the team leaders in engineering and business have employer liaison and engagement projects that they are responsible for developing and managing" (UTC I). A governor noted that in the experience of his UTC: "Having a broad mix of employers also helps to ease tensions between industry and teachers" (UTC F). The challenge of maintaining working relationships with employers was sometimes exacerbated by UTC staff turnover or employers' personnel changes that interrupted continuity of engagement.

Another internal challenge involved identifying ways to use employers' input to best effect. This was articulated by one interviewee as: "It's finding that activity for them to do and planning it professionally enough so that it actually delivers a tangible result for the students" (UTC F). Another interviewee said that it was challenging; "Making sure that the employers offer consistently high and good quality experiences for the young people" (UTC G). The timetabling implications of providing work experience could also be a challenge as one senior leader explained:

"The employers offer work placements at varying times and this has required a change of mindset among staff. They don't just take place during the same two weeks in May every year. They happen as and when the employers need and can take students. This has an implication for timetabling. Teachers have to be willing to release students with very little notice for several weeks. Unlike in mainstream schools where academic outcomes are driving the teachers, in the UTC it is the destinations of students and therefore there is a better understanding among school staff of the need for the placement and they work to support that"

(UTC A)

A UTC governor pointed out that the movement of staff between industry and education was not without difficulty owing to the expectations of different cultures:

"The transition between industry and education is much bigger than people realise. We train teachers. Better to have younger ones as they are more open to new ways of working. We have a great group of teachers now. [There is] always tension there though and I think most UTCs will struggle with that"

(UTC F)

Providing appropriate CPD opportunities to ensure that UTC staff keep up to date with industrial developments and standards was a challenge in some cases. Interviewees considered it important that they brought real-life workplace scenarios and examples into their teaching. A UTC senior leader pointed out that the skills demands from industry are changing, and in particular:

"The demand for teaching certain skills is quickly changing from mechanical engineering to digital skills-based capabilities. The governing board needs to look at ways in which the staff can get exposed to digital capabilities so that they can keep up and make sure their knowledge and skills can help students. Industry has a role in helping the teaching staff as well as the students in this respect. However, this has a cost in terms of equipment and the UTC isn't able to upgrade due to financial constraints"

(UTC I)

5.2 Recruitment and retention of students and staff

The findings revealed that UTCs' recruitment of students was a challenge. Senior leaders and governors observed that UTCs are seen as competitors by local schools which view UTCs as posing a financial threat to them by taking away students. Whilst acknowledging the financial issue, UTC interviewees suggested the need for dialogue with local schools to get them to see the benefit of the UTC curriculum for some students, as this senior leader asserted: "What we should be doing is the right thing for the kids, not being territorial about student numbers for our own institution. It's getting the right balance" (UTC D).

The UTC staff we interviewed noted that institutional reputation is influential in the recruitment of students. They explained that it takes time to build reputation and an evidence-base of success that help to inform decision-making by students and their parents/carers. Staff at the UTCs we visited said that they were making progress in reputation building, but still had some way to go to ensure their institution was considered to be a viable and attractive local educational choice. A governor reported that his UTC was starting to make progress: "As our reputation has grown, we are now gaining the right students, those with a genuine interest in the specialisms" (UTC F).

A UTC senior leader referred to the mixed-intake challenge, explaining that: "Some students join for the engineering focus but a percentage join us because it has not worked out elsewhere, students come here because their schools have told them it's a good idea for them to come here" (UTC I). The challenge was experienced in another UTC in this way: "We're not swimming in learning support. We have a disproportionate number of young people who do not see the point of mainstream education and suffer from anxiety and depression. They come here for the work-based model of education but bring with them challenges" (UTC G). A governor explained that where his UTC is situated meant that it recruited students from quite deprived backgrounds, commenting that: "Some local schools had tried to farm out pupils with behavioural problems to the UTC" (UTC A). He added that the UTC was working hard on its recruitment marketing and attempting to attract high-calibre engineering students directly rather than through local schools.

Recruiting enough students was mentioned by several interviewees who noted the competition between local schools and in some cases travel logistics. One UTC governor explained the local context, saying:

"We're still very challenged on numbers. And then it becomes difficult. I mean some kids who want to be there, are

travelling huge distances to come because they really want to be there. They're doing an hour's commute each way every day which is horrendous for them. And expensive"

(UTC H)

The cost of transporting students to study was mentioned by staff in another UTC which shared the cost with parents. As the UTC was not classed as a local school the local authority had no obligation to provide free transport.

Interviewees also pointed out that transition at 14 was a student recruitment challenge because moving schools at this age is not the norm. A governor remarked that:

"There's also quite an issue I think about taking them at 14 because kids probably moved at 11, 12 from their first school to their second school. A lot of them don't want to move again and have to make new friends ... So keeping the numbers up and getting that broad group of kids and not just the challenging children, I think it's quite hard"

(UTC H)

Another UTC governor echoed this point: "I think the main challenge is recruitment of pupils ... because for Year 10s it means coming out of your school. Year 12 is not so bad but for the Year 10s it is difficult. And also made more so because some schools are now starting GCSEs at Year 9" (UTC J).

The research discovered that some of the UTCs had experienced challenges in recruiting and retaining staff. Senior leaders emphasised that it was important for UTCs to appoint the right teachers, as this interviewee observed: "Staff have to want to be involved in something different and special" which was also endorsed by a UTC governor who said: "This is all about a vision for a different sort of education" (UTC I). Senior leaders pointed out that there was a general issue in England in teacher recruitment, especially in STEM-related subjects that are relevant to UTCs. They also explained that there were specific recruitment challenges in the UTC context. These included employment terms and conditions that could be seen as less attractive than

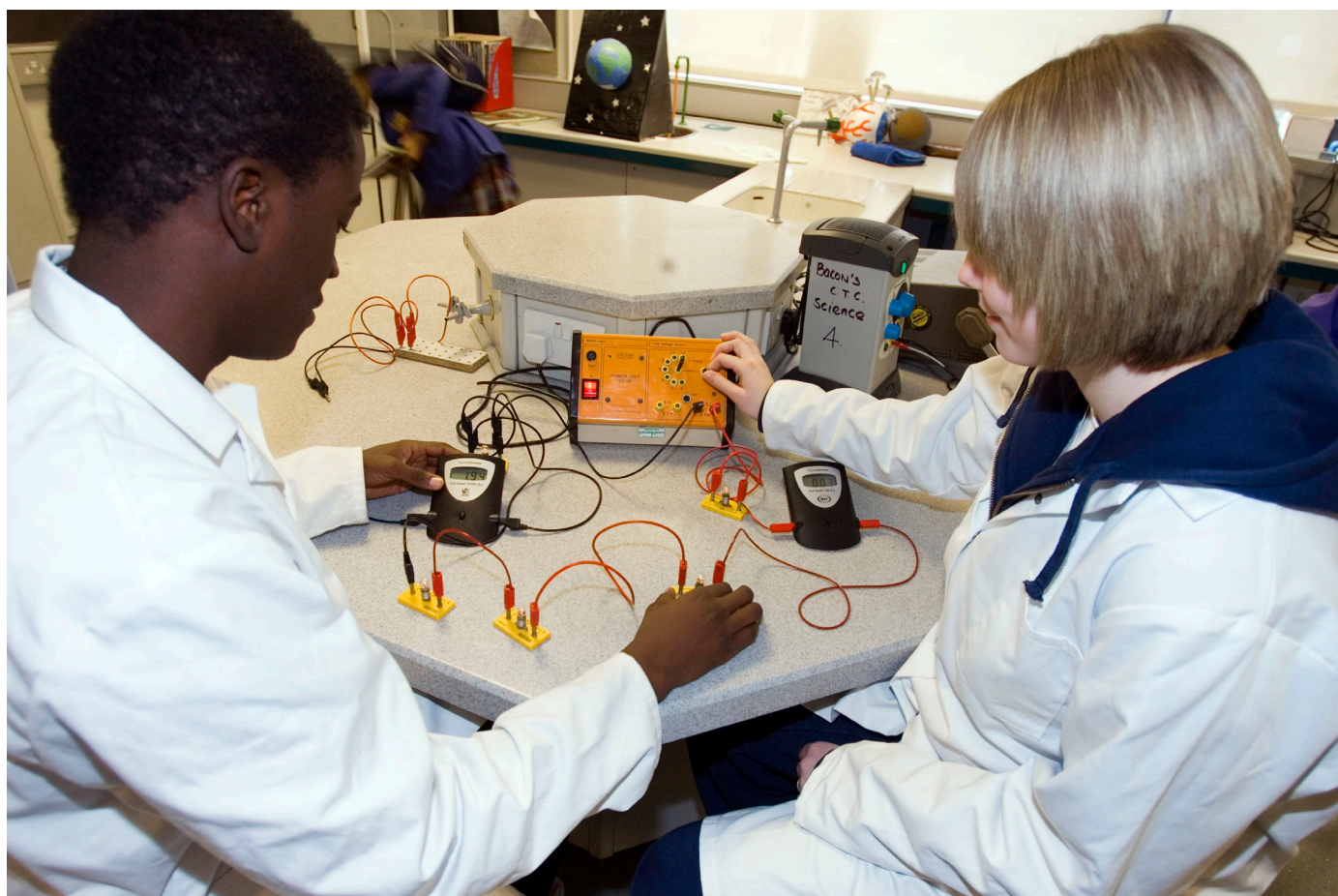
those offered by other schools and colleges: longer working hours, more teaching hours per week, less support and more cover responsibilities owing to flatter management structures. Some of the case-study UTCs had experienced challenges in retaining staff though it wasn't clear whether this was a specific UTC-related issue or more generally part of the career mobility in the teaching profession.

5.3 Other challenges

Curriculum changes such as the new GCSEs were a challenge identified by some UTC staff. They said that UTCs had had to modify the curriculum, including employer input, to accommodate the changes. One UTC senior leader said that the change from diplomas was a challenge and pointed out that the introduction of T-levels would bring further change. He added that: "For PBL, which takes a lot of time to pull together, these changes are horrendous. Makes it very difficult" (UTC I). Another challenge

was the mapping of PBL activities to the curriculum in a meaningful way that involved making these activities an integral part of the curriculum rather than a 'nice to have' addition or enrichment activity.

UTC staff considered that the accountability framework they have to work within was a challenge as one senior leader commented: "It's very prescriptive in terms of which qualifications count and how schools are judged. PBL we want to do doesn't always get accredited in the way we want it to ... Progress 8 doesn't always work for us ... PBL done properly doesn't always deliver a qualification that counts for the school. The Department for Education needs to come up with a different accountability framework for us because we are different" (UTC D). A governor identified a core accountability tension as: "The strain between Ofsted and industry priorities", adding that: "we are often pulled back to academic priorities" (UTC D). In another UTC staff explained that Progress 8 was



unsuitable because their students only do seven subjects “so dividing that by eight, we’re stuffed on that measure” (UTC I). Another view was that Progress 8 does not reflect accurately the skills and qualities that UTCs deliver and employers want. A senior leader also pointed out that UTCs were being held to account to achieve results within an unfair timescale: “Most students join at Key Stage 4 and most haven’t had a fantastic time at Key Stage 3, so we’re being measured on a five-year measure but they have only been with us for 20 months by the end” (UTC G).

Funding was identified as a major challenge. This included the delivery of the UTC curriculum that had associated costs such as more teaching hours, the purchase of specialist equipment and resources, and transport for work placements and workplace visits. A UTC senior leader summarised the challenges as: “Finances, making ends meet. Almost diseconomies of scale as we’re working at under-capacity in terms of student numbers and with green but keen staff. Additionally, technology is expensive” (UTC G). A governor expressed the challenge as:

“Finance, finance, finance. The UTC model doesn’t work. [We] can’t do a longer day with an expensive curriculum on the same amount of

money as a typical school. Increasing the number of students is all we can do. We’ve lowered the costs as much as possible, we are as lean as we can be, taken out layers of management, no cover teachers, very lean operation. Sponsor is having to subsidise”

(UTC G)

A senior leader outlined the funding dilemma: “We get funded the same way as any other secondary school: money per student. But we teach 35 hours a week, 10 extra hours for every student. We have to pay those teachers. Very difficult” (UTC D). A governor in another UTC said that budget pressures were not unique to UTCs, explaining that the vast majority of costs are staffing costs and: “These can’t be compromised because of the need to employ good-quality teachers. The UTC is very financially constrained. The governing board is struggling to see how they can make cost savings without having an impact on the quality of learning outcomes” (UTC A).

In Chapters 6 and 7 we outline what UTC staff, governors and sponsoring universities believe is working well within their UTCs and summarise what advice they would give to other UTCs. These relate to ways to overcome some of the challenges outlined above.



6 What works well

Key findings

The findings from the case studies indicates that when UTCs are working at their best they are successful at:

- Providing real-world application of theoretical concepts.
- Working with employers to realise a common vision.
- Having dedicated time for staff to work with employers.
- Providing students with genuine and meaningful contacts and experience with employers.
- Preparing students for employment.
- Developing clear and appropriate pathways for students to follow that are attractive, engaging, and aspirational.
- Securing positive destinations for their students.

6.1 Learning relevance

The case studies indicated that UTCs are successful in providing appropriate contexts in which students can learn effectively. The research has discovered that where they work well, UTCs provide innovative and creative approaches to the curriculum content and delivery. This includes adopting a context-driven approach and providing opportunities for 'hands-on learning' where students can understand real-world application of theoretical concepts rather than focusing on abstract academic work. This approach is successful where UTCs have diversity in staff experience and backgrounds; this includes having a mix of industry and academic staff to provide students different perspectives and insights.

Young people can see their routes to employment and understand the relevance of their learning to the world of work. UTC staff indicated that students' destinations are at the heart of UTC activities. For example, one senior leader explained: "Organisations like ours transform their lives – turn them around, give them a purpose, structure, vision of where they can see their future life going" (UTC I).

6.2 Employer input

The research discovered that generally

good progress has been made in the recruitment of key industry partners despite the challenges outlined in Chapter 5. Indeed a few of the case-study UTCs reported that employer partners are now approaching some UTCs to be involved.

A key to success is maintaining the original vision and aims of the UTC where employers make a significant contribution to learning activities and where there is a shared understanding of the relationship between UTCs and employers. For example, one governor explained: "Students understand that [employer projects] are embedded in the identity of the curriculum. They're not a bolt-on" (UTC I).

Additionally, the research indicated that the person/people responsible for liaising with employers held different roles, such as departmental heads or non-teaching business relations managers, within the case-study UTCs. They were clearly skilled at working with diverse employers at different levels. The task of liaising with employers was reported to be time-consuming and worked best where staff had dedicated time allocated. We will explore these roles and how they are funded in more depth in phase two.

Other aspects of employer engagement that were reported to be working well

within our sample of ten UTCs were when:

- students and employers take ownership of their parts of a project
 - employer briefs and projects were authentic/real genuine projects and problems were reported to inspire students.
 - projects were directly relevant to qualifications such as BTEC/A Level.
 - students were aware that they can gain from engaging enthusiastically with employers by for example making useful contacts that could help with future employment and/or an apprenticeship
 - employers were able to give and gain what they wanted for the relationship (see Chapter 2 for a discussion on profound, moderate and contextual engagement)
 - there was an ongoing, respectful relationship between the UTC and the employer.
- providing students with genuine and meaningful contacts and experience with employers. One senior leader believed that: "It's all about getting students to meet people from industry rather than it all being teacher-led. Employers with current experience of the world of work have credibility" (UTC B).
 - preparing students for employment. For example, a senior leader explained: "They [the students] feel twice, three times as prepared and knowledgeable of the working environment, because they've spent time talking to industry partners, they have a very clear understanding of what these partners do, and it [the world of work] doesn't feel like an alien environment. They feel that it [the UTC] has prepared them incredibly well" (UTC F).
 - developing clear and appropriate pathways for students to follow that are attractive, engaging, and aspirational. One senior leader explained: "We put students on pathways that they want to be on. There is much more focus on young people's needs, identifying where they want to go in the future as opposed to "a generalist education through a comprehensive system" (UTC B).
 - securing positive destinations for their students. The case-study UTCs provided examples of students who have completed successful extended work experience placements with employers, have been sponsored by that employer with their degrees paid for, or have their placement years secured and have a guaranteed job at the end of it.

6.3 Students' employability

As set out in Chapter 4, one of the main benefits for students attending a UTC was their increased likelihood/ability to secure and maintain successful post-UTC destinations. UTCs have been successful in enhancing students' employability by providing appropriate, up-to-date skills. This has been achieved by developing a curriculum for students that meets employers' needs by using labour market intelligence. According to one teacher: "The key successes are that students' progress rapidly here as they are learning at a level that is consistent with current employment standards" (UTC G).

Furthermore, the findings suggest the ability of UTCs to provide students with relevant qualifications and experiences that are meaningful to employers and have 'kudos' works well. Our case-study UTCs indicated that they have been successful in:

The whole UTC experience – curriculum, employer involvement, environment, ethos and culture – constantly prepares students for apprenticeships/future employment. The ongoing challenge, as described in Chapter 5, is the relaying of the key benefits of attending a UTC to young people and their parents and ensuring that the right young people enrol.

7 Advice for other UTCs and future priorities

Key findings

UTC staff and their partners identified five key recommendations for other UTCs:

- **Develop a clear vision and mission.**
- **Raise the UTC's profile and reputation among all stakeholders.**
- **Ensure pupils develop meaningful, relevant and appropriate skills.**
- **Invest in building and maintaining quality relationships with employers.**
- **Provide regular and sustained exposure to a range of industry partners.**

Future priorities of the ten case-study UTCs centre on developing the learning offer (to ensure its ongoing quality and relevance) and ensuring longer-term sustainability by maintaining (and increasing) student numbers.

7.1 Advice for other UTCs

The case-study UTC staff and their key partners identified five broad recommendations for other UTCs:

Hold showcase events and open days that provide opportunities to meet staff and students and experience the learning environment.

- 1. Develop a clear vision and mission for the UTC** and invite all key stakeholders to share in its development. Define what needs to be accomplished and establish (short- and longer-term) targets to measure progress towards the vision. Place a strong and clear emphasis on achieving high academic standards as well as developing students' transferable 'work-ready' skills. Establish clear expectations and standards for students, staff and key partners.
- 2. Raise the profile and reputation of UTCs among all stakeholders.** Disseminate the UTC's vision to prospective students, parents/carers, governors, other education settings, and employers. Build an evidence-base of success that can be shared in marketing materials.
- 3. Ensure students develop meaningful and relevant skills.** Identify and communicate with key local and national employers to understand what knowledge and skills they require of their future workforce. Where possible match the curriculum and PBL activities to identified skills gaps. Change direction and meet skills gaps as they arise.
- 4. Invest in building and maintaining quality relationships with employers.** Invest in employer engagement from the outset and prior to the UTC opening, where possible. Ensure there is a member of staff with a dedicated remit (and time) for stakeholder engagement. Start small and be selective with employer partners, which helps

to keep things manageable. Build respectful relationships that are 'business like'. Have clarity and consistency of expectations. Adopt a realistic approach, ask employers what they want out of their involvement as well as what they can give. Create a sense of ownership for employers so that engagement is not tokenistic.

-
- 5. Provide regular and sustained exposure to a range of industry partners** via, for example, PBL activities, potential lesson (co-)delivery, work experience, talent pools, showcase events and employer talks. Ensure that employers are highly visible throughout the UTC and to all year groups. Be flexible with timetabling

to allow students to engage in a range of activities (both on- and off- site) with employers.

7.2 Future priorities

Future priorities for the case-study UTCs involved the following:

- Reviewing local and national skills shortage areas and future employment priority growth areas to inform curriculum design and wider learning opportunities.
- Sustaining the quality and relevance of PBL activities.
- Recruiting and retaining high-quality staff.
- Maintaining or increasing student numbers.



8 Conclusions

The conclusions of the phase one research into the use of PBL and employer engagement in the development and delivery of the curriculum within UTCs at Key Stage 4 and post-16 are set out below.

-
- 1. The research highlighted that employers contribute at different levels, within and across the case-study UTCs, to the development of young people’s technical and transferable employability skills.** Most substantial, *profound* employer input, characterised by project ownership, appeared to be evident within three UTCs and was linked with different models of PBL. *Moderate* employer involvement, where they contributed significantly to projects but with less emphasis on development and project ownership, was evident within all ten case-study UTCs. *Contextual* involvement, where employers contribute to informing young people about technical and employability knowledge and skills, on a more ad-hoc basis was also present across all case-study UTCs. A mixed economy of employer contributions at these different levels is beneficial to UTCs and is suitable for employers with varying degrees of capacity to input into UTCs. However, we suggest that some profound input is necessary and is consistent with the ethos of UTCs.

 - 2. Different models of employer liaison were evident across the case-study UTCs.** The person/people responsible for liaising with employers held diverse roles within different UTCs. Engaging employers at different levels in the curriculum development and delivery, benefits UTCs, students and employers but was considered challenging and worked best when dedicated time was allocated to the task.

 - 3. Most young people enrolled at a UTC because they were interested in the specialism and wanted a more work-related education.** Young people were perceived to have benefitted from attending a UTC by demonstrating enhanced academic, technical and transferable skills and improved readiness for the world of work. They were also reported to have improved attitudes and motivation to succeed and greater awareness and likelihood of securing post-16 destinations.

 - 4. UTC staff, governors and sponsoring universities described what they believed worked well within UTCs.** For example, they considered that UTCs prepare young people well for the world of work through genuine and meaningful contact and experience with employers, applying theoretical concepts to the real world and supporting young people to navigate their way successfully to future destinations. Advice they offered to other UTCs included; developing a clear vision and mission; raising the profile and reputation of their UTC among all stakeholders; ensuring that students develop meaningful and relevant skills; and investing in building and maintaining quality relationships with employers; and providing young people with sustained and regular exposure to a range of industry partners.

5. Challenges were also identified, including the recruitment of diverse employers (and maintaining relations with them); the recruitment of engaged students with an interest in the specialism; the recruitment of high-calibre staff; responding to external curriculum changes; and making PBL fit productively with updated course content and qualifications.

In 2018 phase two of this research will offer the opportunity for further detailed exploration as we carry out three in-depth case studies with phase one UTCs that demonstrated profound engagement with employers in PBL. We will explore: the lifecycle and different levels of projects displaying profound employer input; what facilitates profound employer input into PBL; different models of business liaison and employer engagement strategies (and how these are funded); and the impact on young people and their post-UTC destinations.

The final report, due to be published in winter 2018, will systematically draw together findings from phases one and two of this research and will share the most effective practice and identify lessons learned in order to inform future sector-wide practice.



9 References

Buck Institute for Education. (2017). *What is Project-Based Learning?*. Novato, CA: BiE [online]. Available: http://www.bie.org/about/what_pbl [18 October, 2017].

The Prince's Trust Macquarie. (2017). *Youth Index 2017*. London: The Prince's Trust [online]. Available: <https://www.princes-trust.org.uk/about-the-trust/research-policies-reports/youth-index-2017> [9 November, 2017].



ROYAL
ACADEMY OF
ENGINEERING

Royal Academy of Engineering

As the UK's national academy for engineering, we bring together the most successful and talented engineers for a shared purpose: to advance and promote excellence in engineering.

We provide analysis and policy support to promote the UK's role as a great place to do business. We take a lead on engineering education and we invest in the UK's world-class research base to underpin innovation. We work to improve public awareness and understanding of engineering.

We are a national academy with a global outlook and use our international partnerships to ensure that the UK benefits from international networks, expertise and investment.

We have four strategic objectives, each of which provides a key contribution to a strong and vibrant engineering sector and to the health and wealth of society.

Make the UK the leading nation for engineering innovation

Supporting the development of successful engineering innovation and businesses in the UK in order to create wealth, employment and benefit for the nation.

Address the engineering skills crisis

Meeting the UK's needs by inspiring a generation of young people from all backgrounds and equipping them with the high quality skills they need for a rewarding career in engineering.

Position engineering at the heart of society

Improving public awareness and recognition of the crucial role of engineers everywhere.

Lead the profession

Harnessing the expertise, energy and capacity of the profession to provide strategic direction for engineering and collaborate on solutions to engineering grand challenges.



Royal Academy of Engineering
Prince Philip House, 3 Carlton House Terrace, London SW1Y 5DG

Tel: +44 (0)20 7766 0600
www.raeng.org.uk

Registered charity number 293074

 Please recycle this report (the cover is treated with recyclable laminate)