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EARLY SCHOOL WORKERS

CRITICAL REVIEW ON THE UTC AND CONCEPT MODEL

UTC transferability guidelines

1

ESW
EARLY
SCHOOL
WORKERS

Erasmus+ KA2
Strategic Partnership
for vocational education
and training

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ESW EARLY SCHOOL WORKERS

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CRITICAL REVIEW ON THE UTC AND CONCEPT MODEL

UTC TRANSFERABILITY GUIDELINES

1

Project Reference

Project code: 2018-1-IT01-KA202-006754

CUP: G34D18000020006

Programme

Programme: Erasmus+

Key Action: Cooperation for innovation and the exchange of good practices

Action Type: Strategic Partnerships for vocational education and training

Duration

3 years (01/10/2018 – 30/09/2021)

ESW PROJECT

VET systems need a radical renovation to be competitive. In fact, it is clear that Young people need to acquire specific competences to be successful in the world of work and it is necessary to address and prevent the Early School Leaving (ESL) problem, as well as the lack of key competences among young people.

The UTC (http://www.utcolleges.org) approach seems to be capable of addressing these challenges. In these schools knowledge and skills are acquired through the resolution of real problems or projects. Their approaches deliver an innovative training concept, which is able to narrow the gap between knowledge and competences acquired at school and those required by the companies. The aim is to tackle and solve the Early School Leaving problem, and to increase the competences of each student during IVET programmes.

The possibility to reach these excellent results has been possible thanks to innovative methodologies and by re-thinking spaces, times and learning approaches. Each UTC is backed by employers and a local university who work with staff to develop an innovative curriculum that gives students first-hand experience of what life is like after school, also integrating three types of learning: technical, practical and academic. A UTC curriculum includes one or two technical specialisms, which are linked to the skills gaps in the region.

All the aspects of these colleges are built around a specific methodology called PiXL Edge, namely a model that gives students the possibility to develop skills useful for the rest of their lives and for their future professional activity (Leadership, Organisation, Communication, Initiative and Resilience).

The project aims at supporting the renovation of VET systems in Europe with the ultimate goal of tackling Early School Leaving and increasing the employability of youngsters while fostering their active role in the society.

In order to reach this objective, **the project intends to further strength the key and technical-professional competences of young people attending the VET pathways, analysing and adapting the English UTC model to the Italian / German / Spanish context.**

In this way the project tries to provide an answer to a common issues faced by European VET system:

1. increase the level of key competences among the youngsters and reduce the skills gap;
2. promote new partnership and WBL organizational models/approaches

The idea is to transfer the English model to training realities in other countries to face the training gap and the ESL. On one side there will be the provider partners (schools from the UK) that will transfer their successful models and, on the other side, the user partners that will study these models and try to adapt these good practices to their national contexts.

The project aims at analysing the UTC model, with its theoretical and practical features, and it fulfils the following goals:

1. Elaboration of a model (organizational and educational variables) transferable to all contexts.
2. Transfer this model and adapt it to VET centres in other countries implementing new training pathways in professional sectors by combining national standards and the innovative aspects of UTC model
3. Test and validate the model
4. Monitoring and evaluating the learning outcomes

This project involves 7 Partner Organisations and 3 Associated Partners from 5 European countries.

PROJECT PARTNERS

5 TRAINING ORGANIZATIONS

1 UNIVERSITY

1 EUROPEAN NETWORK

3 PUBLIC INSTITUTIONS

ENAC

enac.org

cjd

cjd.de

ENDO-FAP

endofap.it

INSTITUTO VIRGEN DE LA PAZ

ies.lapaz.alcobendas.educa.madrid.org

UTC WARRINGTON

utcwarrington.org

UNIVERSITÀ CATTOLICA del Sacro Cuore

brescia.unicatt.it

EfVET European Forum of Technical and Vocational Education and Training

efvet.org

RegioneEmilia-Romagna

regione.emilia-romagna.it

Comunidad de Madrid

comunidad.madrid

REGIONE PUGLIA

regione.puglia.it

The projects foresees 4 main intellectual outputs:

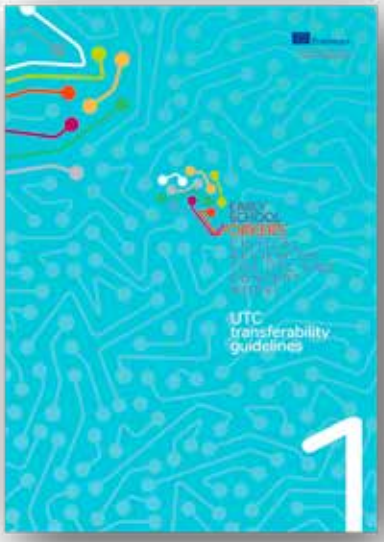
- IO1 Critical Review on the UTC and Concept model
  Document aimed at explaining the UTC model and support VET provider to replicate it in their own contexts

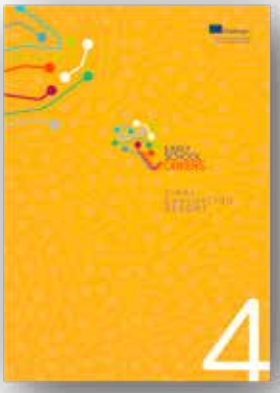
- IO2 Methodological framework and common tools for developing new curriculum:
  Tools and supporting materials to create new curricula based on the UTC model

- IO3 New curricula
  6 new curricula based on the UTC model

- IO4 Final evaluation report
  A report highlighting the main project findings.

PROJECT OUTPUTS





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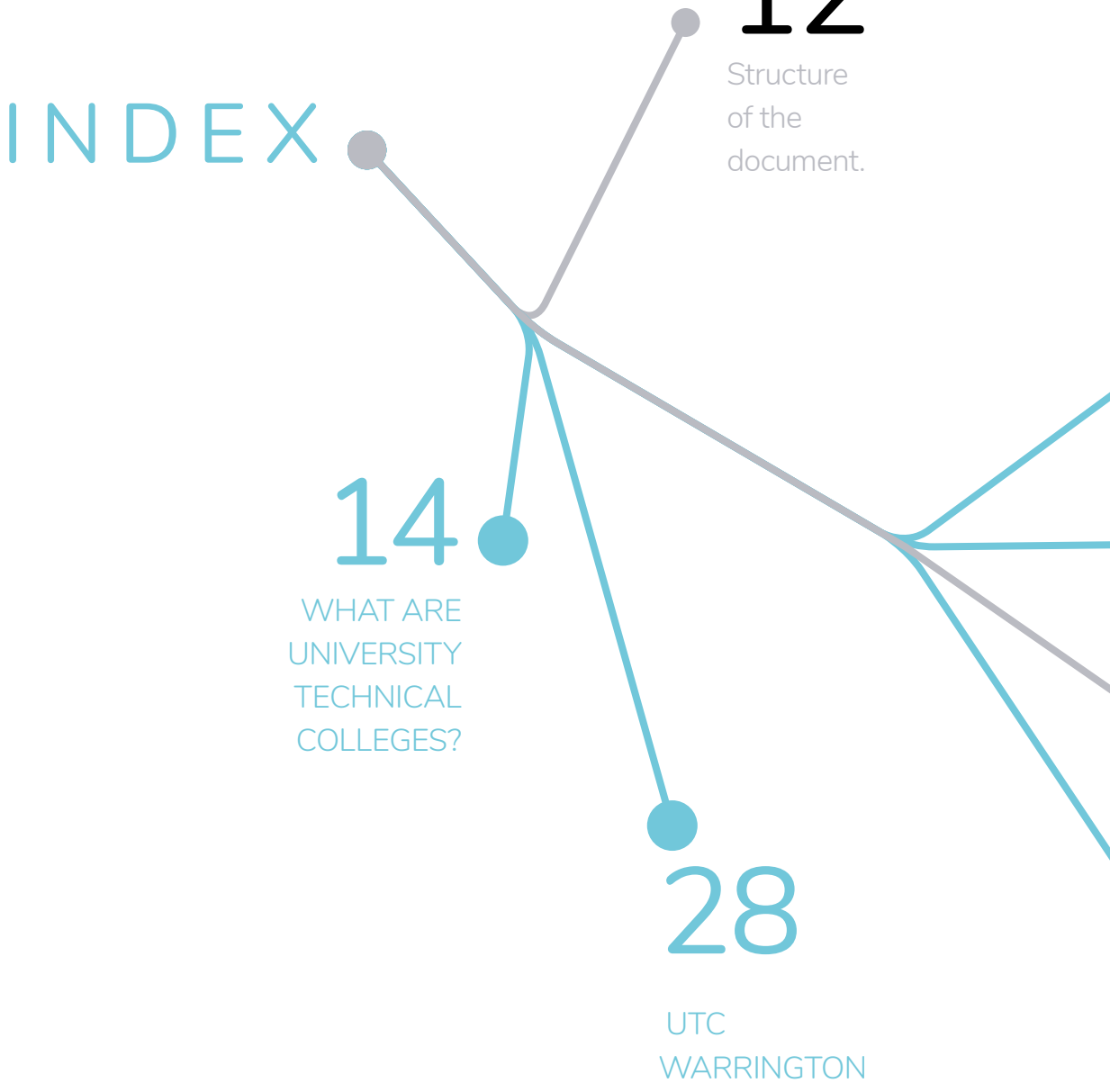

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This document aims to present a critical report on the phenomenon of UTCs (University Technical Colleges), a new type of school that is spreading in the United Kingdom, and to define a set of guidelines in order to replicate this model in the education systems of other countries.

STRUCTURE OF THE DOCUMENT

The document is made up of 5 sections:

SECTION 1 - WHAT ARE UNIVERSITY TECHNICAL COLLEGES

This section presents the phenomenon of UTCs explaining how and why they were founded, the challenges that UTCs try to address and the specific features of this kind of school.

SECTION 2 - UTC WARRINGTON

This section presents the experience of UTC Warrington explaning how this school was able to translate the UTC model in the city of Warrington (Manchester).

SECTION 3 - THE CONCEPT MODEL

This section is the result of desk research based on available UTC documents and on a study visit conducted at UTC Warrington. By "concept model" we mean the attempt to identify the distinctive elements that underpin UTCs and the logical structure that connects these schools. In short, the concept model represents the “ideal-type school model” to strive for.

The fundamental elements of a concept training model are (at least) the following:

- the organizational dimension: this aspect concerns the organization of the school, its rules, its logics, the practical methods of organization such as the organization chart and the timetable;
- the pedagogical dimension: values and ideas that influence the schools education system;
- the didactic dimension: it is related to the “tools” used to achieve the final goals, for example the teaching methods to make the contents accessible and to concretize the pedagogical principles.

SECTION 4 - TRANSFERABILITY GUIDELINES

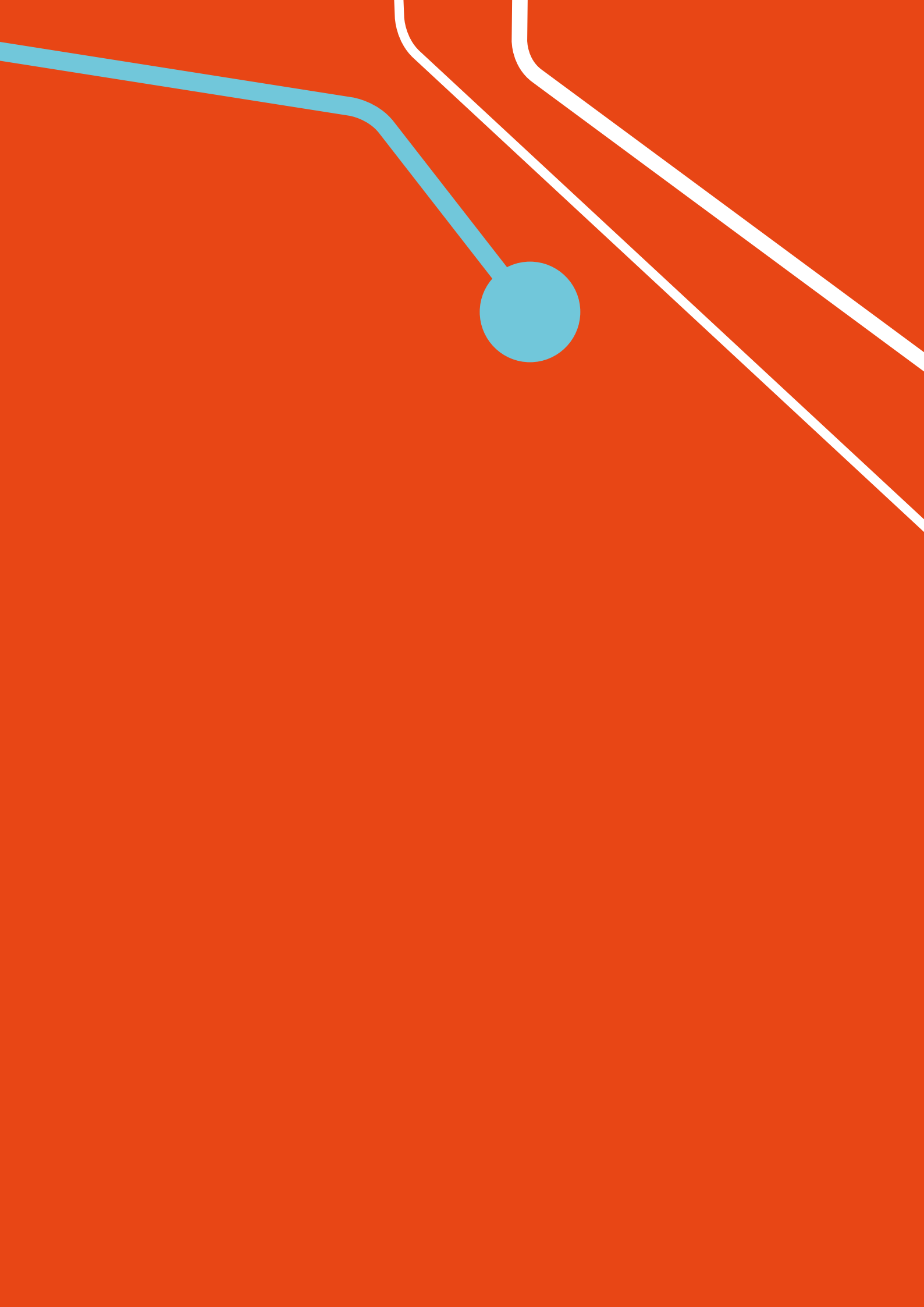
This section presents the transferability guidelines, i.e. the process to put into practice the concept model introduced in section 3 the concrete steps to reach the “ideal-type school model”. The peculiar element of the guidelines, besides the practical approach, is modularity and adaptability to different contexts: the guidelines are divided into four thematic areas, each area consists of eight guidelines each of provides a certain number of methodological principles. Even though the guidelines are strictly connected, they represent recommendations that can be partially applied, thus realizing a version of the concept model suited for the local context, based on the situation and goals of the local community. A further feature of the guidelines is that they have been shared and have the consensus of a scientific community. Indeed, in this project, this principle has resulted in the validation of the guidelines in different steps: from an initial draft, submitted to a council of experts who proposed amendments up to the final version.

SECTION 5 – TRANSFERABILITY GUIDELINES ACROSS NATIONAL CONTEXTS

This section in the English version summarizes recommendations and critical issues to be taken into consideration for the transferability of the model in other education system (outside England).

Moreover, the chapter briefly introduces the Italian, Spanish and German VET systems and highlights the main difficulties, opportunities and advantages that can arise from the application of the guidelines in the different national contexts.

On the contrary, in the Italian, Spanish and German versions of IO1, Section 5 is replaced by a detailed description in which more detailed information are presented on both the individual national contexts and the advantages that the application of the model could bring to the educational and training system of the specific country.



WHAT ARE UNIVERSITY TECHNICAL COLLEGES?

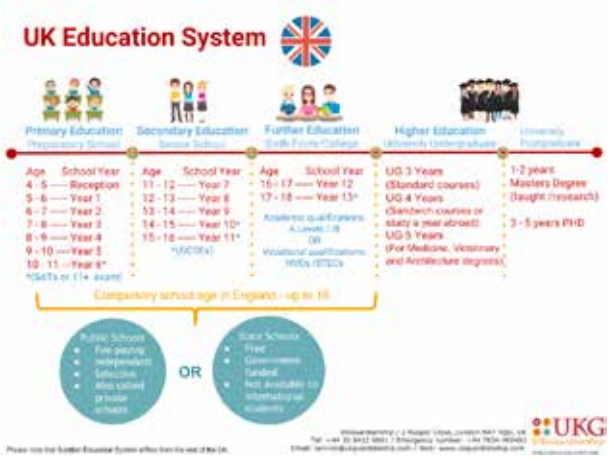
This section presents the phenomenon of UTCs explaining how and why they were founded, the challenges that UTCs try to address and an overview of the UTC model.

1

1.1 System issues addressed by UTCs

Any school system is an expression of a society and it is culturally embedded. It is especially connected to national standards.

UTCs are UK schools for 14 to 19 year olds that deliver an education which combines technical, practical and academic learning. In these schools, students can study a technical specialism alongside core academic subjects at GCSE and A-level.



The general framework and nomenclature of the UK school system is reported in the Figure (© UKGuardianship). In the United Kingdom, the General Certificate of Secondary Education (GCSE) is an academic qualification, generally taken in a number of subjects. Studies for GCSE examinations generally take place over a period of two or three academic years (depending upon the subject, school, and exam board), starting in Year 9 or Year 10 for the majority of students, with examinations being set at the end of Year 11. In fact, each GCSE qualification is in a particular subject, and stands alone, but a suite of such qualifications (or their equivalent) is generally accepted as the record of achievement at the age of 16. Between 2015 and 2018 (first assessment Summer 2017), A Levels in England are being reformed. The A Level (Advanced Level), however, is a subject-based qualification conferred as part of the General Certificate of Education.

Baker Dearing Educational Trust (BDT) was founded by Lord Baker and Lord Dearing in 2009 to promote the concept of University Technical Colleges ("UTCs"). UTCs were to enter the school system with the aim of breaking the mould of 'one size fits all' education. Baker Dearing created and owns the UTC brand and registered trademarks. BDT is a small, flexible charity that sits at the centre of the UTC network and focuses on promoting and supporting new and existing UTCs. Baker Dearing, as Licensor, is uniquely placed to work with UTCs, employers and the Government.

The 2010 programme for goverment by The Coalition contained specific points on the school system. Some points of the programme went in the direction of UTCs, as the Coalition committed to:

improve the quality of vocational education, including increasing flexibility for 14–19 year olds and creating new Technical Academies as part of our plans to diversify schools provision (1 p. 29, our emphasis).

The basic orientation for these reforms was the following:

The Government believes that we need to reform our school system to tackle educational inequality, which has widened in recent years, and to give greater powers to parents and pupils to choose a good school. We want to ensure high standards of discipline in the classroom, robust standards and the highest quality teaching. We also believe that the state should help parents, community groups and others come together to improve the education system by starting new schools (Coalition, 2010, p. 28, our emphasis).

In general, space would be made for new providers in the school system:

We will promote the reform of schools in order to ensure that new providers can enter the state school system in response to parental demand; that all schools have greater freedom over the curriculum; and that all schools are held properly to account (Coalition, 2010, p. 29, our emphasis).

Also, the intention was expressed towards making teachers more varied and goal oriented, accountable, and

motivated toward quality:

...seek other ways to improve the quality of the teaching profession [and] reform the existing rigid national pay and conditions rules to give schools greater freedoms to pay good teachers more and deal with poor performance. [...] seek to attract more top science and maths graduates to be teachers (Coalition, 2010, p. 29).

All this considered, UTCs are a timely and a growing network: at the start of 2014, there were 17 UTCs open in England. In 2018, there are now 49 UTCs across the Country.

1.2 UTC progression routes

Secondary schools in the U.K. are for 11-16 years olds. UTCs are for 14-19 year olds.

Accordingly, when most 14 years old students arrive at the UTC from mainstream schools their education has been fragmented into unrelated subjects. They have little understanding of the relevance of their academic studies to the world of work and have little awareness of employment opportunities. Many are uninspired and underachieving. They have a spark of self-knowledge, however, which means they have chosen a specialist technical context for their future education. At age 15 students get their GCSE and equivalent qualifications. They then can decide to stay at UTC for A levels and equivalent technical qualifications. Otherwise they can leave to start an Advanced Apprenticeship or to attend sixth form or Further Education colleges.

Some students start UTC at 16. When they are 17, students qualify for A levels. Then at 18 they start a Higher Apprenticeship or a job, later qualifying as Registered Technicians. Otherwise they start a degree.

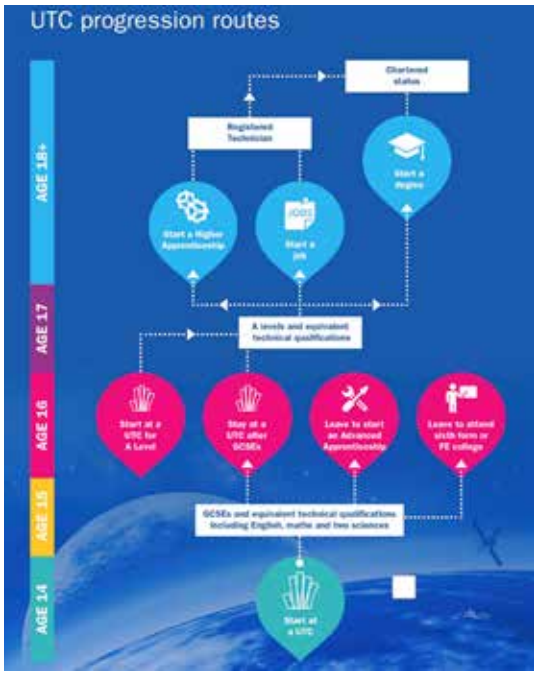
The UTC curriculum "starts from where it ends": no matter whether the student leaves the college at age 16 or 18 they will:

- have received a broad general education, complemented by an in-depth technical education in their chosen specialism;
- understand the relevance of one to another;
- have good academic and practical skills, valuing both equally;
- have excellent employability skills and understand their own strengths and weaknesses;
- be aware of the career opportunities in their specialism;
- better understand the requirements of employers.

1.3 UTCs in a nutshell

University Technical Colleges (UTCs) offer 14-18 year olds the opportunity to take a highly regarded, technically-oriented course of study at a specialist college equipped to the highest standards. UTCs are sponsored by a university and employers, sometimes in partnership with a college of further education, and offer clear progression routes into higher education or further learning in work:

- They are academies (UK Parliament, 2010; Department of Education UK, 2016) with a comprehensive, all-ability intake;
- They have a longer school day, typically 8.30am to 5pm, replicating a typical business day;
- They are demand led, in response to repeated demands from industry for an increased number of well-educated, high status technicians and engineers;
- Range of attraction: UTCs are not aca-



demically selective and charge no fees. They respond to needs of local area (eg: identified skills shortages). Yet, they often have a catchment area extending across a number of local authorities;

- They typically have around 600 students — they are smaller than traditional secondary schools.

UTCs are evaluated by Ofsted[1] using the framework common to all state schools. It is expected that UTCs achieve at least a good grade especially in quality of teaching and learning and achievement. Employers and the university provide leadership for the structure of the curriculum of the UTC rather than mere approval. They endorse all the qualifications the UTC offers. They take an active role in the education of UTC students, both as governors and through help with the delivery of the curriculum.

1 The Office for Standards in Education, Children's Services and Skills.

1.4 Practical and academic learning combined

UTCs aim to deliver innovative, high quality education that combines practical and academic learning. This requires specialist teaching staff and 'state of the art' facilities and equipment.

In the UTC 14 to 16 curriculum students spend 40% of their time on technical studies (University Technical Colleges, 2016). Not all of this time is practical activity, however, as technical education includes theoretical aspects of the specialism. At least 30% of a student's time will be engaged in practical education.

In the UTC 16 - 18 curriculum for full time students, the split between general education and technical studies is 40:60 (University Technical Colleges, 2016). The technical quota comes through both:

- specific technical studies which are more specialised than before and job related. These courses lead not only to the technical qualification but also to a recognised professional qualification, such as "Tech Eng" or "Tech Sc", both of which are recognised by professional bodies
- academic qualifications such as A Level courses or other Level 3 qualifications when the academic content of the course relates directly to the technical specialism.

During weekly dedicated Student Professional Development time, students can participate in projects, enrichment activities or extended work placements. The rationale underpinning this approach is to offer industry-based activities and opportunities to support students' learning and development and to 'help them stand out' in their future pathways, through providing experiences and

skills to enhance their CVs, interview performances, and university and job applications.

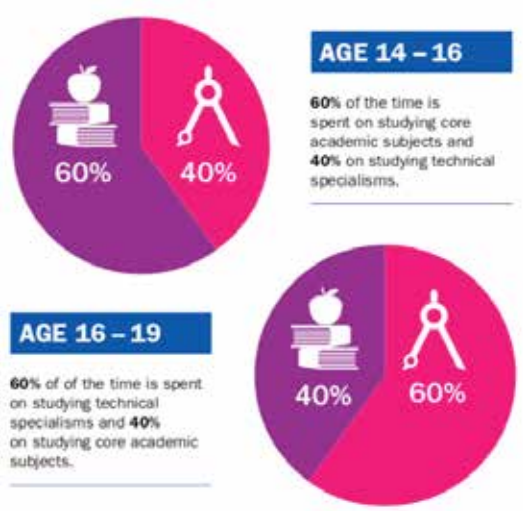
1.5 Specialties

Each UTC focuses on one or two technical specialisms (University Technical Colleges, 2015). Technical specialisms in UTCs cover a wide range which includes:

- engineering;
- construction and the built environment;
- health technologies;
- science;
- IT and digital and creative media.

The UTC specialism is central to the curriculum. The content of the curriculum reflects the needs of the employer partners although consideration is given to the overall national needs which are outlined by employer groups or professional institutions. The longer day, however, allows that not everything which is taught needs to be a formal part of the qualification. It is important that the specialism does not become too narrow, particularly pre 16. A UTC might be specialising in, for example, aeronautical engineering, but illustrate parts of the curriculum with examples from other types of engineering.

As we have seen, at least 40% of curriculum time is dedicated to the technical specialisms, and PBL (Project Based Learning) is accordingly implemented in a pervasive way: the UTC specialism is taught through employer projects and stand alone lessons. Opportunities are sought to explore elements of the specialist curriculum within the normal subject lessons.



1.6 Curriculum principles

The UTC curriculum plots the students' pathway from beginning to end and is based on principles that underpin the uniqueness of UTCs, differentiating their curriculum from normal schools, and have a direct influence on how the curriculum is delivered and structured.

The UTC curriculum is divided into two components: technical studies and general education. Rather than being taught separately, these are integrated and academic subjects are taught in ways that relate to and reinforce the technical specialism.

Two important elements of the UTC model are the involvement of employers in the curriculum and the use of project-based learning.

1. At every stage the curriculum is directed by employers and the university; only through this can the intended radical change be achieved.
2. Technical, academic and practical education are valued equally in the curriculum and the values of the UTC. During Key Stage 4 the split in allocation of time between technical and general educa-

tion is 40:60, which is reversed after 16.

3. The curriculum is planned holistically with all teachers and members of staff understanding their contribution to a student's education and how their subject relates to other aspects of a student's curriculum.

4. Academic subjects are related to and illustrated by the technical specialism.

5. Employability skills are integrated into the curriculum but are made explicit to the students. The progress of students towards obtaining these skills is monitored and students are helped to improve.

6. Enrichment activities are an important element of a complete UTC education offering opportunities for leadership and team work.

1.7 General academic subjects

The key principle for teaching general academic subjects is that wherever possible they should be taught in the context of, and illustrated through, the UTC's specialism. All students, no matter their qualification package, should be taking part in the employer projects. At GCSE, for example, biology offers great opportunities to be taught through the technical health specialism and physics can be excitingly illustrated through engineering. There is also subject time in which this learning is reinforced or taught in preparation for the project, and it is recognised that not all elements of a general qualification can be related to the specialism (so must be taught in its own right). Yet, wherever possible a subject is taught through an employer project. This is particularly important at post-16 where the majority of a student's time might be being spent on traditional science A Levels. If these are taught as they would be in a normal school there is little reason for a student to move to a UTC. The longer school day means that there is plenty of time to expand on the A Level syllabus. It is only through doing this that the A Levels are able to count towards the post-16 60% technical target.

English/literacy: Whatever the specialism of the UTC, English and literacy are a very important part of the curriculum. UTCs attract a large number of boys, some of whom find literacy irksome and difficult. Nevertheless if students are to progress then a grade C at GCSE is the minimum requirement and achieving this is a priority for the UTC. Literacy is embedded across the curriculum and its relevance demonstrated to students through the employer projects. The written and verbal feedback to employers at the end of a project provides an excellent vehicle for this. Moreover, it is unlikely that a GCSE on its own will sufficiently equip a student to be successful either in employment or at university. It is essential that literacy skills, such as report writing, continue to be developed up to the age of 18.

Mathematics and numeracy: These are tackled in a similar way, through the subject and across the curriculum. Some UTCs, especially those specialising in engineering, make high level mathematics a compulsory element for post-16 students. Where this does not happen it is essential to continue to develop a student's numeracy skills in the same way as literacy.

Science: Most UTCs offer separate sciences as core and additional at GCSE. Some offer a course such as BTEC. If these are taught according to ability care has to be taken that the decision is not made too early and based solely on a student's attainment at their previous school but ensures that the student can progress to their preferred destination. In addition to the normal separate sciences environmental science might be a good addition for UTCs which are specialising in some form of sustainability.

Information technology: While all students study ICT it is not a requirement that they

gain a qualification. In many instances the employer and university sponsors prefer it to be integrated into the curriculum. If this is the case the previous suggestions for the integration of topics apply. An increasing number of UTCs are offering GCSE computer science either as an option or where the UTC is specialising in digital technology as a compulsory subject. There is a range of vendor qualifications which a UTC may wish to consider.

Modern languages: Language skills are important as they are needed in almost every job. UTCs give students the confidence to work in the global economy by developing links with international companies and other organisations. All UTCs offer students the opportunity to study a foreign language either to GCSE or another appropriate qualification. UTCs encourage as many students as possible to study a language but some students have been so put off by their experience of language teaching in their previous school that they are very resistant. Most UTCs have one main foreign language often chosen by the employers. Students may, however, have gained a good standard in a different language which they wish to continue to GCSE. UTCs facilitate this by working with nearby schools or colleges. When a student has made good progress in a language up to the age of 16 it makes little sense not to build on this post 16. This would not usually be to A Level but would be based on practice and possible international work experience. Consideration can be given to offering students who have not studied a language up to 16 the opportunity for conversation language learning post 16.

Humanities: Students at UTCs learn about the historical and geographical aspects of their specialism. This is achieved either through the employer projects or by offering one or both of these subjects at GCSE. Most UTCs offer either history or geography and some offer both in which case care must be taken to ensure that they can be staffed and taught to a high standard. If GCSE is offered it must enhance the knowledge of the specialism. For example "a history course based around the Tudors or Hitler would not be relevant" ("A practical guide to the UTC curriculum", The Baker Dearing Educational Trust, p. 19).

Physical Education (PE) / Personal, Social, Health and Economic (PSHE)[2] Religious Education (RE): These are taught in a manner which complies with legislation.

Options: Some UTCs find it helps recruitment to offer students a limited choice of option subjects. Where this is done the choices are broadly relevant to the specialism and the UTC curriculum. According to "A practical guide to the UTC curriculum" by Peter Mitchell, if the range of option subjects becomes too extensive there will be difficulty in staffing them and there is a danger that the flavour of the UTC may be lost.

The knowledge of business is an important employability skill. It can either be taught through a GCSE or by integrating it in employer projects. Students need to gain a practical knowledge which will help them operate effectively in employment or to set up their own business. If a GCSE or any other qualification is being used it is important that it can deliver these aims.

Developing a student's knowledge of career choices presents similar issues. At its best it is integrated into the curriculum but made explicit. When student choose to attend a UTC it is reasonable to suppose that they have an interest in the specialism e.g. engineering, but it is less reasonable to suppose that they have a good understanding of the different types of engineering; mechanical, civil, etc. Part of the job of the curriculum is to introduce these aspects as well as employment opportunities within them. Once again this is not left to chance but is planned into the curriculum.

2 Personal, Social, Health and Economic (PSHE) education is a school subject through which pupils develop the knowledge, skills and attributes they need to manage their lives, now and in the future.

1.8 Project Based Learning (PBL) and professional development activities

Professional development activities, including Project Based Learning (PBL), constitute significant elements of the UTC's overall offer and their impacts cannot be measured in isolation. PBL, in particular, supports the development and/or achievement of:

- students' work-readiness skills, including social and emotional development, communication and team working skills, personal development and self confidence;
- tangible project outcomes and qualifications/awards, including the product or design created through 'live' projects which is often presented and celebrated in a project showcase event and assessed by employers;
- positive progression opportunities for students through the acquisition of industry-relevant skills and qualifications and exposure and access to a range of potential employers.

PBL has delivered wide-ranging impacts for students, including the 'soft' social and emotional skills often said by employers to be lacking in many prospective employees. When combined with the high-level technical skills acquired, the industry contacts and relationships developed, and work-related opportunities experienced, students are able to stand out in their CVs, university personal statements and job applications and interviews. UTCs seem to have excellent destinations data.

Not only employers define the skills they require for future workforces; they are also directly involved in PBL. In this way PBL enables the curriculum and employers to be connected, helping the curriculum to 'make sense' to students because of the real-world practical settings, scenarios and challenges set by business partners.

So the UTC reinforces its position in the local education and employment community by delivering an educational offer that is attractive to students and valued by local employers. Through PBL, staff also have opportunities for increased flexibility and creativity in their teaching compared with the constraints of the curriculum.

1.9 Qualifications

UTCs can only work with qualifications which currently exist, and the latter are in a state of permanent flux. The Baker Dearing Trust (BTD) offers ongoing commentary on these changes but in general, when choosing a qualification, a UTC should always bear in mind the following principles:

- Is that recognised and valued by employers and universities? This includes content as well as title. Occasionally both employers and universities value a qualification even though their knowledge of its content may be out of date.
- How does a single qualification fit into the complete package a student is being offered? Is the package balanced in terms of the curriculum principles and will it enable the students to progress to employment, an apprenticeship or higher education?
- Is it funded by the Education Funding Agency? If it is not it does not necessarily mean that it should not be taught but the UTC should be aware that it is not funded.
- Is it part of the school performance tables? The tables are changing and it is undesirable to chase every indicator in the table. There will be will be some

key indicators a UTC wishes to aim for, however, and in choosing qualifications it is important to reflect this.

1.10 Orientation

Learning and orientation at UTCs is based on vocational considerations rooted in the labour market rather than on different subjects/school levels. Here the link with local universities is also important, ensuring suitable orientation for students who are inclined, willing, and able to pursue a university course.

By integrating 3 types of learning – technical, practical and academic – UTCs aim to create an environment where all students can find their strengths and specialise in subjects that interest and engage them.

1.11 Role of employers

Each UTC is backed by employers and a local university who work with staff to develop an innovative curriculum that gives students first-hand experience of what life is like after school. The other way around, UTCs take into high consideration the requirements from the local/regional employers' (which are also the main impetus for the grounding of UTCs).

According to McCrone et al. (2019) not all UTCs manage to have the same level of involvement of employers in the school. They distinguish 3 degrees of involvement of employers:

- *Contextual:* where partners provide information about workplace and activities that help to inform young people about technical and transferable knowledge and skills.
- *Moderate:* where partners are involved in PBL but are not playing a significant role.
- *Profound:* where partners typically take ownership of a project; input into formative assessment; influence the delivery of curriculum components; and inform teaching and learning with specialist, current, technical skills and knowledge.

High-performing UTCs use a range of approaches to engage and liaise with employers and to utilise their input into design and delivery of the curriculum (McCrone et al. 2019, p. 4). Senior leaders and other staff at UTCs reported that they were continually identifying potential partners and were developing strong working relationships based on mutually-beneficial activities. Their focus was generally on developing long-term employer relationships and PBL activities, rather than investing time in one-off ventures.

1.12 Organisation

Each UTC is run by an "academy trust": a charitable company limited by guarantee. The trust submits an application to the Department for Education (DfE). Members appoint the trustees. Trustees run the UTC. There is no common management structure, each UTC can choose its own. However, in general UTC organisation is "flatter" compared to mainstream schools. The school governance manages the relationship with the Trust, from which there is a pretty large degree of autonomy.

1.13 Challenges

McCrone et al. (2019) found that the main challenges 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 were motivated to engage and succeed;
- recruiting and retaining high-calibre staff with appropriate knowledge, experience and skills.

Additionally, UTC staff highlighted the challenge of engaging SMEs which had limited capacity and resources to support UTCs. They also pointed out that staff mobility within companies means that contacts and relationships require constant reinvestment of time by key UTC staff.

There are a number of other challenges constitutively affect the UTCs in the current system.

1.13.1 School evaluation criteria

Current progress measurement systems in the U.K. constitute one of the most serious challenges for UTCs. UTCs are evaluated by Ofsted[3] through the same national framework common to all state schools. Of course it is expected that UTCs achieve at least a good grade especially in quality of teaching and learning and achievement. But the peculiar curriculum of UTCs does not ensure the good — and improving — results in the subject matters on which evaluation focuses. The UTC specialism is central to the curriculum. The content of the curriculum reflects the needs of the employer partners although consideration is given to the overall national needs which are outlined by employer groups or professional institutions. Students are assessed, however, using available qualifications which might not always entirely reflect the employers needs and there may need to be compromises. Several articles in the newspapers and media examine this problem and propose different criteria for evaluation (Welham, 2015; Wilby, 2016; Gove, 2017; Baker, 2018).

3 The Office for Standards in Education, Children's Services and Skills.

1.13.2 Costs and funding

UTCs receive the same amount of per capita funds from the ministry: they are paid 5,000 pounds per student/year. With this budget, they need to work in close cooperation with local/regional economy to build a sustainable business plan, considering also the need for excellent staff, state-of-the-art equipment, high investment of career counselling and so on.

1.13.3 Engaging employers in the area

The UTC may encounter challenges associated to local socio-economic and industrial contexts. Often, the most relevant businesses in the area are SMEs with limited capacity and resources to successfully engage with, and support, the UTC. At the same time, demands for employer engagement, work placements and work experience from other UTCs and educational establishments are high. Efforts to overcome these barriers centre on dialogue and communication and the promotion of the UTC in the local business community, highlighting how involvement with the UTC will benefit businesses. In addition, staff mobility within companies means that contacts and relationships require constant reinvestment of time by key UTC staff.

Concerns about the extent and nature of their expected role can be a barrier to em-

ployers engaging in PBL. As well as the time commitment and requirements on staff, some employers can also be deterred by the perception that they will be 'asked to create education resources when they are not educators'. Misunderstandings or a lack of mutual knowledge about how schools and businesses work can further hinder this relationship.

Dialogue and communication are crucial to overcome this, and the appointment of industry staff to senior roles in the UTC helps bridge the gap between the two. In addition, the UTC makes strenuous efforts to ensure employer involvement as easy as possible, such as attending planning meetings at the employer site, not at the UTC.

1.13.4 Appropriate projects for PBL

Critical to effective PBL is the organisation of, and buy-in to, the project across partners as a lack of commitment, due to inadequate time or lack of interest, for example, can undermine successful project completion. So a challenge is the selection of an appropriate project that works for all partners i.e. employers, UTC staff and young people (Bell, 2010; Buck Institute for Education, 2015; Buck Institute for Education, 2015; Helle, Tynjala, & Olkinuora, 2006; Hmelo-Silver., C.E. Duncan, & Chinn, 2006; Lam, Cheng, & Cho, 2010; Menzies, Hewitt, Kokotsaki, Collyer, & Wiggins, 2018; Patton, 2012).

1.13.5 Students' recruitment

Concerns have been raised about enrolment and attendance levels at UTCs (Long & Bolton, 2017). It is difficult to recruit students at 14 and 16 (Cook, Thorley, & Clifton, 2016) because their schools won't let them go easily despite a law guaranteeing their freedom to choose. Now a law allowed UTCs to advertise in other schools, but the practice is still difficult. Yet, since 2010, a growing number of 14–19 institutions have opened in England (Cook, Thorley, & Clifton, 2016). Some UTCs also experimentally start programme at 11 (also to inspire students at a younger age).

1.13.6 Students' engagement

Varied levels of student engagement, motivation and ability have been identified as challenges, often related to individuals' reasons for attending the UTC. Some of the younger students have low aspirations and lack of motivation, and getting them to buy into, and understand, the concept and ethos of PBL and how it differs from the rest of the curriculum, can be a challenge.

Offering a broad range of PBL content helps in providing opportunities to hook students in, especially through activities that are practical, hands on, and real world in nature.

1.13.7 Students' orientation

UTCs have the problem — common to all schools, but declined in a peculiar way for UTCs — of orienting students who are unsuitable for a technically biased curriculum, as well as the issue of properly assisting SEN students (students with Special Education Needs) who are not rare in the school population.

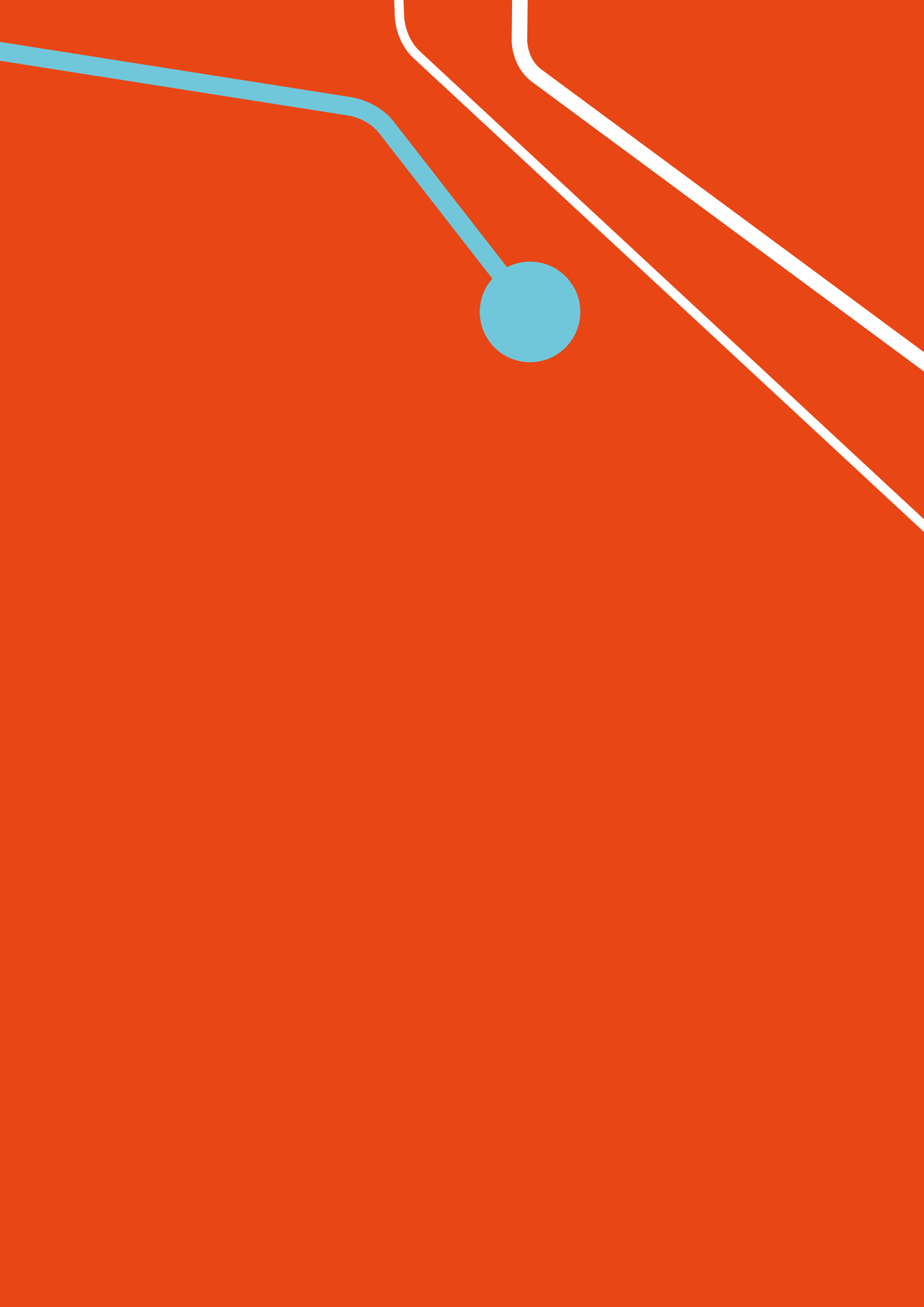
1.13.8
Staff recruitment and engagement

Recruiting and maintaining high-quality staff is one of the key challenges to delivering PBL with employer input, working closely and effectively with industry partners. Having consistent staff working on a project can be the biggest factor in ensuring a project is successfully completed. The teacher who owns the project has to be very responsible and proactive. For example, employer visits must be well-planned, not cancelled for unexpected reasons, and employers must be welcomed warmly.

Ensuring staff motivation and engagement can be a potential challenge, especially when staff are unfamiliar with the concept and practice of PBL. Senior staff have overcome this challenge through providing support and continuing professional development (CPD) programmes and via a strategy of recruiting staff from industry and research environments who understand the value of practical project-orientated learning. UTC staff receive support to value employers and their continuing input.

1.13.9
Holiday pattern

Can be a challenge both for students (and families) and staff.



UTC Warrington

This section presents the experience of UTC Warrington explaning how this school was able to translate the UTC model in the city of Warrington (Manchester).

2

UTC Warrington is a £10m[1] college opened in September 2016 to address the skills gap in Warrington (following a report in 2012 by Warrington Borough Council).

2.1 The curriculum

The school is a 14-19 Science & Engineering Specialist Academy focusing on getting students into top Science, Engineering or Digital Careers (through Degree Apprenticeships or full time University). UTC Warrington delivers a curriculum which is technical, academic, and based on real life projects, and it does so alongside a local sponsor university (Manchester Metropolitan University, MMU) and employers of the area such as Sellafield Ltd, Exova, Balfour Beatty, Cavendish Nuclear, Stanley, Nuvia, Fujitsu, Rolls Royce, Mott MacDonald, Siemens, and Wood.
With the employers, UTC Warrington works to:

- Develop real-life challenges and projects
- give students high-quality and relevant work experience
- inspire and inform students
- develop academic, technical and leadership skills

Accordingly, the UTC manages to operate a mature, business-like culture.

There are 5 alternative "pathways" for Y10 (when students are 14 years old) and 3 "pathways" for Y12 (when they are 16). Each pathway features different subjects. Each pathway is focused to guide students gaining the knowledge and expertise needed in their chosen field.

For Y10 pathways subjects are:

- *Creative* pathway: Maths, English, Science (Dual or Separate), Geography, Art & Design Engineering Design, BTEC ICT or Media
- *Science pathway:* Maths, English, Biology, Chemistry, Physics, Computer Science, Astronomy, Systems & Control
- *Engineering pathway:* Maths, English, Science (Dual or Separate), Geography, Engineering Manufacture, Engineering Design, Systems & Control
- *Digital pathway:* Maths, English, Science (Dual or Separate), Computer Science, BTEC ICT, Systems & Control, Engineering Design
- *Business pathway*: Maths, English, Science (Dual or Separate), Geography, Business Studies, BTEC ICT, Principles of Engineering

In 2016 the school had started with only 2 pathways, Science and Engineering. The Creative pathway was added especially to attract also female students, then Digital and Business followed. Mandatory subjects for all are Maths, English and Science.

For Y12 pathways:

- In the *Science* pathway, pupils study and specialise in up to 3 A Level equivalents in BTEC Applied Science Level 3: Advanced Forensics, Biomedical, Physical Science
- In the *Engineering* pathway, pupils study and specialise in up to 3 A Level equivalents in BTEC Engineering Level 3: Mechanical, Electrical, Civil
- In the *A Levels* pathway, pupils choose up to 3 A Levels (or equivalents) in: Computer Science, Maths, English Lang./Lit., Art, Physics, Chemistry, Biology.

1 £8.4 millions were spent by the Department of Education just to establish the building. The goals of UTC Warrington are: (1) to address the skills gap in Warrington, (2) to meet the future needs of industry, and (3) supply a pipeline of talent.

The Figure gives an example of units titles and sizes (expressed in Guided Learning Hours, GLH) for one group of pathways, i.e., BTEC Engineering. Total GLHs are 3,480, divided by 80 weeks (the school working weeks in 2 years) it is 43.5 GLH a week.

All three pathways include Extended Project Qualification and PRINCE2 Project Management. The Engineering pathway adds Core Maths. Professional Qualifications are an important specific tool for students' access and success in industry. Extended Project Qualification (EPQ) has the role of showing employers and universities how able the students are to develop their own ideas.

Alongside all Y10 and Y12 pathways, there is an Employer & University Engagement offer of Master classes, Technical projects, Work Experience, CV & Interview coaching, Industry mentoring and more. Strengthening of core competencies happens in line with getting insights into different kinds of jobs (the vocational aspect).

For all students, the enrichment activities offer includes Army Cadets (CCF), Duke of Edinburgh Award, Green Power Racing, Sport, Gym, Sailing, STEM Ambassadors, Coding and more. Enrichment activities are integral to the curriculum as they are aimed to develop students' social, cultural, technical and sporting skills.

The pre-apprenticeship programme is for 16 years old students who are not yet ready to go on apprenticeship or university. It is a 1 year program especially for SEN (Special Education Need) youngsters with special needs in core subjects (English, Maths). It includes a Level 2 post 16 course and Maths and English resit (to grade 4). Then it also includes Enrichment activities, Employer & University engagement, and work experience.

What is different about the curriculum at UTC Warrington? Most main features are common to the UTCs system: Master classes, Drop down days, Technical challenges/ Project-based learning, Work experience, Industry mentoring and University visits. Academic Subjects (such as Maths, English, Geography) are fairly traditional – they all have exams – but they are taught in a way that is linked to real life applications, some using employers and university links. As for technical subjects (such as Science, IT, Art) they are all very practical– but they all have exams. Of course they are linked to real life applications, they make heavier use of employers and university links, and they are characterised by a digital focus. For practical activities, UTC Warrington offers £1m Specialist Equipment.

2.2 Employability skills

UTCs consider "employability skills" as a feature of competitive advantage and, as such, a priority in teaching and learning. Employability skills give students the confidence and interpersonal skills that they will need to succeed in industry. Employability skills at UTC Warrington are developed through Work Experience and Master Classes, but also — especially in the GCSE Professional Charter — through a planned school culture and specific teaching. The Business Dress code and adult environment, for example, contribute to reflect industry. There are core business hours and Soft Skills development activities.

UTC Warrington has adopted the PiXL Edge skills model, conceptualising employability skills as:

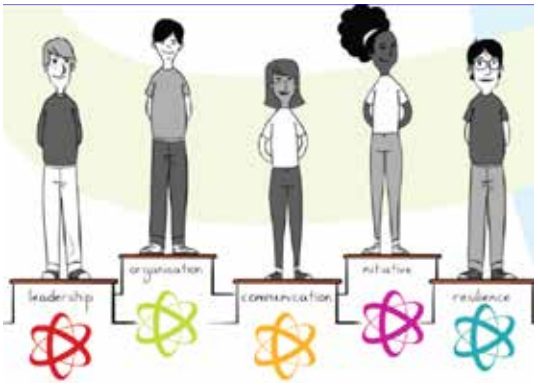
- Leadership,
- Organisation,
- Reliability,

- Initiative,
- Communication.

The PiXL Edge skills model is also acronymised as LORIC. Interstingly, the same model used for students' development is also used for teachers' professional evaluation and development (see next section 2.3).

Applied to "outstanding learning", the LORIC skills are declined as follows:

- *Leadership* is planning, checking and self-correcting your learning to improve: it happens when you plan your learning carefully thinking about what to include / what to be aware of; you self-check your learning to see what is missing and make changes to improve; you embrace opportunities to extend and consolidate your learning outside of lessons. Planning, checking and self-correcting your learning to improve.
- *Organisation* consists in thinking critically, investigating ideas and being rigourous; it happens when you explore and investigate ideas; you are meticulous and precise in your learning; you are focussed on the best possible outcome by always giving your best efforts; you are proud of your learning and share your ideas with others and celebrate.
- *Resilience* consists in maximising your capacity to learn and improve; it happens when you persevere if you make a mistake or find something difficult and understand that this is an important part of learning; you find strategies to overcome difficulty; you believe in hard work leading to success.
- *Initiative* is taking an active role in your learning; it happens when you are absorbed and engrossed in your learning and demonstrate curiosity; you embrace challenge as an opportunity to learn; you can work well on your own, in pairs or as part of groups; you learn from feedback and mistakes so that you can improve; you ask questions about your learning to help you improve.
- *Confident* communication means expressing yourself and conveying ideas and information primarily through spoken and written language but also other media such as visual arts, sports and technology. Confident communication happens when you share your ideas with conviction, you articulate your ideas clearly and use this as an opportunity to refine and improve your thinking, and you use subject specific terminology and apply it to your learning.



2.3 The Framework For Teaching and Learning

UTC Warrington has built a shared vision and agreement ("non negotiables"), a holistic picture of quality teaching and learning. The shared vision has been used to develop 'Teacher Profiles' that are be linked to Continuous Personal Development (CPD) Programme for Quality Assurance and Continuous Improvement.

The process of building the shared vision was collaborative, and it was initiated by looking at research such as the "Sutton Trust Review" (Coe et al. 2014). According to the review, "Great teaching is is defined as that which leads to student progress", and diffe-

rent factors have different impacts on student learning. There is strong evidence for impact of (1) Pedagogical (Content) Knowledge and (2) Quality of Instruction; there is moderate evidence for impact of (2) Classroom Climate and (3) Classroom Management; and there is some evidence for impact of (4) Teacher Beliefs and (5) Professional Behaviours.

The UTC Warrington vision links outstanding teaching, thirst of learning and success of students. Marking, Planning and Teaching are three activities that must be closely correlated and refined in a continuous cycle.

Guidelines for teaching are supposed to help for example there is a typical lesson format available to teachers. It is structured as follows:

- *Stimulus:* The lesson should start with an initial stimulus that will capture the attention of the students and draw them into the lesson.
- *Recap:* We need to ensure that the students can recall previous learning related to the lesson and to help them to see how they are going to build on this.
- *Input:* The teacher introduces the new concept or skill as concisely as possible.
- *Model:* The teacher models the learning that the students are going to be involved with and provides a framework that sets clear expectations for the quality of the outcomes.
- *Develop:* As the students gain in confidence, provide opportunities for them to use and adapt their understanding and knowledge.
- *Evaluate:* How much progress have the students made? Are there aspects that need re-visiting. How do you/the students assess the success of the learning?

Outstanding teaching at Warrington is, as anticipated, shaped by the PiXL Edge LORIC model of soft skills:

Leadership:

- Challenge is embraced as an opportunity to learn and pace is set according to depth.
- Questioning – Teachers use skillful, probing and differentiated questioning that challenges all.
- Difficulty is legitimised as part of learning.
- Differentiation – Teaching is adapted to the needs of all students and planning is informed by a meticulous understanding of students through marking/data analysis.
- Quality First Teaching challenges and supports all students to achieve.

Organisation:

- Explanation – Teachers begin with the end in mind and contextualise the learning by being explicit about what the sequence of learning is.
- Teachers break down complex ideas clearly for students.
- Modelling – Teachers guide students through practice and provide models so that students are clear how to apply the knowledge and skills.
- Memory - Teachers build on prior learning and build in regular and varied opportunities for recall and assessment to improve and check students' understanding.
- Feedback – Students anticipate and respond to feedback so that they can reflect and improve.
- Homework consolidates learning and deepens understanding as part of a greater sequence of learning.

Resilience:

- High expectations – Students are meticulous and precise – there is an expecta-

tion of hard work as teachers constantly demand more. Students are encouraged to focus on the best possible outcome.

- Fostering Resilience – Students know that thinking hard leads to learning and are prepared to take risks and learn from their mistakes.
- Positive, purposeful and ambitious learning environment – All students demonstrate excellent attitudes to learning and are encouraged to achieve, often beyond their target grades.

Initiative:

- Being explicit about the processes of learning – Teachers break down the approach to learning in clear steps so that students can understand this too. Teachers share their thinking to show how marks are awarded so students can see how to progress.
- Encouraging student ownership of learning – Students develop checklists/learn to self-check their work so they know what to include/what to be aware of. Students are encouraged to articulate their ideas.
- Making Connections– Teachers signpost where students learn skills that can be applied across a range of subjects.

Communication:

- Awe and Curiosity – Teachers create interesting hooks and link learning to the outside world.
- Joy - Teacher passion and enthusiasm celebrates intellectual curiosity and achievement.
- Teacher agility – Teachers respond and intervene through assessment in lesson often using errors and misconceptions to improve student learning.
- Depth – Teachers encourage students to engage with content at higher levels and extend their skills.
- Subject specific language – Opportunities for literacy are grounded in the explicit teaching of subject specific terminology and texts.

There are many methods simultaneously used to monitor the performance of school teaching and learning: Teacher on a page, Department for Education visits, AFL visits, SLE support, Literacy review, External consultants review, Lesson observations, Book sampling, Learning walks, 'Mocksted'.

The "teacher on a page" (Fig. below) is an observation grid for teaching activity review.

Teachers are visited in the classroom 6 times a year by Learning Walks. After observation and students' feedback, strengths and "areas for development" are identified for each teacher. Personal Development Plans are made by considering also the Whole College Priorities, which for example are currently the following:

- Ensure students make rapid and sustained progress from entry in reading;
- To close gaps in attainment and progress – Pupil Premium, Most Able (Level 5) and Boys;
- Whole school focus on Year 11 and key male cohorts, particularly in English and Maths;
- Ensure curriculum is appropriate for all students so that they can achieve and progress on to positive destinations;

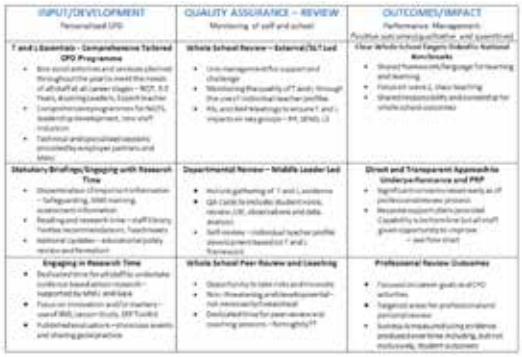
In turn, the Whole College Priorities result from Teaching, Learning and Assessment reviews, yielding that:

- Literacy and reading across the curricu-

lum,

- Formative assessment/marking and feedback and increase consistency, validity and the quality of assessments,
- Use of data to inform teaching and learning,
- Quality assurance of medium and long-term planning to ensure that formative assessment and AFL impacts on outcomes,
- Develop teaching and learning pedagogy to improve the quality of teaching and learning so that all teachers meet appropriate career stage expectations,
- Develop secure subject specific knowledge for teaching staff.

So the school strategy is constantly monitored and updated, and inputs/developments are linked to quality assurance methods and to expected outcomes and impacts, like in the Table.



Timing and specific organisation practices such as Middle Leader Meetings, Faculty Progress Meetings, Whole school briefings, Year Team Meetings, Pick and Mix CPD are in place. There is also a philosophy of Choice and Flexibility, Development and Peer to Peer Support, and Leadership Development and Distribution. The elements of "quality assurance" of outstanding teaching and learning at Warrington are data monitoring and evaluation, course review, CPDs, aspirational target setting/review, Regular Line Management and effective PM, and success celebration.

2.4 Admissions and destinations data

For 2018/19 UTC Warrington has 100 places for Year 10 and 100 places for Year 12. For Year 10 there are no entrance criteria. The application form must be sent by 14th December. Entrance criteria for Year 12 are course specific:

- for A Level study: Grade 6 or above in relevant courses
- for BTEC Level 3: Maths and English Grade 4 or above
- for Pre-Apprenticeship: Maths and English Grade 3

The families' FAQ in evaluating UTC Warrington for their kid are:

- UTC Warrington is fairly new and doesn't really have a track record. How can I be assured my son/daughter will get a good education?
- Is UTC Warrington linked to other UTCs?
- Is UTC Warrington likely to close?
- Do I need to tell the kid's current school he/she is leaving for the UTC?
- Will we get a place?
- Will all lessons be practical?
- Are qualifications the same as other schools?

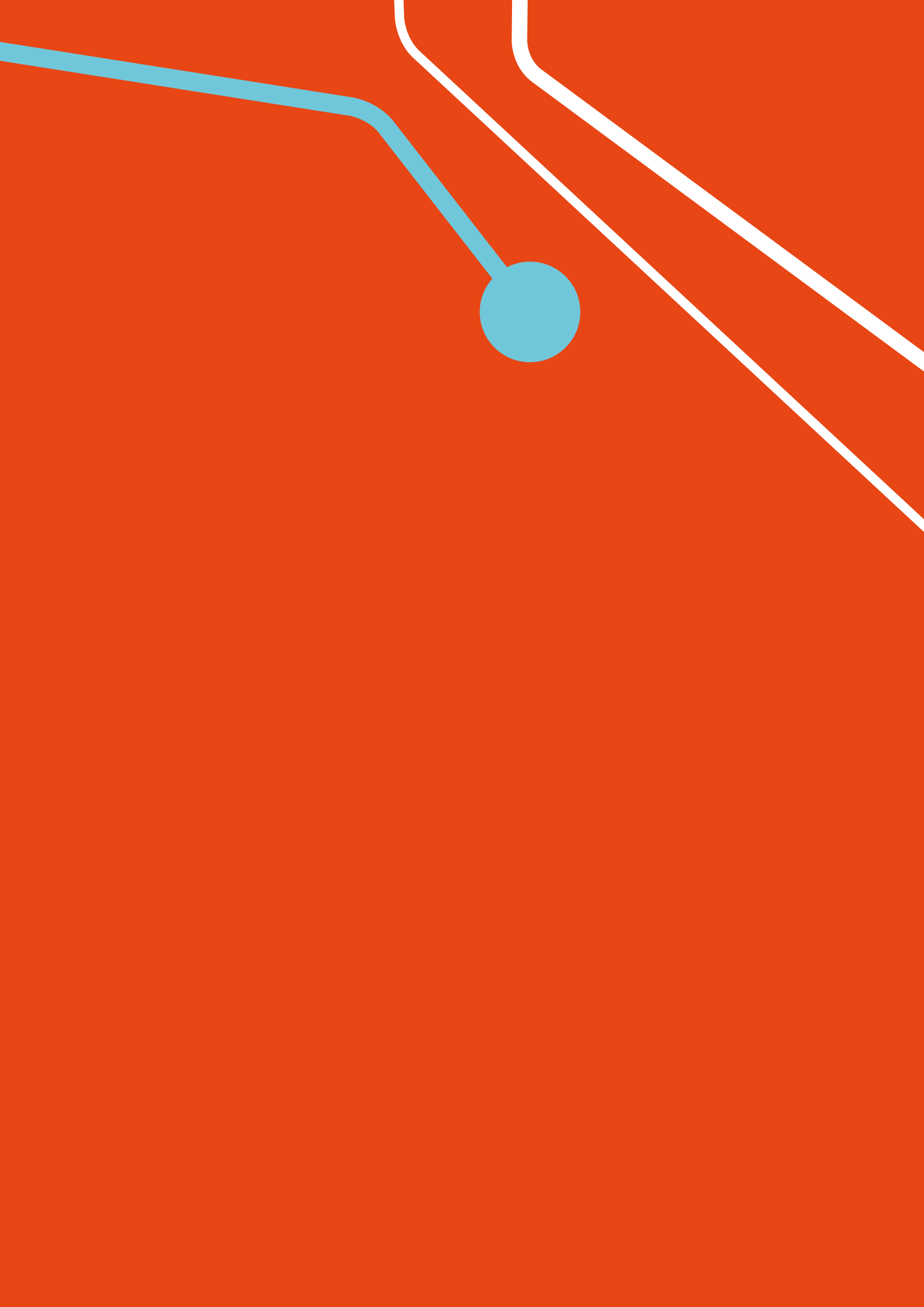
Concerning destinations, the latest figures are based on 1212 students who left UTCs at the end of Year 13 in July 2018. Overall 97% stayed in education, started an apprenticeship or started a job. This breaks down as:

- 44% of UTC leavers went to University (up two percentage points from previous years)

- 27% of UTC leavers started apprenticeships (up three percentage points from previous years)
- 16% of UTC leavers started work (up three percentage points from last year)
- 10% stayed in other forms of education (mostly FE College).
- More recent figures say that:
- 34% leavers went on Apprenticeships or Degree Apprenticeships
- 32% leavers were accepted onto STEM related University degrees
- 34% leavers entered the world of work

The Level 3 Apprenticeship offer was launched in September 2018. It consists in a partnership with a large, national employer and it can last up to 4 years: Year 1 Full Time at UTC Warrington, Years 2 – 4 one "day release" at college and 4 days on site.

Employers often want Level 3 BTEC in Engineering or A Levels in STEM subjects. Many employer partners now offer Degree Apprenticeships, through which the leaver student (18+ years old) can earn a salary starting on £15k whilst obtaining a degree.



THE CONCEPT MODEL

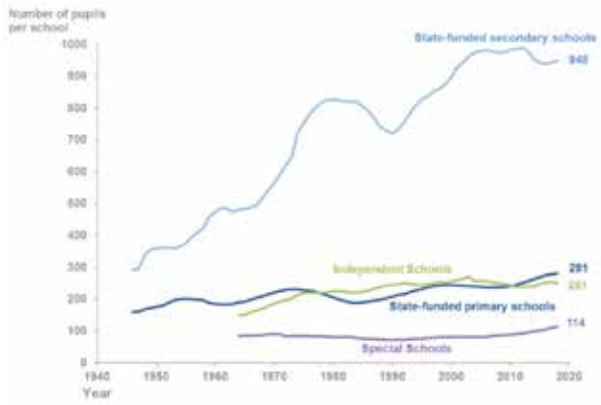
This section is the result of desk research based on available UTC documents and on a study visit conducted at UTC Warrington. By "concept model" we mean the attempt to identify the distinctive elements that underpin UTCs and the logical structure that connects these. In short, the concept model represents the “ideal-type school model” to be striven for.

3.1 The size dimension

UTCs host 600-650 students on average (up to 800). They are thus smaller than traditional secondary schools. According to the National Statistics "Schools, pupils and their characteristics: January 2018" (Department of Education UK, 2018) the average number of pupils in state-funded secondary schools is not as high as in 2010, but still 948, and rising.

The largest UTC in January 2016 had just over 570, the smallest fewer than 50. The majority had between 100 and 250 pupils.

The number of pupils is kept small by method and design. The complexity of the curriculum and the relatively brief time that students are in a UTC before external examinations makes monitoring students' learning even more important than in most schools. Each UTC aims to be a robust system which, combined with the small size of each year group, ensures each student is supported in making their maximum potential progress.



Average pupil numbers in state-funded primary and secondary schools in England, 1947-2018. The average size of all school types apart from independent schools increased in 2018, with secondary schools reversing the drops in average size in recent years (Department of Education UK, 2018, p. 5).

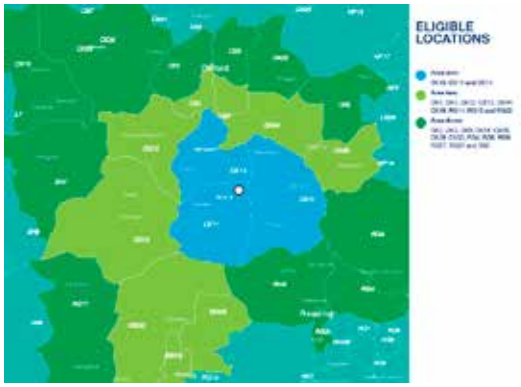
3.1.1 Catchment area

The catchment area of a UTC may span several local authorities (while a mainstream school usually spans only one).

When preparing an application (Department of Education UK, 2015; Department of Education UK, 2015), the UTC trust will have looked at local context such as parental demand, employer skills' needs, and where there is a need for places. This information is used to target the efforts. UTCs with large sub-regional catchments must ensure they consider the audiences across the entire catchment; this will include neighbouring local authorities, schools and colleges, parents and their children. Equality issues must be considered as part of the UTC's marketing, for example, to ensure that different ethnic groups in the locality can access the information or that the marketing material is attractive to both males and females.

The UTC can give priority to children who live within a distance of, for example, two, three four or five miles of the school – but it must be clear how that distance will be measured, for example how you will distinguish between two children at the same address, in a block of flats, for instance. As UTCs serve a sub-regional area, catchment is often described in terms of concentric circles, geographic areas, zones or nodal points. Any catchment must be reasonable and clearly defined. It is not lawful to define a catchment area which has entirely the same boundary as the local authority, as it would breach the Greenwich Judgement. The

Greenwich Judgement (1989) established that schools must not give children living outside the school's home local authority lower priority for admission for the sole reason that they live outside the local authority's administrative boundaries.



Example: UTC Oxfordshire catchment area http://www.utcoxfordshire.org.uk/catchment-area/

Example: Heathrow UTC catchment area http://www.heathrow-utc.org/frequently-asked-questions/.

3.1.2 The building

Physical space and staff are sized accordingly. Most UTC applicants have already identified a site before applying. The typical formula is 'peppercorn lease' (i.e. for nil consideration). A 125-year peppercorn lease is the department's preferred type of tenure, as it ensures long-term security for the UTC as well as value for money. Certainly, where the site is in the ownership of a public body or one of the key sponsors of the UTC, it should be acquired on the basis of a long-term peppercorn lease.

UTCs normally do not require the construction of a completely new building. Existing premises already identified by the sponsors can be refurbished or remodelled, and the DfE (through EFA, the Educational Funding Agency) will provide funding to ensure the new UTC is functional and complies with all relevant legislation. EFA discusses the suitability of proposed premises follows the feasibility study stage. Approval into the pre-opening phase does not constitute endorsement of the initially proposed site which may eventually not be the most feasible one: it may be too small or too big for the number of pupils; it may not actually be available in the time needed to open the new UTC; it may be too expensive to maintain. If the preferred site is not feasible/appropriate or if there is no suitable site already identified, the EFA ask property advisers, work with the applicant, visit and assess the preferred site, carry out a high level title review of the site, assess the good value for money, then the more in-depth feasibility study begins.

The vast majority of acquisitions are made in the name of the UTC trust by peppercorn rent lease, freehold purchase, or commercial lease.

Negotiations are very commercially sensitive and public disclosure can seriously undermine the negotiating position, so the applicant is asked to keep them reserved.

In some cases UTCs have opened on a temporary site before being relocated to their permanent building. Temporary solutions can come in many forms depending on what is needed and what is available. Still, the funding agreement can only be concluded once the Heads of Terms for the site have been secured.

UTC Cambridge Building

UTC Warrington building

UTC Wigan building

3.2 Time and space management

3.2.1 A proportioned physical space

Some UTCs are built from the ground. Others are opened in existing buildings, appropriately refurbished. In all cases, the design of spaces in a UTC is aimed to:

1. reflect the work place
2. provide students and teachers with opportunities to practice different types of teaching and learning.

3.2.2 The teaching rooms and other spaces

The UTC is divided into very different teaching spaces. Rooms are organised by subject matter, so they are set up to collect subject-specific materials and knowledge supports. Accordingly, rooms are also sized and furnished differently (tables, desks, chair, air-chair, storage furniture etc.).

Science rooms are provided with small sinks to teach and suggest right hygienic habits.

The school space is highly diverse, providing for several kinds of settings, overcoming the traditional distinction between classroom and corridor.

Each floor offers areas devoted to common activities (hangout and bar) as well as for learning, such as the computer lab in the hall. Students are not allowed to use common spaces outside break time. Only older students when they have free time can use them (young students do not have free time except for breaks).

The common space at one of the 5 floors.

Restaurant.

At UTC Warrington, restaurant and bar are managed by the Academy Catering, whose workers are UTC employees. This catering is getting a small profit.

UTC Warrington has a flexible theatre hall that can host assemblies, employers' meetings etc.

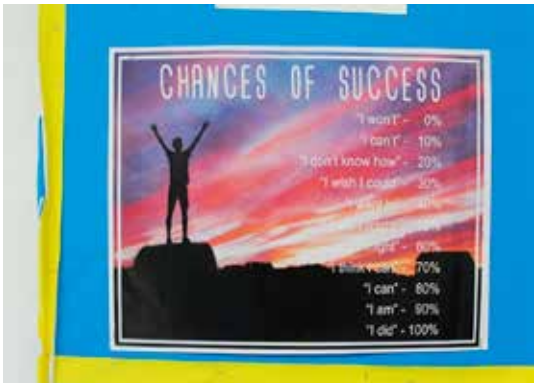
UTCs typically lack outside space for sports: some UTCs have built one more floor on the top for sports activities.

3.2.3 *Walls*

Classroom, lab and corridor walls are seldom empty. Instead, they are filled with several kinds of contents, especially:

- Motivational communications and/or general tips to study and stay focused,
- Students' works in the particular subject to which the room is devoted,
- Knowledge and know-how, again related to the particular subject,
- Interactive posters with activities repositories,
- Safety instructions,
- Reminders of LORIC employability skills,
- Employer branding (especially in rooms with technological equipment).

Examples for each kind follow:



Motivation: "Chances of success"

Tips: "23 ways to learn faster"

Students' works: "The cat speaker"

Knowledge posters in a computer lab

Safety instructions

Key terms in science”

LORIC employability skills

Random activities for waiting times

Employer branding in rooms with technological equipment.

3.2.4 Equipment

UTCs specialise in subjects that need modern, technical, industry-standard equipment, such as engineering and digital technologies, and teach these disciplines alongside business skills and a broad, general education. The overview of UTCs provided by the UTC website maintained by the Baker Dearing Educational Trust provides further details, specifying that a UTC must have "the latest equipment and technology used by industry" to create an environment where students can thrive and develop the abilities that industry needs.

According to McCrone et al.'s (Evaluation of University Technical Colleges, NFER (the National Foundation for Educational Research) commissioned by The Royal Academy of Engineering & The Edge Foundation, 2019) report, students are aware of the technical skills they acquire, and they value the enhanced opportunities for 'hands-on' learning, noting their improved confidence in using technical equipment. Some students recognise that the development of these skills is also facilitated by opportunities to engage with employers and use industry-standard technical equipment (p. 24).

Equipment is also an integral part of Project Based Learning: students are able to undertake projects that are meaningful for the employer because they can also access the real, state-of-the art equipment that is appropriate and necessary to do that kind of work.

At UTC Reading,

One example of a CoTeach project is where the Royal Electrical and Mechanical Engineers (REME), a corps of the British Army that maintains the equipment that the Army uses, works with the UTC's Engineering Department to deliver a unit of the Level 3 BTEC Diploma in Engineering. Securing the commitment of senior REME staff is important, as is the steer to REME to work with the UTC in order to develop a more cohesive approach to recruiting engineers. The UTC and REME have worked together to create an appropriate brief that will meet the BTEC assessment criteria. One senior leader at the UTC pointed out that: 'you need an employer who has the confidence' to query educational terminology, such as assessment criteria and schemes of work (p. 20).

The provision of technical equipment is done in close cooperation with local/regional economy and universities: machines, tools, infrastructures are typically provided by partner employers with no cost for the school. The equipment will thus be new, in line with those found in actual work places.

At UTC Warrington, right at the entrance the visitor can see the workshop through a glass wall, getting to see the school technologies and various equipment.

Rooms that host industrial technology are often characterised by messages and posters by the providing sponsor, conveying their philosophy and support to students, but also, sometimes, presenting the attractive aspects of the company as a future employer.

3.2.5
A longer school day

To achieve an in-depth technical curriculum within a broad education and ensure all students take part in extra-curricular activities, UTCs have a longer school day. Employers appreciate students experiencing a day which reflects normal working practices. Most UTCs work from 8.30 to 5 although this varies slightly to fit in with local transport arrangements[1]. Often there is an earlier finish on a Friday.

From 8.30 to 9.00 youngest students (year 8-10) are welcome to get ready for the day (to be involved in the process and make sure about uniform, equipment, timetable, and for phone calls by/to parents,..).

Each day from 8.30 to 9.00 the Personal Development program is scheduled focusing on Soft skills and school priorities values ('Excellence and Kindness Culture'). The program is run by a head faculty teacher and his assistant. He or she has developed materials and timetables, so to make each teacher able to follow the program.

The Enrichment activities (volunteer session) are scheduled each day from 15 to 17 ; extra-teaching can be also provided for max 5 students groups.

Enrichment activities means different options achievable for students.

1 For example, a UTC in London finishes at 5 pm, while a UTC 10 miles from Warrington finishes at 4.30.

3.2.6
A denser school year

It is recommended that UTCs have two weeks less holiday than mainstream schools. The academic year lasts 40 weeks (39 + 1). The first one, at the end of August, is dedicated to welcome new students and to inform them about the building, dress code, standard behaviour, etc. Besides, at the beginning of the school year, new students are tested in English and Math to assess their initial level.

The Enrichment Week runs every year (on July), focused on Personal Development. Various activities are organised, both inside and outside school.

3.2.7 A well structured timetable

"timetable is an art"
by Lee Barber, Head of UTC Warrington

A well structured timetable significantly aids students' learning and makes cost effective use of members of staff and facilities. A rigid timetable which is the same every week over the whole year is unlikely to make the best use of facilities and does not reflect what students will find in the work place or a university. So most UTCs occasionally vary the timetable to provide longer blocks of time for specific activities. A few are more radical in making more regularly change. The small size of the UTC and the holistic curriculum planning assist in this approach.

Length of teaching periods varies from UTC to UTC. The most common is multiples of an hour but other lengths from three hours to multiples of 15 minutes have been used. So a lecture can actually last between 15 and 180 minutes.

UTC Warrington provides teachers with a standard lesson format. Of course it is not mandatory and it can be adapted and personalised in various ways. However, it contains intuitions and indications coming from empirical findings and it is aimed to aid towards the ideal of "outstanding teaching and learning".

Employer projects are usually scheduled in blocks of at least two hours. Some UTCs make use of 'Drop Down Days', also known as 'off-timetable' days, in which structured classroom lessons are replaced with activities used to strengthen students' practical application of skills to provide a deeper learning experience. But the use of Drop Down Days may change from year to year. The UTC Reading, for example, used to deliver projects through UTC-wide 'drop-down' days, but as the number of young people attending the school grew, senior leaders felt they were not achieving sufficient return on investment in terms of employer input. So they retained the same number of 'drop-down days' but now use them for activities such as soft skills workshops, mentoring, careers talks and employer talks.

At the Liverpool Life Sciences UTC:

Students are timetabled two periods each week to participate in industry-inspired projects, generally working in teams. For example, Jaguar Land Rover provide a challenge that runs for five weeks during which time students have to measure the depth of water in a glass to a very high degree of accuracy. No special equipment or resource is needed for this, but it is a fundamental question in engineering i.e. how to measure, and how to understand measurement and its importance. [Example from LIVERPOOL LIFE SCIENCES UTC in McCrone et al. 2019]

As for work experience, UTC Warrington for example foresees 2 weeks during the academic year, not the same weeks for all students (otherwise the company and the person responsible at UTC would not have time to supervise the students). More time at work could be spent using school holidays.

Most UTCs arrange for students to carry out independent learning within the day to avoid the need for homework. This is popular as it reduces conflict at home and compensates for students who may be travelling some distance, not arriving home until early evening.

3.2.8 Attendance monitoring

There is no compulsory attendance ruled by national law. The average attendance in UK is 95.4% and UTCs are compared with that during Ofsted Inspection. Anyway studen-

ts' attendance is monitored by means of an electronic register. Staff members always wait at the entrance for latecomers and ask for an explanation. Teachers call families in case of unjustified absence.

3.2.9 Groupings

Small groups are a distinctive feature of UTCs[2]. About this feature, a student said "Moving from a mainstream school with over one thousand students to the college, with less than half the number of pupils, was strange at first but I soon got used to it. Everybody gets on with each other, which will help when we all go out into the working world where you have to get on with everybody even if you don't want to. The numbers make our class sizes smaller too, which means the teachers can help each student more so everybody understands" (a Year 12 student on p. 12 of "A practical guide to the UTC curriculum").

How students are grouped is a very important decision for the UTC. While there is no right or wrong way to do this, there are some guiding principles.

Not all UTCs place students in ability sets. When they do, they often wait a term before making decisions which can then be based on the students' progress and ability assessment. In fact, a guiding principle is that attainment of students in their previous school may not reflect their ability. When students experience the different UTC environment their learning is accelerated.

Even if students are taught in mixed ability groups there should always be a baseline assessment so that student progress can be demonstrated, especially as part of an Ofsted inspection. In mixed ability groups, teachers may, for example, give assignments to 3 different student levels (A-B-C): each level has different goals and task.

Personalised learning is very important: students make progress according to their possibilities, meaning within the same lesson you have different groups. Instead of having a 'middle' teaching aiming to the average, everyone should make progress (top students as well as students with disadvantage). The pupil is made responsible as well to choose the task and outcome. In this way, for example, top students will pick the most difficult tasks and will not get bored. Differentiation is another way to put this principle: teach to different groups in different ways so that all can progress. Teachers work as facilitators of the group's and each individual's work.

Grouping is not solely about ability. Some UTCs use mixed age groups in employer projects[3]. sThis approach offers very interesting benefits such as younger students learning how to plan projects from older students and the opportunity for students to learn how to lead and work in teams of people with different backgrounds and experience.

Teams for Project Based Learning meeting a few hours a week for several months (see below) generally comprise students groups from across the year who have shown an interest in the topic, although experience of Student Professional Development (including PBL) varies across the year groups, with less time available for project work at key academic times such as pre-GCSE and A level examinations.

If a UTC has two specialisms it may wish to consider how this affects grouping. In some UTCs where specialisms are related e.g. toto each other engineering and construction, students are taught together for a while before they make their choice of specialism. Even when the projects are less related e.g. health technology and digital media, involving students in common projects widens students' experiences.

2 Although, of course, the size of groups also depends on the yearly economy of the school, ultimately on how many teachers are available.

3 Note that if a UTC adopts this approach, it means planning double the number of projects (see below) so students do not repeat them.

Small, mixed-age project team

Small mixed ability group

Larger group

3.3 The organisation dimension

Each UTC is run by an "academy trust": a charitable company limited by guarantee. Trust Members appoint the trustees who, in turn, run the UTC. The trustees are the governors and the company directors, but to avoid confusion, the preferred terminology in all official documents is 'trustee'.

3.3.1 Roles and figures

There is no common management structure, each UTC can choose its own. However, in general the UTC organisation is "flatter" compared to mainstream schools. UTCs are small schools which do not require a large departmentalised structure and a large number of senior posts is unaffordable. On the other hand, salaries have to be sufficient to attract applicants. Many UTCs find the answer to be a flat structure in which all staff are paid a reasonable salary and in which members of staff have several responsibilities. Staff may be expected to teach more than their counterparts in mainstream schools. Staff are often attracted by the opportunities UTCs offer for innovation and personal development rather than solely by the salary or other terms and conditions.

Management structure at UTC Warrington. UTC organisation is "flatter" compared to mainstream schools: all staff are paid a reasonable salary and members of staff have several responsibilities. In this case we have an Assistant Principal and a faculty leader for almost every department, with some assistant faculty leaders. 9 people are in the Business Support Department (led by the Business Director), there are a Vice Principal, the Principal & Chief Executive (with an executive assistant) and a Partnerships Manager (a consultant). Assistant Principals' areas of competence are Teaching, Learning and Assessment; Inclusion; Personal Development; Operations; and Employability and Destinations.

For qualified teachers, UTCs can offer their

own contracts of employment. The national school teachers' contract has a number of restrictions which make it very difficult to operate a UTC, not least the length of the school day. There are a number of model contracts UTCs have found useful but it is important that each UTC considers what it requires from a contract, deciding on key terms and conditions e.g. length of day and holiday periods and requirements to attend training. These may vary from senior posts such as vice principal to staff with less responsibility. These requirements are then drawn into a contract by an appropriate human resources advisor or lawyer. Often an employer sponsor is able to help with this.

The school governance manages the relationship with the Trust, from which there is a pretty large degree of autonomy. There are persons in charge of different aspects, for example of modelling and organising the 'Student personal development'.

Staff structure is important in ensuring that the curriculum is planned as a whole. If the structure reflects that of mainstream schools, fragmentation and empire building will result. To achieve the blend of practical, technical and academic education, staff members must be recruited from a variety of backgrounds. Some will be qualified teachers; others will come from employment in the specialist area. In both cases they will need an induction period and continuing professional development to achieve different things.

For qualified teaches important achievements will be:

- an appreciation of the implication of working in an institution driven by employers and a university;
- an understanding of how to work through employer-led projects integrating their specialist subject;
- when teaching their subject in discrete lessons, understanding the potential of relating it to the UTC's specialism;
- the planning of a student's curriculum holistically rather than in separate subject areas as would be normal practice in most schools and colleges;
- working in multi-disciplinary teams which include people from different backgrounds and with different skills, appreciating that the teacher is not the "top professional" in the UTC.

Teachers with an employment background will be more likely in need to achieve:

- an understanding of how young people learn;
- an understanding of the education landscape such as qualifications and Ofsted;
- an appreciation of the expertise that experienced teachers bring to planning teams;
- an understanding of the requirements of academic subjects which may not be related to the UTC specialism but which are necessary to achieve a qualification.

In an ideal world qualified teachers and people with an employment background would work together effectively to achieve their objectives. In reality, different people join the UTC at different times and even with good will people need to have a framework to work with. It is important, however, that in any training scheme the two groups work together, contributing to each other's understanding. It is vital that teachers who are appointed from traditional schools and colleges bring their experience whilst considering how to teach their subject in the light of the UTC philosophy. Professional development is hence a key policy which is devised either before or during early staff appointments. 'Teacher Profiles' are linked to Continuous Personal Development (CPD) Programme for Quality Assurance and Continuous Improvement.

3.3.2 The relational dimension: relations with companies and employers, relations with universities

Companies are active in the UTC with different roles: master classes, work experiences of 2 or more weeks, staff training, PBL (Problem Based Learning) projects, business mentoring, apprenticeship programme. In some UTCs, employers are more active in shaping the curriculum. They are represented in school by pieces of technology and advertisement (posters etc.), to inspire students.

Universities are responsible to both collaborate with the school to shape the curriculum, and cooperate to orientation and information about university-level training and the professional roles requiring it.

A central database is maintained so that students and staff can keep track of their engagement with employers - through for example, projects, work experience and placements - and to help students build portfolios of evidence to support their future pathways. It is fundamental, in fact, to follow up and record all connections with employers systematically, and ensure the senior leadership team has access to activity records.

One example of a CoTeach project is where the Royal Electrical and Mechanical Engineers (REME), works with the UTC's Engineering Department (this project has already been mentioned in section 3.2.4) .

One senior leader at the UTC pointed out that: 'you need an employer who has the confidence' to query educational terminology, such as assessment criteria and schemes of work. The employer described the project life cycle as having three phases:

1. The 'understanding' stage where the young people are briefed on the project at a launch day at the REME site where they can gain an understanding of the organisation and the problem that underpins the project. The fact that the project encompasses real-life problems requiring innovative solutions is critical, for example an enhancement to a small tank to enable the secure location of a radiator. The REME interviewee explained: 'The project is authentic because it is a real-life project which can make a difference in reality'. UTC and REME staff believe that the young people respond well to the challenge of genuine problem solving. They have a tour of the army equipment, take photos and talk to the engineers.

2. The 'support' stage where the young people return to the UTC, decide on the particular project they want to work on, are allocated to teams and start to work on solutions to the problems. They are supported by REME who supply engineers to mentor and advise young people, four times over the course of the project, as the young people develop their solutions. The young people may also return to the REME site to, for example, take additional measurements or photos.

3. The 'recognition' stage where a small panel of military staff will go to the UTC and be briefed on how the projects have progressed and how the enhancements to equipment work. The young people will present their work and take staff through an exhibition. The panel will grade the projects and the winning two teams will progress to a final stage where their projects will be appraised alongside those from other colleges. UTC staff will consider the projects according to the BTEC assessment criteria.

Following completion of the projects, UTC

and REME staff will jointly hold a debrief to consider what went well and how things can be improved for the following year.

3.3.3 The curriculum: professional skills and socio-emotional dimensions

In Part I we have seen the "curriculum principles" of UTCs: the curriculum is driven by employers and university; technical, academic and practical education are valued equally, and academic subjects are kept linked with the technical specialism; the curriculum must be holistic; employability skills are explicit and integrated (see Section 3.5.3); and enrichment activities are an important element. Also, the curriculum at UTC has three fundamental references:

1. the National standards
2. the local employers' needs and contributions
3. the UTC pedagogical model

3.3.4 National standards

As for the National standards, in the UK these dictate the notions and skills students should have achieved (to pass Nationally organised exams). They do not establish minimum or maximum amounts of hours for each subject: there are national guidelines, but not mandatory. This makes a high degree of personalisation possible.

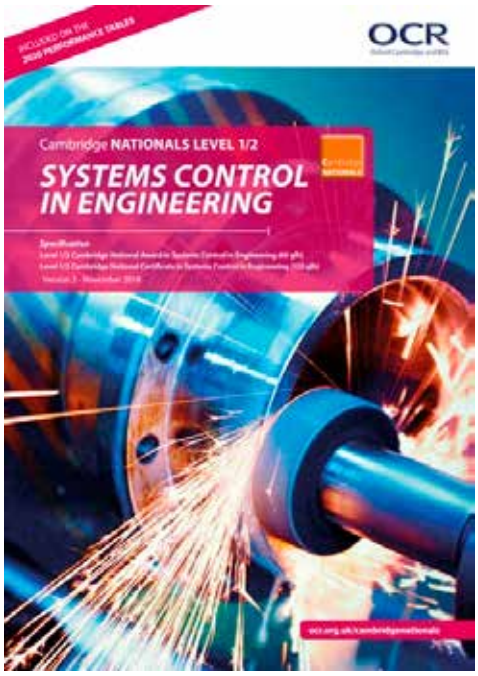
UTCs aim to accompany their students reach BTEC Business & Technology Education Council qualifications or the Cambridge Nationals qualifications.

BTEC courses in the UK are high quality, hands-on qualifications grounded in the real world of work. They are characterised by specialisation, learning by doing , and valuable skills. Designed in consultation with employers and professional bodies, BTEC qualifications aim to provide high employability in the chosen industry.

Cambridge Nationals are vocational qualifications, equivalent to GCSEs, for 14–16 year olds. Recognised on performance tables (up to 2022) each qualification goes from Level 1 to 2. They provide an excellent foundation for progression to Cambridge Technicals and other Level 3 vocational qualifications as well as A Levels and apprenticeships.

Examination of students will be provided by the consortium that maintains the chosen standard.

Example: BTEC Level 3 National Extended Diploma in Engineering - Specification. Employers, professional bodies and higher education providers that have worked to the standard include: Cisco Systems, Engineering Council Network Rail, Nottingham Trent University Parafix, Royal Academy of Engineering, University of Exeter, University of Northampton. Qualifications have been approved by the engineering professional bodies on behalf of the Engineering Council as contributing to the requirements for professional registration as an Engineering Technician (EngTech). The professional bodies include: The Institution of Engineering and Technology (IET), The Institution of Mechanical Engineers (IMechE) The Society, of Operations Engineers (SOE). In addition, universities, professional bodies and businesses have provided letters of support confirming that these qualifications meet their entry requirements. These letters can be viewed on our website.



Example: Cambridge Nationals Level 1/2 in Systems Control in Engineering - Specification. It consist of two qualifications: OCR4 Level 1/2 Cambridge National Award in Systems Control in Engineering (requires 60 GLH in total); OCR Level 1/2 Cambridge National Certificate in Systems Control in Engineering (requires 120 GLH in total).

3.3.5

The local employers' needs and involvement

As we have seen in Part I, each UTC is backed by employers and a local university that work with staff to develop an innovative curriculum. The curriculum must give first-hand experience of after-school life. The UTC will thus take into high consideration the requirements from the local/regional employers.

We have also seen that not all UTCs manage to have the same level of involvement of

4 OCR Nationals are vocationally related qualifications which were officially launched by the OCR Board in September 2004 and that are now being phased out, and replaced by the Cambridge Nationals. The qualifications are designed to meet the needs of those seeking vocational education in place of the traditional, theory-intensive, academic route. Although the target audience are teenagers (14-19), the qualifications are also suitable for adult learners.

employers in the school. 3 degrees of involvement of employers may be distinguished:

- *Contextual:* where partners provide information about the workplace and activities that help to inform young people about technical and transferable knowledge and skills.
- *'Moderate':* where partners are involved in PBL but are not playing a significant role.
- *'Profound':* where partners typically take ownership of a project; input into formative assessment; influence the delivery of curriculum components; and inform teaching and learning with specialist, current, technical skills and knowledge.

Contact with employers is something which is often emphasised by students in evaluating their experience at a UTC:

We have had visits from a number of different companies, including Jaguar Land Rover and RAF Cosford. The Royal Marines also came to speak to us about the different options in the marines. All these experiences highlight the fact that engineering isn't all filing metal in a workshop, and help us to decide what we want to do in the future. Other schools don't give their students the opportunities to see the real world of work (a Year 12 student on p. 12 of "A practical guide to the UTC curriculum")

And again:

The way the UTC combined academic studies with an industrial context gave me a much better understanding of what working in the industry would be like than I could have got at school (Ibidem, a former student on p. 13)

3.4 Project Based Learning

Employer projects are a cornerstone of the UTC curriculum and are one of its distinguishing features. They are industry-relevant and most effectively developed in collaboration with local employers to ensure that the qualifications and other outcomes achieved help students to secure positive future pathways in the local area and beyond.

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. (p.1).

Menzies et al. (15) explain that PBL is a type of inquiry-driven learning based on three constructivist principles:

1. learning is context-specific;
2. students are involved actively in the learning process;
3. students learn through social interactions and the sharing of knowledge and understanding.

They note that the context of learning is provided through authentic questions and problems within real-world practices that lead to meaningful learning experiences. Patton (16) emphasises the importance of deciding the 'essential question' for a project which 'both inspires and requires students to conduct serious research' (p.38).

In their Gold Standard PBL: Essential Project Design Elements, the Buck Institute for Education (11) recommends that all projects include a focus on developing 'success skills' which are critical thinking and problem solving, collaboration, and self-management. Helle et al. (12) point out that 'the most distinctive feature of project-based learning is problem orientation, that is, the idea that a problem or question serves to drive learning activities' (p. 290). Lam et al. (14) situate problem solving in student-centred learning approaches which aim to equip students with

skills in critical thinking, collaboration and communication. They elucidate how:

They [students] pursue solutions to a problem by asking and refining questions, debating ideas, making predictions, collecting and analysing data, drawing conclusions and communicating their findings to others. (p.2)

In their education and skills annual report, Educating for the Modern World (2018), CBI/Pearson note that 60 per cent of the employers who were surveyed valued problem-solving alongside resilience and communication as one of the three most significant considerations when recruiting school/college leavers (p.23).

Bell (10) explains that PBL is a student-driven, teacher-facilitated approach through which students construct knowledge. She reports that working on projects which involve solving real-world problems deepens students' learning. Hmelo-Silver et al. (13) highlight the importance of 'scaffolding' in PBL which involves supporting students to progress and achieve deeper understanding and greater independence in the learning process:

Scaffolded inquiry and problem-based environments present learners with opportunities to engage in complex tasks that would otherwise be beyond their current abilities ... students become increasingly accomplished problem-solvers given structure and guidance... (p.100)

The role of student agency in the PBL learning process is identified within 'reflection', one of the six criteria in the Buck Institute for Education's A Framework for High Quality Project Based Learning (2015b). The other quality criteria are: intellectual challenge and accomplishment; authenticity; public product; collaboration; and project management.

Reflection involves students learning to evaluate the quality of their work and thinking about how to make it better. The Framework elaborates the enhanced role of student agency in the learning process:

By reflecting on what they have accomplished, students retain project content and skills longer, develop a greater sense of control over their own education, and build confidence in themselves. (p.4)

Students gaining confidence through this learning approach is illuminated by Patton (2012) who concludes that:

When students do projects, they surprise themselves, their parents, and their teachers with what they are capable of. When they present their work to a wide audience, they become confident and articulate advocates for themselves, who will go on to stand out at university and in the world of work (p.78)

3.4.1 The local employers' needs and involvement

The evidence indicates that PBL and employer input, where delivered in a high-quality embedded way, deliver wide-ranging impacts for students, including work-readiness, enhanced emotional skills, high-level technical skills, and qualifications/awards. Additionally, access to industry professionals and working on a variety of projects with different employers over Key Stages 4 and 5 contribute to informed decision-making over their destinations and their futures. UTC staff interviewees noted young people's enhanced levels of confidence, motivation and engagement in their education. Young people feel that their classroom-based and project-based learning support each other. They are aware that the work-ready skills they acquire are transferable and could also be used to support job, apprenticeship and university applications. Overall, evidence (24) shows that UTCs have developed ways to invigorate learning so students see its relevance to their future lives. Students recognised that the projects and employer engagement be-

nefitted their academic learning and developed their technical and 'work ready' skills. They were aware that they were acquiring appropriate workplace behaviour, communication and interpersonal skills, developing their problem-solving skills as well as learning industry- relevant skills and knowledge. Additionally, UTC staff interviewees pointed out that young people's confidence had improved through working with employers, their understanding of the way the world of work operates had progressed, and their decision-making was better informed.

3.4.2 *PBL at UTCs*

In most UTCs the projects are eight weeks long although the time spent on them during a week does vary. There is nothing magic about the eight weeks other than it fits neatly into five terms. Some UTCs vary the length of the challenge according to need. In terms of working time, a Project may for example take place one afternoon a week for any group of students (see Groupings above) between September and February.

There are two slightly different ways of devising projects. The first is to start with an employer's idea for a project which is then developed by the UTC and employer working in partnership, taking into account any elements of qualifications. Staff from all subjects should be part of the planning process so that they appreciate the relevance to their subject and what it might contribute to the project.

The second approach is to start with a syllabus asking employers which part they would like to contribute to. The project can then be devised in a similar manner to the first project.

Whatever approach is used, an employer project should have the following characteristics:

- it is based on a problem or brief which has more than one solution or outcome;
- it has real relevance to the employer;
- it has both practical and theoretical elements;
- it requires team work.

The extent that the employer will be directly involved in the delivery of the project will vary according to their capacity but at the minimum they should launch the project to the students and receive and comment on the outcome.

Although these are described as employer projects, universities also devise projects e.g. an engineering department offers a post 16 project which reflects the type of work students would be undertaking at university.

Some employers have "ready-made" projects which they have used at other UTCs. These can be valuable, particularly at the beginning but should always be re-interpreted and modified in the light of the opportunities at the new UTC. Working with employers to devise projects unique to a UTC produces a strong partnership and prevents watering down of the impact on students and staff.

3.5 The pedagogical dimension

Any education is based on a pedagogical model and on specific didactic approaches. The pedagogical principles underlying a UTC curriculum are the following:

- Employer involvement
- Embedding of career advice: career days, chance to talk with employers, guidance of teachers to find the right pathway accordingly to students' attitude
- Learning in context: pupils should be

able to understand the relevance of what they are studying through real application

- Clear link between curriculum and career path
- Parity between technical, practical and academic aspects (and subjects)

UTCs cannot be selective in admissions, but they want right people who are passionate about science and engineering. They also welcome students who want a fresh start after unsuccessful experiences in other schools. The complexity of the curriculum and the relatively brief time that students are in a UTC before external examinations means monitoring students' learning is even more important than in most schools. Each UTC has a robust system for this which, combined with the small size of each year group, ensures each student is supported in making their maximum potential progress, by means of intensive monitoring, tutoring and support.

3.5.1 *The didactic approach*

The didactic approach is consciously set up for integrating various forms of learning: technical, practical and academic. As already reported in Part I, the balance between academic and practical/technical learning shifts from 60-40 (for 14-16 years olds) to 40-60 (for 16-19 years olds). According to the "excellent teaching and learning framework" exposed in Part I sect. 2, teaching and learning should be interesting, challenging and take place in a positive atmosphere, as this is supposed to bring positive impact onto the development and strengthening of competencies and skills.

Gaming and gamification are also frequently used, in the form of within-school team competitions and between-school competitions.

3.5.2 *The normative aspect*

Different aspects of school life are regulated by specific policies, especially for what concerns safety. At the beginning of school students sign a document about ICT safe use policy. Mobile phones are allowed only for study reasons.

3.5.3 *Employability skills: the socio-emotional dimension of the curriculum*

Employability skills are central to a UTC curriculum. They are integrated into all areas of the curriculum and are made explicit to the students and staff members. There are many versions of employability skills. The employers and university decide which the most important skills are for them. The same model used for students' development is also used for teachers' professional evaluation and development.

As seen above, the UTC Warrington adopted the PiXL Edge skills model, conceptualising employability skills as:

- Leadership:
- Organisation
- Reliability
- Initiative
- Communication

Once that is agreed, the chosen and detailed

attitudes must be embedded in all aspects of the school, every lecture and subject, but also dress code and everyday life at school. As we have seen, employability skills may also be provided with visual clues and color codes, and repeated over and over again throughout the school space, in a mix of repeated key words and declination in different aspects of the pupil's life.

Two more instances of visual reminders of the UTC's employability skills

As for the curriculum, choosing an employability skills framework implies three consequential decisions:

- At which point in the curriculum will it be easiest to develop a particular skill?
- How will the skills be articulated to students?
- How will a student's progress in developing a skill be monitored? It is effective to have a grid outlining stages of progress against a skill but this should not become a bureaucratic tick list, but rather form the basis for one to one discussions between the student and his or her mentor. With the support of their UTC teachers and mentors, students assess and record the development of their skills.

The pupil is also scheduled for a weekly discussion with his/her tutor concerning the development of his/her employability skills.

3.5.4 Enrichment activities

Enrichment is an important feature for UTCs as it provides opportunities for pupils to broaden their interests or build upon existing activities. The nature of enrichment activities depends on staff's skills and interest. Some might be related directly to the specialism e.g. Young Engineer, but others might be areas of interest e.g. a musical group, allotment club, film club, first aid, golf, public speaking, theatre.

Some UTCs expect students to participate in a number of areas during their time at the college, and some expect students to choose from different categories e.g. physical and creative.

As most UTCs lack external areas for sports activities, sport at the UTC is often enhanced through a partnership agreement with the university or a local provider of sports facilities.

3.5.5 Assessment and grading

In view of National exams, it is important that in-school assessment is in line with National standards. On the other hand, in view of employment, assessment must also be well in

line with what is required by employers. Also, assessment must be organised so to provide information and feedback about different abilities: technical and "hard" skills, soft skills, work experiences.

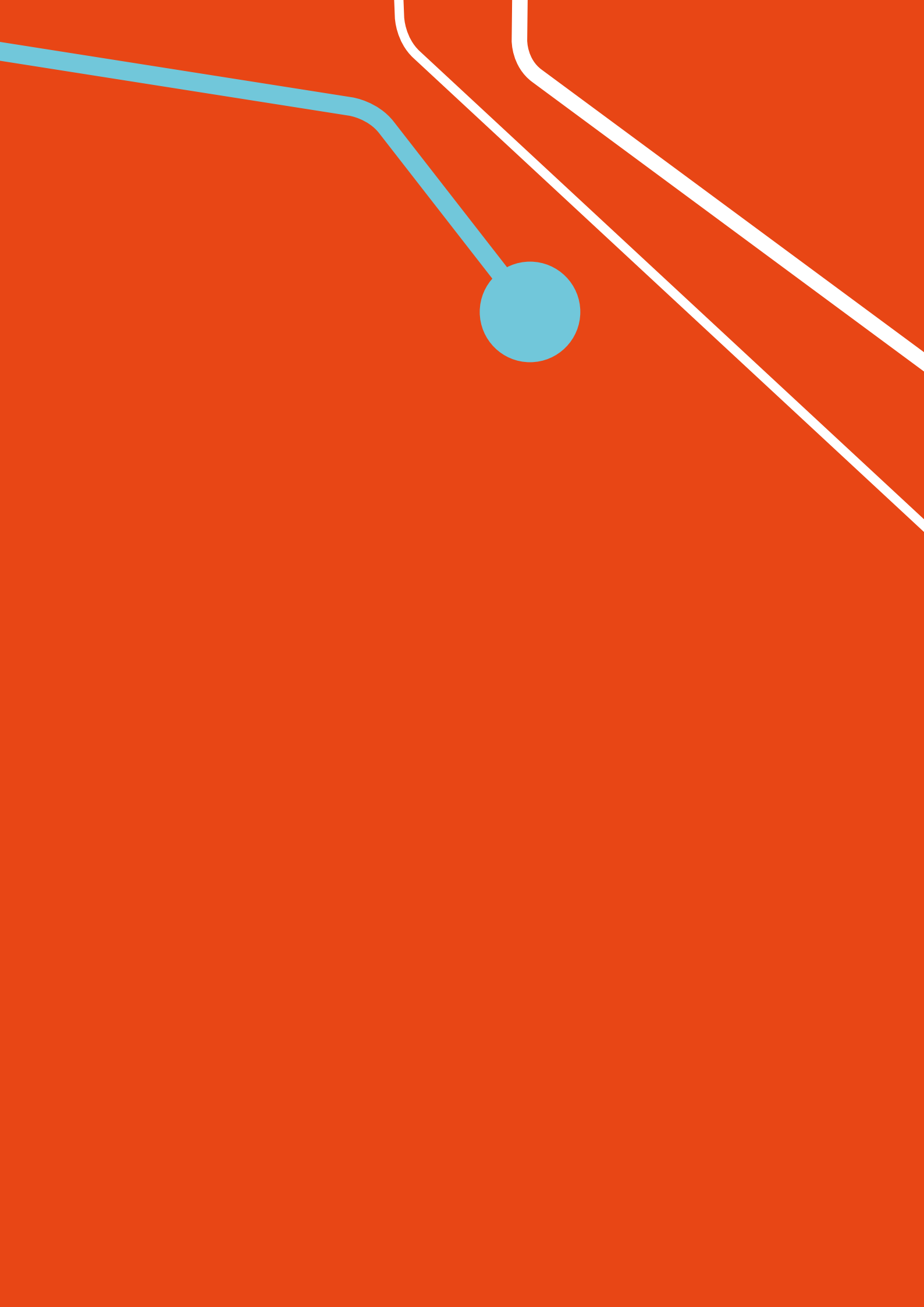
The assessment plan is not very much detailed in any official UTC document. Testing and grading, however, in line with UK standards, seems very frequent and punctual

We see the use of "rubrics" for a clearer agreement between teacher and students on what skills and quality measures are expected to be met by the student.

Testing and grading.

A detailed wallpaper rubric with different level description (and corresponding grade) for four different abilities.

The UTC approach, thanks also to the small size of each age group, provides intensive individual monitoring, tutoring and support.



TRANSFERABILITY GUIDELINES

This section presents the transferability guidelines, in other words what needs to be done to put into practice the concept model introduced in section 3, the concrete steps to reach the “ideal-type school model”. The peculiar element of the guidelines, besides the practical approach, is modularity and adaptability to different contexts: the guidelines are divided in four thematic areas, each area consists of eight guidelines which provide a certain number of methodological principles. Even though the guidelines are strictly interconnected, they represent recommendations that can be partially applied, thus realizing a version of the concept model suited for the local context, based on the situation and goals of the local community. A further feature of the guidelines is that they have been shared and have the consensus of the scientific community. Indeed, in this project, this principle has resulted in the validation of the guidelines through different steps: from an initial draft, submitted to a council of experts who proposed amendments up to the final version

4

4.1 Time, space and grouping

4.1.1 Sizing the school

The number of students must be appropriate for both didactic and organisation reasons.

Managing a complex schedule and variable groups of students, as well as differentiated timings (varied throughout the year) for different didactic activities would be impossible with too large a number of students. Safety and the possibility for all to use machineries are also to be factored in. Moreover, the complexity of the curriculum and the relatively brief time before students face the external environment (examinations, employers) makes monitoring students' learning even more important than in most educational enterprises.

The same organisation and didactic reasons determine a minimum number (too small groups won't work, as they will not be rich and diverse enough).

- The minimum and maximum numbers and the optimal size (and the right economic scale) should be determined by a formula taking into account projections and several factors. It is important to consider the costs related to the chosen sector of activity, especially for what concerns equipment and energy consumption (mechanical engineering, for example, is costly under such respect).
- An ideal school size for example can range around 600, 650 students with a maximum of 800. Often the school will in fact be smaller, between 100 and 250. Spaces and personnel are sized accordingly.
- Very small institutions can exist only in a network system (coordination agreements and partnerships).
- Economic sustainability relies on methodological choices in staff retribution (maintaining a good adults:children ratio, e.g., 1:10; staff salaries typically constitute the 70-75% of costs in a school), on a particular mix of funding sources, and possibly on peculiar support by the public system, motivated by opportunity and effectiveness of the didactic model.

4.1.2 Selecting the school building

The building to be destined to the school is chosen according to various factors.

- Firstly, the site must be strategic from the point of view of transportations with respect to the catchment area (e.g. close to a train station). The latter is normally well defined and, at the same time, rather large. The school should be open and allow parental choice within the catchment area. Moreover, since the educational enterprise aims to occupy a central role in the employers' network within the area, the site and characteristics of the building might take this into account.
- Despite the primary role of physical space organisation in the didactic model, and the precise criteria thereof, the school may not require construction of a building from the ground (although there are major benefits of doing this); often the school will be opened in existing buildings, appropriately refurbished.
- You need to be sure of long term

availability of the land and the building, especially in case of a public authority involved.

- Building or refurbishment and furnishing should be led by teaching personnel at least in the final part (e.g., by applying the "design and build" methodology, see guideline 4.1.3).
- Suitable staff space should be provided both for functional reasons and for quality workplace.
- Finally, the school building must comply with all the applicable National and Local laws, and be inclusive (e.g. of persons with disabilities).

4.1.3 Organising spaces within the school

The design of spaces inside the school is aimed to (1) reflect the work place and (2) provide students and teachers with opportunities to practice different types of teaching and learning. A key concept is flexibility of spaces and furniture, as multiple uses can be foreseen in sequence or simultaneously. This is why it is highly important that builders allow teachers and school staff to lead the construction (see guideline 4.1.2).

- The school space is highly diverse, providing for several kinds of settings, overcoming the traditional rigid distinction between classroom and corridor. It is also flexible (also with respect to furniture), allowing for changing destinations of use over the years.
- Each floor should offer areas devoted to common activities (hangout and bar) as well as for learning, such as the computer lab, library, study room, meeting room. The use of common spaces should be regulated according to students' age, groups' size, schedule requirements and other factors. Assigning floors to different age groups might be a good idea, but it is also important to provide spaces and times in which age groups may mix.
- Teaching rooms are organised by subject matter, so they are set up to collect subject-specific materials and knowledge supports. Accordingly, rooms are also sized and furnished differently (tables, desks, chairs, air-chair, storage furniture etc.).
- The organisation of spaces should include a multipurpose flexible big space (e.g. theatre or conference room) suitable to host assemblies, employers' meetings, collective worships and other official events as well as smaller groups and one-to-one meetings.
- In case the organisation of spaces lacks internal and external areas for sports activities, sport can be enhanced through a partnership agreement with the university or a local provider of sports facilities, as sports will be an integral part of integrative didacticts ("enrichment") or socially relevant activities.
- Space design should not forget the need of teachers and staff: the availability and quality of space dedicated to them will improve their experience and therefore the quality of teaching.

4.1.4 Taking advantage of the walls to create the didactic environment

Walls within the school "speak", they cooperate to the creation of a didactic and educational environment. Therefore, they must be as covered as possible with different kinds of aesthetically excellent communications co-

vering different kinds of didactically relevant contents.

Motivational communications and/or general tips to study and stay focused

- Students' works in the particular subject to which the room is devoted
- Knowledge and know-how repositories, again related to the particular subject
- Interactive posters with random activities to be picked up in waiting time
- Safety instructions, both room specific (e.g., a chemistry lab) and general
- Reminders of the employability skills pursued by the school, so that the student is constantly reminded the model of person and values that inspires the school
- Employer branding (especially in rooms with technological equipment)

4.1.5 Obtaining and setting up technical and technological equipment compliant with companies' needs

To specialise in subjects such as engineering and digital technologies (taught alongside business skills and a broad, general education) the school needs modern and industry-standard equipment, identical to what is used for production in the workplace. The equipment will be part of PBL as well: students will be able to undertake projects that are meaningful for the employer inasmuch as they will do it with real and up-to-date equipment. Students recognise that the projects and employer engagement benefit their academic learning and develop their technical and 'work ready' skills, noting increased confidence in operating the technological equipment.

- The school must offer the most recent equipment and technology used in industry, in order to create an environment in which students will be able to develop the skills that industry needs.
- Curriculum requirements are also to be taken into account. Fundamental equipment that will not be used later is often useful for students to understand the whole process.
- The provision of technical equipment is done in close cooperation with local/regional economy and universities: machines, tools, infrastructures can be provided by partner employers with no cost for the school. This will be possible only if employers are deeply involved in the school, possibly participating in the board (see guidelines 2.4, 3.3) The equipment will thus be new, in line with those found in actual work places.
- Otherwise equipment can be rented.
- Resources must be spent in training teachers. Training can be provided at above-school level.
- Rooms that host industrial technology are often characterised by messages and posters by the providing sponsor, conveying their philosophy and support to students, but also, sometimes, presenting the attractive aspects of the company as a future employer.
- More generally, a visibility and "return" plan should be devised for the sponsor that provides the machines, with benefits that will top on the "basic" one of a more qualified availability of workers that are trained according to its own needs.

4.1.6
Setting up a school-day and a school-year resemblant to work-day and year

To achieve an in-depth technical curriculum within a broad education and ensure all students take part in extra-curricular activities, a longer school day is needed. Employers appreciate students experiencing a day which reflects normal working practices.

School day will last about 8 hours, although adaptations will be possible to fit in with local transport arrangements. Often there will be an earlier finish on some days. Some moments of the day will have a peculiar characterisation, such as:

- Morning start could be dedicated to Personal Development program focusing on soft skills and values pursued by the school.
- The afternoon could be devoted to enrichment activities; extra-teaching could be provided based on learning results on different parts of the curriculum.
- The day programme could foresee moments of autonomous study in order to avoid homeworks, reducing conflict at home and compensating students who live the farthest away (who will arrive home late in the evening).

The academic year may be longer than usual. Some periods of the year will have a peculiar characterisation, for example:

- The first week, at the end of August, can be dedicated to welcome new students and to inform them about the building, dress code, standard behaviour, etc. Besides that, at the beginning of the school year, new students could be tested in Language and Math to assess their starting level.
- School year start can be differentiated for different age groups.
- In summer there could be the Enrichment Week, focused on Personal Development, with various activities organised both inside and outside school.
- As for work experience, this could last 2 weeks during the academic year, not the same weeks for all students (otherwise the companies and the school supervisor would not have time to supervise students properly). More time at work could be spent using school holidays.

Some families will be glad that students stay longer at school, while for some others this will be a problem. All these aspects will have to be considered in setting up the schedule, but the most important aspect will be a clear, motivated and preventive communication to families about how schedule and school calendar are structured and why.

4.1.7
Organising the school timetable

A well structured timetable significantly aids students' learning and makes cost effective use of members of staff and facilities. A rigid timetable which is the same every week over the whole year is unlikely to make the best use of facilities and does not reflect what students will find in the work place or at university. Accordingly, the timetable will have to program different times adequate to different activities, and to be modified frequently. Both structured and unstructured time are important in the curriculum. The small size of the school and holistic curriculum planning assist in this approach.

- Students like routine. They may resist a changing and flexible timetable.

- Length of teaching should be flexible according to activity and topic, from very short (e.g. 15') to very long (180'). Suitable breaks (e.g. 20' in the morning, 40' or 1h for lunch).
- Employer projects will usually be scheduled in blocks, for example of two hours once a week.
- It is possible to make use of 'Drop Down Days', also known as 'off-timetable' days, in which structured classroom lessons are replaced with activities used to strengthen students' practical application of skills to provide a deeper learning experience.
- It is important to organise and operate the school timetable with its own criteria and logic, managing groups of students whose composition is unknown at the beginning of the year. Students be assigned to the various groups during the year, according to factors that will mostly emerge and get defined along the way.

4.1.8 Grouping the students

Provided that learning groups must be appropriate in size to the activity at hand, many different criteria may be employed for their composition. There are, however, some guiding principles, and how students are grouped is a very important decision.

- Ability sets: assessing the student's ability is a complex matter. The ability of students is updated in light of their progress in frequent assessment tests.
    1. Ability sets: they allow a homogeneous teaching, calibrated on the the whole group's entry level knowledge and ability.
    2. Mixed ability groups: they require specific didactic strategies that allow inclusive teaching and differentiated activities; there should always be a baseline assessment so that student progress can be traced and demonstrated.
- Project teams: these are mixed age groups that work on employer projects. Project teams generally comprise students from across the year groups who have shown an interest in the topic. This approach offers very interesting benefits such as younger students learning how to plan projects from older students and the opportunity for students to learn how to lead and work in teams of people with different backgrounds and experience. They meet for a few hours a week for several months, although experience of Student Professional Development (including PBL) varies across the year groups, with less time available for project work at key academic times such as examinations and pre-examinations.
- Grouping by specialism: if the school has two specialisms it may wish to consider how this affects the grouping. If specialisms are related, e.g. engineering and construction, and if allowed by the curriculum, students may be taught together for a while before they make their choice of specialism. Even when specialisations are less related to each other, e.g. health technology and digital media, involving students in common projects widens students' experiences.
- Since the composition of groups varies during the year, according to factors that will mostly emerge and get defined along the way, it is important to organise and operate the school timetable with its own criteria and logic, providing the means to form groups of students on the basis of solid and clear criteria.

4.2 Staff and oranizational model

4.2.1 Agreement and involvement

Opening a school should be preceded by a very important phase of consultations with local stakeholders.

- The local context must be listened to: requests and needs expressed by family, youth, institutional subjects and by the orienting network; needs and skills expressed by the employers and jobs availability.
- These information are then used to guide the efforts.
- The consensus built during the consultation process is fundamental for the success of the school project.

4.2.2 Analysing the local economic context

STEM skills are critical to the future growth of the economy. Workers with advanced STEM skills are required for the new technologies which drive economic growth. That importance is reflected in the growth of STEM jobs over the past decade and their future predicted growth.

Besides such general tendency, the specialisations offered by a UTC are always linked to the demands of the job market in the particular area.

Such demands are reconstructed by means of not only an indirect study, but by direct involvement of employers.

4.2.3 Analysing and managing the catchment area

The catchment area of an, educational institution may span several local authorities, other schools, mediating associations, parents and the young potential students. Catchment is often described in terms of concentric circles, geographic areas, zones or nodal points. Any catchment must be reasonable (not too large, not too small) and clearly defined. Equality issues must be considered as part of the school marketing, making it necessary:

- To know the catchment area, the potential students and their families;
- To ensure that different ethnic groups in the locality can access the information;
- To ensure that the marketing material is clear and attractive to everyone (males and females), possibly differentiating the language for different targets (e.g., youth and the parents).;
- Organising activities to make the educational institution known to the youth and their families (micro-stages, open days etc.).

4.2.4 Involving employers

Employers must be engaged and their contribution must be used for curriculum planning and realisation, with the collaboration of teachers. Not only employers define the skills they need from their future workforce; they are also directly involved in teaching, at the very least through PBL Project Based Learning which is based on real challenges posed by the partner companies. Contacts and relationships require constant investment of time by key personnel, and various approaches may be put to work:

- Identify within the educational institution a stable figure (senior leader and/or other figures) with the task of continuously seeking potential partners and develop solid working relationships based on reciprocally advantageous activities. This will facilitate the development of long term relationships with employers, to be preferred to episodic ones.
- Company staff may be directly involved as senior staff in the school, helping close the possible gaps.
- Make strenuous efforts to ensure that employer involvement is as easy as possible, for example by planning meetings at the employer site, not in school.

The local socio-economic and industrial context may be challenging. Often, the most relevant businesses in the area are SMEs with limited capacity and resources to successfully engage with, and support, the school. Concerns about the extent and nature of their expected role can be a barrier to employers. As well as the time commitment and requirements on staff, some employers can also be deterred by the perception that they will be 'asked to create education resources when they are not educators'. Misunderstandings or a lack of mutual knowledge about how schools and businesses work can further hinder this relationship. Efforts to overcome these barriers centre on:

- dialogue and communication and the promotion of the educational institution in the local business community, highlighting how involvement with the UTC will benefit businesses;
- involvement of mediating subjects (work consultants) and tutors; moments of training and dissemination;
- involvement of employers at three different levels:

1. 'Contextual': where partners provide information about the workplace and activities that help to inform young people about technical and transferable knowledge and skills.
2. 'Moderate': where partners are involved in PBL but are not playing a significant role.
3. 'Profound': where partners typically take ownership of a project; input into formative assessment; influence the delivery of curriculum components; and inform teaching and learning with specialist, current, technical skills and knowledge.

4.2.5 Recruiting staff

To achieve the blend of practical, technical and academic education, staff members must be recruited from a variety of backgrounds. Some will be qualified trainers or teachers; others will come from employment in the specialist area. In both cases they will need an induction period and continuing professional development to achieve different things. A service agreement will have to be stipulated with them, so to ensure they share the institution's educational goals.

For qualified teachers (coming from the school system), important achievements

will be:

- appreciation of the implications of working in an institution driven by employers and a university;
- understanding of how to work through employer-led projects integrating their specialist subject;
- when teaching their subject in discrete lessons, understanding the potential of relating it to the specialism offered by the school;
- planning a student's curriculum holistically rather than in separate subject areas as would be normal practice in most schools and colleges;
- working in interdisciplinary teams which include people from different backgrounds and with different skills, with equal professional dignity.

Teachers with an employment background will be more likely in need to achieve:

- understanding how young people learn;
- understanding the education system, in particular the normative framework, the forms of organisation, the national standards that must be met by students in all areas of knowledge, including academic subjects that, while not too related to the offered specialisation, are nonetheless mandatory to achieve a qualification;
- an appreciation of the expertise that experienced teachers bring to planning teams.

4.2.6 Defining the organisation structure

Small schools do not require a large departmentalised structure and a large number of senior posts is unaffordable. On the other hand, the didactic model is more demanding in terms of time and energy. For example, staff may be expected to teach more than their counterparts in mainstream schools. Salaries have thus to be sufficient to attract a quality staff, although other forms of motivation should be considered, such as the opportunities for innovation and personal development.

- A "flat" structure is advisable, in which all staff are paid a reasonable salary, taking also into account the economic value with respect to their functions.
- Members of staff have several responsibilities: faculty leaders, assistant principals areas of competence such as teaching, learning and assessment, inclusion, personal development, operations, employability and destinations and so on.
- It is important considering what the contract requires, deciding on key terms and conditions e.g. length of day and holiday periods and requirements to attend training.

4.2.7 Defining a quality model for teaching

It is important for the school to build a shared vision and agreement ("non negotiables"), a holistic picture of quality teaching and learning.

- The process of building the shared vision may be collaborative and involve teachers and staff, and may get external input, for example studies and researches on teaching effectiveness. The shared vision is then used to develop 'Teacher Profiles' that in turn shape the Continuous Personal Development (CPD) Programme for Quality Assurance and Con-

tinuous Improvement.

- Particularly stimulating is the idea that the teacher's profile may be based on the same employability skills that are proposed for students.
- From here, a continuous cycle of refinement between training, marking, evaluation and planning is put in place, and teaching guidelines are developed (see guidelines 2.8 and 4.8). Among these guidelines, a lesson plan format, available to all teachers, may be useful.
- The teacher or trainer must be included in a professional training program.

4.2.8 Staff personal development

There are many methods simultaneously used to monitor the performance of school teaching and learning: "teacher on a page", literacy review, visits from various controlling authorities, external consultants review, lesson observations, book sampling, learning walks, 'Mocksted' (simulations of inspections, see also guideline 4.8).

- Teachers and trainers must be visited in the classroom. The review group does not assist the whole lecture, only a small part (relying on an anticipated whole lecture plan of the day). After gathering students' feedbacks, each teacher has their own "strengths" and "development areas" identified. The "teacher on a page" is an observation grid for teaching activity review and monitoring.
- Personal Development Plans are made by considering also the whole college priorities, which can be related to areas of low performance in the curriculum, ability or age or gender segments that do not attain the foreseen progress, particular cohorts and specific subjects. The goal is to ensure that the curriculum is appropriate for all students so that they can achieve and progress on to positive destinations.
- In turn, whole college priorities result from teaching, learning and assessment reviews. So the school strategy is constantly monitored and updated, and inputs/developments are linked to quality assurance methods and to expected outcomes and impacts.
- The development cycle is sustained by timing and specific organisation practices such as middle leader meetings, faculty progress meetings etc.

There is also a philosophy of choice and flexibility, development and peer to peer support, and leadership development and distribution. The elements of "quality assurance" of outstanding teaching and learning are data monitoring and evaluation, course review, CPDs, aspirational target setting/review, regular line management and effective project management, and success celebration.

4.3 The curriculum and the PBL method

4.3.1 Setting up guiding principles

The curriculum must be created and updated as a tradeoff between three fundamental references:

1. the National and/or regional standards and the correspondent qualification paths/exams

2. the local employers' needs and contributions
3. the evolution of pedagogical models promoted by the present guidelines

It is thus necessary:

- To engage the employer;
- To provide continuous vocational orientation and sustain the construction of professional identity: namely, to organise orienteering days, to allow students to talk with employers, to have teachers help students find the right course of study for their talents;
- To provide "learning in context" opportunities;
- To construct clear links and int¬egration between the academic and the professional parts of the curriculum, and between the different kinds of learning.

4.3.2 Role of each teacher in the holistic curriculum

The curriculum should be conceived integratively: each staff member should understand their own role as a contribution to the student's growth, keeping their own activity tightly connected to other aspects and parts of the curriculum.

- Academic training should be partly bent to the requirements of the target professional profile.
- Practical training should value the cultural and academic aspects that are implicit in the performed activities.
- The key principle for teaching general academic subjects is that wherever possible they should be taught in the context of, and illustrated through, practical activities with the employer.
- Staff members should represent a variety of backgrounds (for example: some will be qualified teachers in the specific subjects, other will be experts of education, some will come from employment in the specialist area, and some will be active workers in the field). Diversity of backgrounds, staff training and management have a direct impact on the curriculum (see guidelines 2.5, 2.7, 2.8).

The educational enterprise should provide teaching staff with shared tools, such as a recommended lesson format, planning templates, best practices and examples, etc. to facilitate a common didactic approach.

4.3.3 Role of the employers in the curriculum

Employers should be directly involved in the curriculum: they should be consulted, asked to co-design the curriculum and to be present in the learning activities. Specific forms of collaboration and networking activities are in order. So the educational enterprise yearly does one or more of the following:

- Organise master classes
- Organise guided visits
- Take on working commissions (used for Project Based Learning)
- Open business activities in the relevant professional sector
- Offer students mentoring in the workplace
- Collaborate and have projects with institutions and social bodies in the area

Invite work representatives to teach or co-teach

4.3.4 Employability skills

The educational enterprise should choose a validated model of transversal skills (soft skills, life skills, employability skills) and implement it explicitly in the curriculum.

The choice of a framework of employability skills implies some consequent decisions:

- The chosen model should be shared with employers, who often consider employability skills as much important as technical knowledge and skills.
- To decide where employability skills will be located in the curriculum, the question to ask is at which point in the curriculum will it be easiest to develop a particular skill.
- Granted that employability skills are constitutive transversal to the curriculum, a dedicated curricular space is strongly recommended for some of them.
- For some professional areas it could be advisable to ask students to dress in a way that anticipates the work context.
- More generally, the educational enterprise should promote learning experiences that yield concrete results, qualifications and prizes, cultural and professional products suitable to be presented and divulgated in public events, as well as evaluated and valued by the real world.
- The educational enterprise should provide opportunities for students to show their talents and skills, also allowing for exposition and direct access to employers.

Employability skills should be monitored, evaluated and certified (see guideline 4.3).

As an example, the PiXL Edge model identifies five employability skills: Leadership, Organisation, Resilience, Initiative, Communication Hence the acronym LORIC. Applied to students, LORIC skills consist in:

Leadership: taking decisions and accepting responsibilities

Organisation: time management, work in a group, being prepared

Resilience: showing dedication, being flexible and working well under pressure

Initiative: being creative and being capable of problem solving, being a team member

Communication: communicating own ideas effectively

4.3.5 Role of university in the curriculum

The educational enterprise maintains a link with the world of academic research, at university and elsewhere, with the goal of supporting its own work with scientific evidence, documenting and supporting innovation, realising studies and researches on learning.

The learning enterprise therefore:

- transfers data and documents to support scientific research;
- collaborates with research institutions;
- promotes the dissemination of results.

4.3.6 Progressive professional orientation

The educational enterprise supports the idea of a life plan, providing opportunities to figure out the concrete prosecution of the study and/or professional career of each

student.

- Moments of information about all possible choices and courses that students can undertake for their future study and work are carefully planned in the study course.

Thanks to the support of employers, institutions, schools in the area and the local university, the educational enterprise offers students a direct experience of how their life could be when they finish school.

4.3.7 Enrichment activities

Enrichment activities are an important feature of the training, as they provide opportunities for students to broaden their interests or build upon existing ones.

- The nature of enrichment activities depends on staff's and students' skills and interest, as well as from what is offered by the local community. Some activities might be related directly to the specialism, but others might be areas of interest e.g. a musical group, allotment club, film club, first aid, golf, public speaking, theatre, and/or volunteering services
- The educational enterprise stimulates students to join enrichment activities, offering a broad choice for each area.

Every student is encouraged to choose among activities in different categories (e.g., physical, creative etc.).

4.3.8 Project Based Learning (PBL)

The curriculum includes a fair amount of experiences/projects based on the principles of Project Based Learning (PBL).

- PBL experiences, taking move from meaningful and challenging tasks, have variable length; however, they are characterised by sufficient continuity, they are not fragmented in time.
- The group performing a PBL is composed on the basis of genuine interest expressed by the students, and remains stable throughout.
- A project suitable for PBL should have the following characteristics:
    1. be based on a problem or brief which has more than one solution or outcome;
    2. have real relevance to the employer;
    3. have both practical and theoretical elements;
    4. require team work.

The extent that the employer will be directly involved in the delivery of the project will vary according to their capacity but at the minimum they should launch the project to the students and receive and comment on the outcome.

4.4 Evaluation Sistem

4.4.1 Considering school evaluation criteria

The educational enterprise can only work with qualifications that are currently recognised at the National level, and the latter are in a state of permanent evolution and revision due to the always changing needs and challenges of a globalized world. When choosing

a qualification, the educational enterprise should always bear in mind the following principles:

- Is the qualification recognised and valued by employers and universities? How? What is the evidence for that? How is connected with the European Qualifications Framework and with the National reference framework?
- Is it funded by the relevant institutions? If it is not, it does not necessarily mean that it should not be taught; still, the lack of economic support must be taken into account in the economic planning of the school.
- Is it coherent with school performance tables? Tables – evaluation criteria of local and national authorities – are changing and it is undesirable to chase every indicator in the table. There will be will be some key indicators an educational enterprise wishes to aim for, however, and in choosing qualifications it is important to reflect this.

4.4.2 Assessing students: tests

In view of National exams, it is important that in-school assessment is in line with National standards. On the other hand, in view of employability, assessment must also be well in line with what is required by employers. Also, assessment must be organised so to provide information and feedback about different abilities: technical and "hard" skills, soft skills, work experiences. Assessment is mainly articulated into two categories: formative assessment and summative assessment. Formative assessment is needed as a feedback to the student to regulate learning: it is very frequent and constant, composed by quick exercises and multiple choices tests, and it is administered anytime possible. Summative assessment takes place once every two-three weeks, it covers all topics taught in the preceding weeks (thus reviewing all topics that were already probed by formative assessment). Marks in summative assessment concur to the student's final results.

The employability skills framework (see guidelines 4.3 and 3.4) has precise implications for assessment criteria and for motivating them to the students. Examples of such implications are the follwing:

that students are meticulous and precise as teachers constantly demand more, and students are encouraged to focus on the best possible outcome (cf. high expectations);

- that students know that thinking hard leads to learning and are prepared to take risks and learn from their mistakes (cf. promoting resilience)
- that all students demonstrate excellent attitudes to learning and are encouraged to achieve, often beyond their target grades (cf. positive, propositive and ambitious learning environment);
- that teachers share their thinking to show how marks are awarded so students can see how to progress (cf. being explicit with regards to learning processes);
- that students develop checklists/learn to self-check their work so they know what to include/what to be aware of; that they are encouraged to articulate their ideas (cf. fostering students' responsibility on learning).

4.4.3 Assessing students: employability skills

Employability skills are a feature of competitive advantage and, as such, a priority in teaching and learning. Employability skills give students the confidence and interpersonal skills that they will need to succeed in industry. The progress of students towards

obtaining these skills must then be monitored and students must be helped to improve. A referent person monitors and discusses these goals and progresses with the student: a mentor or a tutor, hence a staff member or a designated teacher.

- First of all, these skills must be analytically decomposed, made concrete and explicit.
- It is effective to have a grid outlining stages of progress against a skill but this should not become a bureaucratic tick list, but rather form the basis for one to one discussions between the student and his or her mentor.
- With the support of their teachers and mentors, students assess and record the development of their skills.

The student regularly discusses in a structured meeting with his or her tutor about the development of his or her employability skills (an assessment sometimes labeled "pastoral").

Applied to "outstanding learning", the five employability skills of the PiXL Edge framework are declined as follows:

- Leadership is planning, checking and self-correcting your learning to improve: it happens when you plan your learning carefully thinking about what to include / what to be aware of; you self-check your learning to see what is missing and make changes to improve; you embrace opportunities to extend and consolidate your learning outside of lessons.
- Organisation consists in thinking critically, investigating ideas and being rigourous; it happens when you explore and investigate ideas; you are meticulous and precise in your learning; you are focussed on the best possible outcome by always giving your best efforts; you are proud of your learning and share your ideas with others and celebrate.
- Resilience consists in maximising your capacity to learn and improve; it happens when you persevere if you make a mistake or find something difficult and understand this is an important part of learning; you find strategies to overcome difficulties; you believe in hard work leading to success.
- Initiative is taking an active role in your learning; it happens when you are absorbed and engrossed in your learning and demonstrate curiosity; you embrace challenge as an opportunity to learn; you can work well on your own, in pairs or as part of groups; you learn from feedback and mistakes so that you can improve; you ask questions about your learning to help you improve.
- Confident communication means expressing yourself and conveying ideas and information primarily through spoken and written language but also other media such as visual arts, sports and technology. Confident communication happens when you share your ideas with conviction, you articulate your ideas clearly and use this as an opportunity to refine and improve your thinking, and you use subject specific terminology and apply it to your learning.

4.4.4 Assessing students: personalised learning

Personalised learning is very important: even if you have different groups within the same lesson, students make progress according to their possibilities.

- Instead of having a 'middle' teaching aiming to the average, everyone should make progress (top students as well as students with disadvantage).
- The student is made responsible as well to choose the task and – granted the

minimum levels – outcome. In this way, for example, top students will pick the most difficult tasks and not get bored. Differentiation is another way to put this principle: teach to different groups in different ways so that all can progress.

- Teachers work as facilitators of the group's and each individual's work.
- Even if students are taught in mixed ability groups there should always be a baseline assessment so that student progress can be demonstrated, especially in presence of external inspections.

In mixed ability groups, teachers may, for example, give assignments to 3 different student levels (A-B-C): each level has different goals and task.

4.4.5 Evaluating PBL activities

The extent that the employer will be directly involved in the delivery of the project will vary according to their capacity.

- At the minimum they should launch the project to the students and receive and comment on the outcome. In many cases the employer will evaluate the projects and confer prizes and acknowledgements, besides specifying the strengths and critical points of the students' products.
- Project teams generally comprise students from across the year groups who have shown an interest in the topic. This approach offers very interesting benefits such as younger students learning how to plan projects from older students and the opportunity for students to learn how to lead and work in teams of people with different backgrounds and experience. However, there should always be a baseline assessment so that student progress can be demonstrated, especially in presence of external inspections.

The teacher who owns the project has to be very responsible and proactive. Through PBL, staff also have opportunities for increased flexibility and creativity in their teaching compared with the constraints of the curriculum.

4.4.6 Assessing students: enrichment activities

Enrichment activities are an important element of a complete education offering opportunities for leadership and team work. Students' participation in enrichment activities is therefore evaluated and assessed.

- Enrichment activities offer students the opportunity to enrich their interests. Some of them will be related to the school's specialisations, other will be unrelated. It is possible to ask students to participate in a number of areas. Should there be areas that are not present in the school, partnerships can be established with external bodies.

On a personal interest basis, student can choose activities that demonstrate a link with the development of soft skills. The school defines and makes explicit how these activities are acknowledged and evaluated, and how they concur to skills development.

4.4.7 Monitoring, tutoring and support

The complexity of the curriculum and the relatively brief time before students face the external examinations makes monitoring students' learning even more important than in most schools.

- Students' attendance must be accurately monitored (possibly by using an electronic register log) with a personalised approach.
- Staff members always wait for latecomers at the entrance and ask for an explanation.
- The teacher or tutor calls the family in case of unjustified absence.
- Being non-selective in the admission, the educational enterprise should retain the right people who are passionate for the profession or sector, but also welcoming students who want a fresh start after unsuccessful experiences in other schools.

Each student should be supported in accomplishing his or her own maximum potential progress, by means of intensive monitoring, tutoring and support made possible by a robust system and by the small size of each year group. Useful tools to start this process are individual meetings, initial personal balance, and parents' interview.

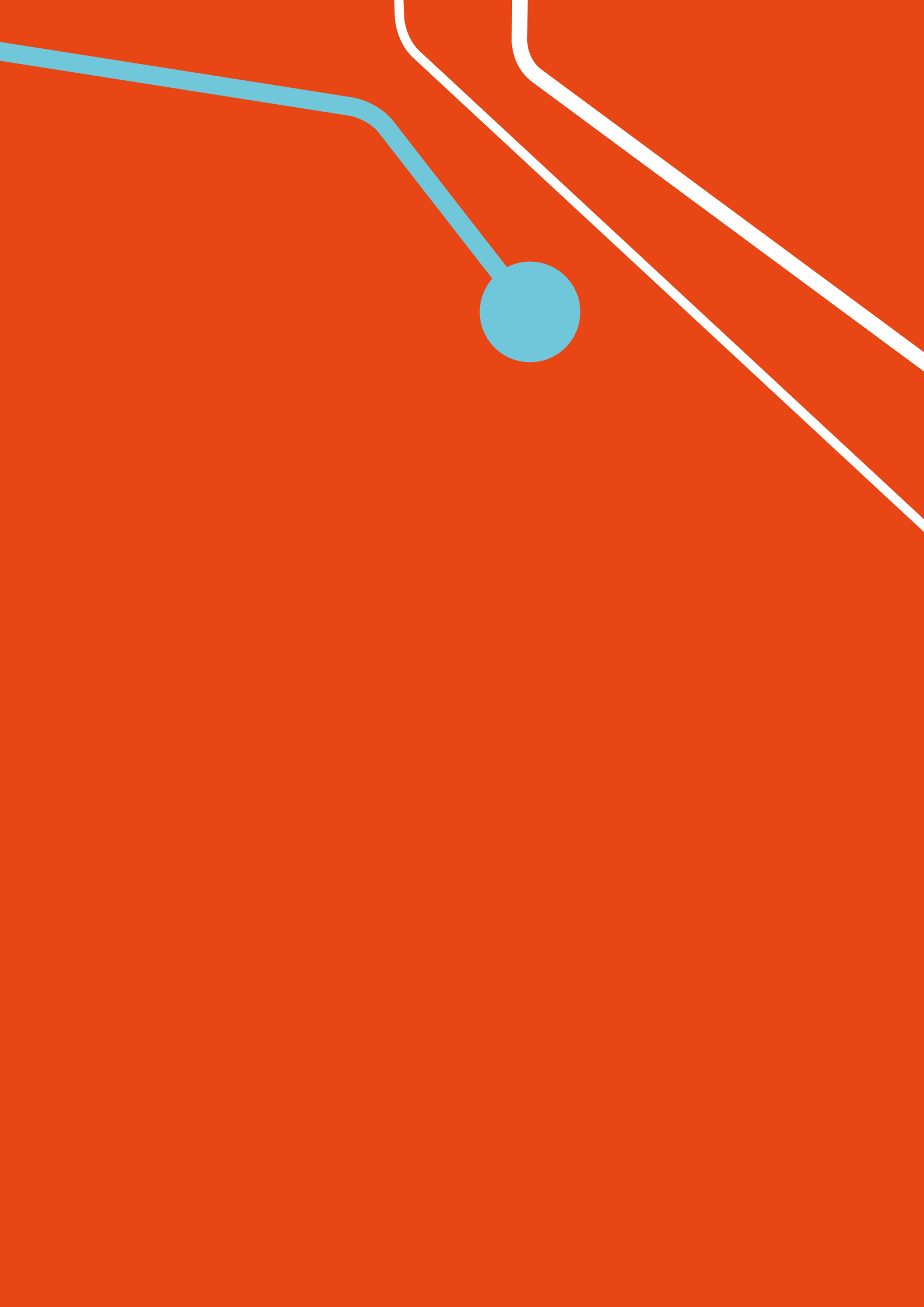
4.4.8 Assessing teachers within development plans

It is important for the school to build a shared vision and agreement ("non negotiables"), a holistic picture of quality teaching and learning. The shared vision is then used to develop 'Teacher Profiles' that in turn shape the Continuous Personal Development (CPD) Programme for Quality Assurance and Continuous Improvement. There are many methods simultaneously used to monitor the performance of school teaching and learning: "teacher on a page", literacy review, visits from various controlling authorities, external consultants review, lesson observations, book sampling, learning walks, 'Mocksted' (simulations of inspections, see also guideline 2.8).

- Teachers and trainers must be visited in the classroom. The review group does not assist the whole lecture, only a small part (relying on an anticipated whole lecture plan of the day). After gathering students' feedbacks, each teacher has their own "strengths" and "development areas" identified. The "teacher on a page" is an observation grid for teaching activity review and monitoring.
- Personal Development Plans are made by considering also the whole college priorities, which can be related to areas of low performance in the curriculum, ability or age or gender segments that do not attain the foreseen progress, particular coorts and specific subjects. The goal is to ensure that the curriculum is appropriate for all students so that they can achieve and progress on to positive destinations.
- In turn, whole college priorities result from teaching, learning and assessment reviews. So the school strategy is constantly monitored and updated, and inputs/developments are linked to quality assurance methods and to expected outcomes and impacts. The goal of all this is to develop a pedagogy of teaching and learning so that teaching and learning are improved, all teachers satisfy the expectations of the professional stage they are in, developing specific and robust knowledge for the improvement of the teaching function.
- The development cycle is sustained by timing and specific organisation practices such as middle leader meetings, faculty progress meetings etc. There is also a philosophy of choice and flexibility, development and peer to peer support, and leadership development and distribution
- The elements of "quality assurance" of outstanding teaching and learning are data monitoring and evaluation, course review, CPDs, aspirational target setting/

review, regular line management and effective project management, and success celebration.

The spirit of these guidelines, which need to be adapted to the national contracting systems and in interaction with the unions, is to establish an internal evaluation system for teachers, which can include peer evaluation, to raise the quality of teaching and professional satisfaction, and ensure the realisation of the model.



TRANSFERABILITY GUIDELINES ACROSS NATIONAL CONTEXTS

This section in the English version summarizes recommendations and critical issues to be taken into consideration for the transferability of the model in other education systems (outside England). Moreover, the chapter briefly introduces the Italian, Spanish and German VET systems and highlights the main difficulties, opportunities and advantages that can raise from the application of the guidelines in the different national contexts. On the contrary, in the Italian, Spanish and German versions of IO1, Section 5 is replaced by a detailed description in which more detailed information are presented on both the individual national contexts and the advantages that the application of the model could bring to the educational and training system of the specific country.

5

National education systems

As education in Germany is governed be the federal states, in practice there exist 16 different regional education systems in Germany. Granted this cross-state variation, the German education system can be described as a complex mix of different educational institutions, providing different kinds of degrees. Its main characteristics are its systems of different secondary schools existing at the same time next to each other, its dual VET system, and a good higher education sector, mainly represented by many different types of universities. According to the German law, it is mandatory for all youngsters from age 6 on to visit an educational institution for at least 9 years. Theoretically, this means that all students should at least finish school with a degree from the lower secondary school.

Spain is National education system, has frequently changed trough the last 3 decades. Spanish education is mandatory for students 6 to 16 years old, though an alternative path is offered to students older than 14 who fail, or wish to shift to a job related education.

The Italian educational and training system is organized in accordance with the principles of subsidiarity and autonomy of educational institutions. The State keeps the exclusive legislative competence for the “general rules on education” and for determining the essential levels of services that must be guaranteed throughout the country. Moreover, the State defines the fundamental principles that the Regions must respect while exercising their specific competences. They share legislative power with the State in the field of education and have exclusive power in the field of vocational and educational training (VET). State educational institutions are autonomous in deciding about their didactic, organization, research, experimentation and development.

VET systems across States

In Germany, A VET course can be done for almost every job, for which no higher education degree is needed. Normally, the course takes between 2 and 4,5 years, depending on the specific job. Its main feature is ‘on the job training’, which takes place directly at the workplace. Trainees normally have a 5 days week, where they go to work for 3-4 days (getting paid therefore). The remaining 1-2 days are foreseen for academic training and theoretical and practical lessons, which are directly connected to the professional skills needed for the specific job.

In Spain, to access the grado medio (intermediate level), pupils must have gotten the Graduado en Educación Secundaria Obligatoria (compulsory secondary school diploma) which is automatically obtained after compulsory schooling. The course lasts from 18 months to 2 years and includes a work placement of 300 hours in an enterprise (Centro de Trabajo). It leads to the title of Técnico, (technician) and allows pupils to continue their education up to specialised A-levels. The technician diploma does not open the door to higher education at university, but does mean that pupils can go on to the Bachiller (mainstream secondary education) or further education for technicians. Vocational training is modular, including a training module in the workplace (módulo de formación en centros de trabajo), but this module can only be taken once all the other modules followed at school have been obtained. The work placement occurs in the final stage of the course. Higher-level training cycles also include a module devoted to a professional project (módulo profesional de proyecto). A professional certificate (certificado de profesionalidad) corresponding to a level I voca-

tional qualification in the national vocational qualifications framework is offered to young people aged between 16 and 21 who have not yet obtained a diploma. It comes under the aegis of the Employment Department and can lead to integration on the job market or a return to initial education.

Since September 2014, the « FP Básica » section offers to young people to start a vocational training from their 15 years old, for a period of two years.

The grado superior (upper level) is open to holders of the Bachiller (A-levels) or the grado medio. This post-secondary education prepares students for specialised vocational qualifications and lasts for 1 or 2 years. One quarter of the time is devoted to vocational training. It leads to the qualification of Técnico superior (higher technician). Without taking any further examinations, holders of the diploma for higher technician are admitted to university courses leading to the Grado (1st university qualification).

Work-study programmes are few and far between. They are offered as a priority to young people between the ages of 16 and 21 who dropped out of compulsory schooling and have neither a diploma nor any qualification. It is carried out within the framework of a Contrato para la formacion (Training Contract) and lasts between 6 months and 2 years. Education authority VET was reformed in 2013 and, from 2014/15, offers basic, intermediate and higher VET qualifications. Programmes last two years (2 000 hours), with training in a company (minimum 20%) and at a VET school (maximum 80%). Dual training schemes may also be based on an agreement between the company, the school and the learner. Participants have the status of student (no age limit applies) and may benefit from a scholarship, depending on the autonomous communities. In that respect, the recently introduced basic VET and easier access to intermediate VET have opened up progression routes for youngsters and adults with low or no qualifications. The dual principle has been implemented nationally to increase VET attractiveness and support young people in transition to the labour market. Participants in dual training programmes (16 to 25 year-olds or up to 30 until youth unemployment decreases) may sign an apprenticeship contract (one to three years) and get at least the minimum wage. The reform also opens up the opportunity to acquire IVET qualifications through dual track schemes (with or without a labour contract). In such cases, duration is up to three years.

The Italian VET system is characterised by multilevel governance with broad involvement of national, regional and local stakeholders. Ministries of education and labour establish general rules for the education system while Regions and Autonomous Provinces are in charge of VET programmes and most apprenticeship-type schemes.

At upper secondary level it's possible to choose among the following VET programmes:

- 5-year programmes (EQF 4) at technical schools (istituti tecnici) or vocational schools (istituti professionali) leading to technical or professional education diplomas. These programmes combine general education and VET and can also be delivered in the form of alternance training. These graduates have access to higher education;
- 3-year programmes (istruzione e formazione professionale, IeFP) leading to a vocational qualification (attestato di qualifica di operatore professionale, EQF 3);
- 4-year programmes leading to a technician professional diploma (diploma professionale di tecnico, EQF 4).

All of them are school based, but can also be delivered as apprenticeships (Type 1).

There is permeability across VET programmes and also with the general education system. On completion of a 3-year vocational qualification, it is possible to attend one additional year leading to a 4-year vocational diploma. This allows enrolling in the 5th year of the State education system and sitting the State exam for a general, technical or profes-

sional education diploma.

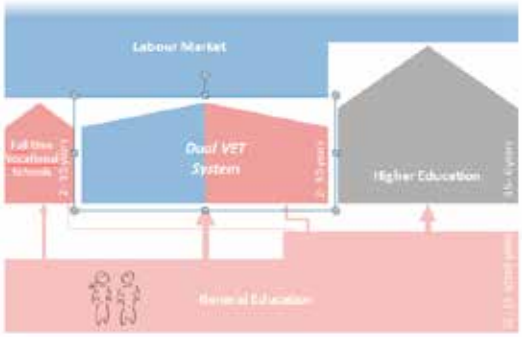
At post-secondary level, VET is offered as higher technical education for graduates of 5-year upper secondary programmes or 4-year leFP programmes who passed entrance exams.

VET for adults is offered by different public and private providers.

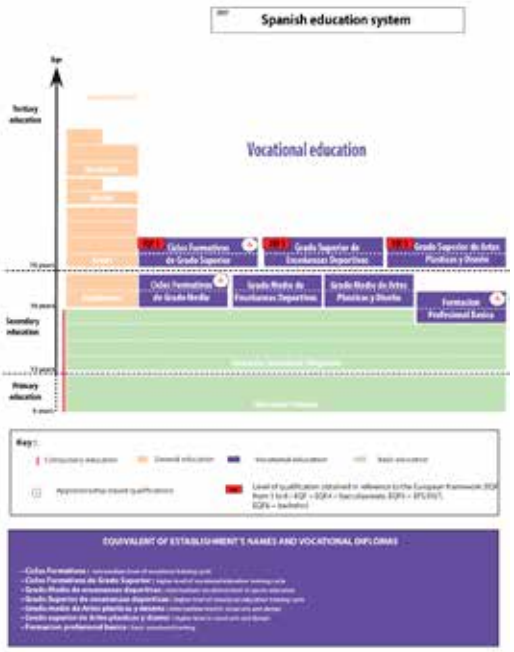
The Figures summarize the three different VET systems.

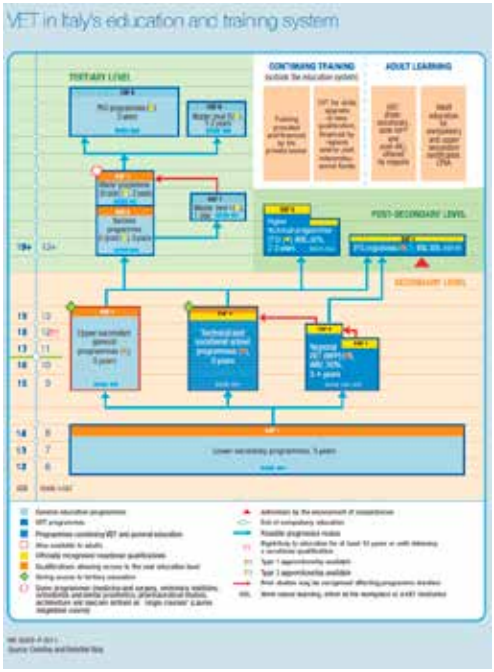
Overview on Germany's VET system.[1]

Overview on the content of the dual VET training system.[2]



The paths offered by the Spanish VET system.[3]





1 GOVET (withoit date): PPT, titled Vocational Education and Training in Germany; available under: https://www.bibb.de/govet/en/54880.php [08.08.2019].

2 GOVET (withoit date): PPT, titled Vocational Education and Training in Germany; available under: https://www.bibb.de/govet/en/54880.php [08.08.2019].

3 http://mavoieproeurope.onisep.fr/en/files/2012/11/Esp-en-2017.jpg

Experimenting the application of ESW guidelines

Generally speaking, the English UTC system has a lot in common with Germany's dual education VET system. Thus for most Germans VET schools and/or centres it should be more or less easy to incorporate elements from the UTC systems into its own systems and institutions. This is especially true for: a close cooperation between VET schools/centres and employers; the combination of academic learning and practical training; the focussing on strengthening the employability skills of the youngsters absolving a VET. On the other side, in spite of the heterogeneity of the German system, especially with regard to the different federal regions of Germany, the German system might be described as somehow rigid. One needs to be seen how this will affect the introduction of new and innovative aspects of the UTC system. Particularly the realization of the following aspects might be different:

- Organising the school timetable: As most German VET schools oftentimes have a rigid timetable, which might be different to change due to different reasons. Especially the flexible form of learning could only be hardly put into action depending on how it gets realized.
- Recruiting staff: The main problem when it comes to recruiting staff mainly lies in the challenge to find qualified professionals as the competition at the German labour market currently is very high.
- Role of university in the curriculum: As normally the ties between an ordinary German VET centre and a university and/or research centre in many cases are not that strong – special VET chambers and other institutions from the field of VET play a more crucial role here – this point might be one of the bigger challenges during the implementation of the main principles of the UTC concept in Germany.

As for the Spanish system, it is difficult to anticipate what criticalities could be solved through the application of the UTC guidelines, since in many cases these criticalities themselves are precisely what could hinder the application of the model. From the interviews held with companies and with part of the teaching staff during the development of this project, it has emerged that among the aspects of the Spanish system that, in comparison with the UTC model, can be considered weak or susceptible to improve, the following stand out:

- Further development of soft skills required by the professional world
- Greater agility when refocusing training to follow the changing needs of the professional sector
- Greater organizational flexibility that allows teachers to develop and apply innovative solutions, which could also result in motivation, updating and professional development of the teachers

As described below, some key aspects of the UTC model could be useful in resolving the aforementioned weaknesses: to involve employers at your local level, time and space management, professional skills and socio-emotional dimensions in the curriculum, Project Based Learning, evaluation and qualification.

For the Italian context, guidelines are anticipated as useful particularly to:

- overcome the curricular-extracurricular dichotomy by including activities that develop cross-cutting skills and competences
- increasing the focus on real and under-

standable problems that are likely to engage students and motivate them

- transforming physical spaces to overcome one-to-many lecturing
- expanding the school day changing the nature of school (no longer a "parking lot" but rather a place that promotes a wide range of activities)
- involving companies and educational institutions to close the gap and mismatch between school and job market requirement
- developing teachers assessment

Italian school has a very strong tradition anchoring it to an organisational model that is far from the needs of new generations. On the other hand, there are no real legal constraints that block the potential change.

Involving employers and university

When analysing the current needs of the German labour market, at one point it makes sense to restrict the focus on the field of STEM. On the other side, there is a huge skill shortage in many sectors, which makes it also worthwhile to evaluate how to apply principles of the UTC approach to the whole VET system, going beyond the STEM sector. This would be more advantageous for most German VET centres, which normally do offer a broad selection of VET courses. In Germany's neo-corporative system, employers normally only have only an indirect grasp on the development process of a VET curriculum through the different German chambers. Thus it needs to be seen how this differs from the English UTC system in reality and what impact this might have on a VET curriculum in the two different countries. Within the German VET system there is a close cooperation between the educational institutions and the economic sector from its beginning on. Especially through their membership in the German chambers companies are a central cornerstone of this system. Such a cooperation brings a lot of benefits with it. But sometimes it is also claimed that the influence of the companies on system – especially on its educational aspects – is too high, taking care of only economic aspects (by excluding other important aspects).

In the Spanish system the commonly used curricula do indeed start from a general study of the job market, and because of this, the main part of the training has a general utility within the corresponding professional sector. However, these curricula could benefit from and complement with a development and adaptation that arises from knowledge and cooperation with local companies that represent real and current employment needs and job niches.

For Italian VET too it is considered indispensable to involve companies, professional associations, social bodies in projects and collaborations within the school. Companies may be involved in both modes, making the curriculum more realistic and fit for the future work context. Teachers themselves should thus start working with companies (perhaps not all of teachers, but a selection of them).

Technical and technological equipment compliant with companies' needs

As it is one of the main objectives to provide all youngsters doing a VET course with the needed employability skills, most German VET institutions obtain and set up the up to date technical and technological equipment according to their compliance with the youngsters' learning needs. Normally, in Italy and Spain most modern technology is too expensive for a (small) VET institution, especially considering that for each specific VET course different capacities can be used. A new kind of collaboration with employers should definitely be put in place to pusue this way.

The ties between an ordinary German VET centre and a university and/or research centre in many cases are not that strong – special VET chambers and other institutions from the field of VET play a more crucial role here. Sometimes it also seems to be the fact the interest on one or both sides to foster their cooperation is not that high respectively could be higher. If this will be a challenge during the implementation of the main principles of the UTC concept in Germany needs to be seen. The same can be said for Italy and Spain.

Time, space and grouping

New technologies and personal skills that are necessary for active citizenship and for the job market require a more active and cooperative style, while diminishing the importance of knowledge and transmissive teaching.

Most German VET centres have training facilities that sustain modern technologies, instruments, and other needed capacities. Similar is the situation for German VET schools, which normally also have the resources and capacities to warrant that the students can strengthen their employability as well as academic skills.

In the Spanish system, the lack of organizational flexibility, together with the need for equity when allocating spaces usually implies fixed assigned spaces, and difficulty in taking advantage of or using spaces other than those assigned. Currently, in most cases, classroom walls are not seen as a tool to create a didactic or interactive environment. It is a matter of teaching model, more than a restriction itself. Teaching is excessively oriented to point out the teacher as the main actor, rather than the classroom as a work and interaction space. It is common to find a high occupancy rate of spaces in Spanish schools as well as a special rigidity in the allocation of their use. Assuming that it is the specific teaching activity that determines factors such as times, groupings and spaces, the commitment to make them more flexible can help teachers explore new options and create new training opportunities for students. The roles of teachers and students must also be flexible in order to undertake them.

In the Italian system, changing time, space and grouping organization are seen as very urgent and applicable guidelines. Questo aspetto è sicuramente uno dei più interessanti tra quelli emersi dallo studio del modello UTC. Learning environment are too often still tied to a 19th century conception: fixed tables and chairs for teacher-centered lecturing, and labs for practical learning. Such learning environments should be re-thought for a more active and more work-reflective teaching. Sometimes there is no need for large economic investments. The educational use of walls, with messages from companies and employers, is a nice example of students' orientation and school-companies collaboration.

Schedule

As most German VET schools oftentimes have a (more) rigid timetable. It might be different to change such a structural setting due to different reasons (law, chamber regulations, other). Especially the flexible form of learning could only be hardly put into action if this means that teachers shall change their courses every 20 minutes and

the recommendation that the schedule might have to be changed more than 1 time per school years should be highlighted here for the German VET context. On the other hand, (almost) all German VET schools are using the dual education concept, where the youngsters have to go to work for 3-4 days a week. When they then take their VET lessons, normally the length of a school day is similar to that of a normal working day. But when looking on the whole academic year, it is as long as a normal school year. Too holiday periods are the same. However, for the youngsters this only means that they have to go to their work place for the whole week when the school is closed.

In Spain, some legal regulations apply to the teacher´s schedules, creating rigidities. Once the teacher´s schedules have been fixed at the beginning of the school year, it is difficult to offer compensation to teachers who dedicate hours outside their schedule. Since a significant number of teachers are assigned to the school during the summer break, and the distribution of courses to each teacher is done in a short term (first week of September) it is difficult to design an optimal schedule. Organisational complexity, and the requirement of teacher's support for some subjects or courses make such groupings difficult. Also, in many centers it is mandatory for students to always be with the assigned teacher, which makes it difficult to separate and regroup students.

Curriculum

PBL

Project-based Learning, which involves an integration of technical and soft skills, can be very enriching for students, but nevertheless requires additional work from teachers who must organize such methodology. The fact of considering this form of learning as an essential element of the UTC system, facilitates making the organisational decisions that will help teachers to apply this new methodology. The approach is considered as valuable to be applied in the Spanish system.

Normally, projects and/or project based learning are not a necessary part of a VET in Germany. However, most VET trainers do use the method as part of their teaching in many different VET courses due to its efficiency in many aspects. Not only professional, but also social skills can be evaluated constructively by PBL. Depending on how the projects are getting implemented in practice within the framework of the UTC concept in England, the chances are high that German VET actors could benefit from gaining more information about the concepts, its parameters, its organizational as well as practical handling, and its impact on the student and its skills.

In Italy, the structure of “National indications” still preserves some ambiguities as of the identification of standards. Moreover, cooperative learning and PBL, mentioned in Ministry’s documents, are provided with application guidelines, resorting to simple ideal desirability. Theachers still have large autonomy, and didactic coordination is not structured in stable and impacting ways. The same is true for employability skills, and there is no specific activity (but only ideal cross-cutting attention) in teaching and learning. Finally, there are no enrichment activities, although the teacher is not prevented to organize experiences and link them to the curriculum. Priority and applicability of curriculum guidelines are thus rated high.

Employability skills

As there are plenty of German VET institutions, there are at the same time plenty of methods how to assess a student’s employability skills. Depending on each institutions specific context, these methods might differ from the ones that are getting applied within the UTC system in the UK. Most German VET institutions focus on that each student reaches a sufficient level of employability skills with regard to his her job. Thereby most of them also apply a specific skill model, but that’s different for most schools and/or VET centres due to the regionalisation of the Ger-

man education systems in general and each schools autonomy. As in England, it is important for the youngsters to be able to show their different talents and skills by using different methods, activities, projects, etc.

Both for Spain and Italy the inclusion of the socio-emotional dimension in the curriculum implies that beyond the technical aspect of the qualification of professionals, the socio-emotional aspect is valued and promoted as a way of developing soft skills. Employability skills must be valued, assessed and certified, as this is one of the contemporary challenges educational institutions face. The incorporation of employers into the learning process in the classroom helps to a goal oriented perspective in education, taking into account the employers' emerging needs and facilitating teachers in pursuing them.

Typical of the UTC model is the proposal of enrichment activities that are coherent with the personal and professional growth path of youth, and the development of soft skills that are required by the job market. Enrichment activities could be easily introduced in the Italian context with an attention to frame these activities as part of the curriculum (not extra-curricular), with a specific weight, value, assessment and recognition.

Assessment and evaluation

The assessment of students' personalized learning is highly content dependent and can be as different as the German education system is. Normally, the benchmarks therefore are getting determined at the regional and/or local level. All German VET institutions have to pay attention to the general rules underlying the field of VET on the European, national, regional and local level. Assessments are based on these conditions and the requirements of the labour market. The final exam takes – normally – place in one of the official chambers that are a central part of the German VET system. As employability skills give students the confidence and interpersonal skills that they will need to succeed in industry, they are highlighted as important in (almost) all aspects of the German VET system. Different forms of assessments exist to monitor and evaluate the student's progress. For each occupation, different skills and assessment forms exist. As it can be more difficult to evaluate process based learning that takes place in the form of an on the job training for each student individually, German teachers, trainers and other actors might benefit from getting deeper insights about the implementation of PBL activities and their evaluation. In times where students and classes are becoming more and more heterogeneous, it's important to gain over a broad methodical toolbox.

Assessment practices and techniques are underdeveloped in the Italian context, and the practice is fragmented between different schools. Law indications are minimal and bureaucratic. Research on assessment emphasize low performance of teachers and scarce educational impact. A change is mostly needed, with the introduction of clear, progressive, skills-centered elements of evaluation and assessment that can help students in their learning rather than classifying them in a rigid and static way. This area is this valued as high in priority and feasibility.

Staff and organisation

The present world requires a staff of teachers and trainers who have different backgrounds, including professionals coming from the work. The evaluation and qualification approach of UTC model, which includes soft skills and also incorporates the employer's point of view, could be an element that helps teachers to continually reorient themselves towards the local and changing needs of the professional sector.

In Germany, the main challenge in recruiting staff mainly lies not in the conceptual principles underlying the UTC approach in this regard (as they already are very similar to the German system), but more on some more practical challenge: there is currently a huge skill shortage in many sectors that are important for VET schools (teachers, trainer, (social) pedagogues, other) and it will be seen in future how this affects the German education and VET sector for real. In Germany's dual education VET system and in the institutions staff normally does represent a variety of backgrounds. E.g. teachers responsible for academic teaching have an education degree, whereas teachers responsible for the more practical teaching normally are specialised in a specific field of working. By doing so, they try to consider the same key principle as a UTC: teaching should be taught in the context of, and illustrated through, practical activities.

Both Spain and Italy (especially in public schools) might have difficulties in recruiting a diverse and solid body of teachers and trainers. A solution could be to rely on external experts with a limited amount of teaching hours.

As the organisation structure of German VET centres and other VET institutions can be different from state to state, there might be institutions having problems with applying the UTC structure 1:1. But as even in England the UTC system is realised in a more flexible form according to the specific needs of the labour market, challenges arising from defining the organisation structure should normally be workable in most German institutions. The Italian organisation model is centered on instruction, there are no tutoring functions, there are only some functions correcting the organization chart. There are possibilities in VET, also for the existence of specific tutoring contracts, but much can be done to improve this system, taking into consideration contractual and other kinds of constraints.

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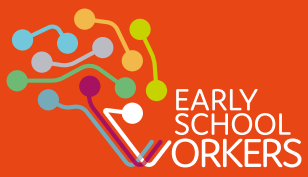

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