



GATSBY

# E-ASSESSMENT IN TECHNICAL EDUCATION IN ENGLAND: FOLLOW-ON REPORT

A REPORT TO THE GATSBY FOUNDATION

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## INTRODUCTION

This short report follows on from the Review of the Potential for E-Assessment in Technical Education in England,<sup>1</sup> written for the Gatsby Foundation and published in October 2021.

The initial report highlighted inherent challenges in assessing technical education and proposed technology-based approaches with the potential to address those challenges. It also made broad suggestions of how to overcome barriers and encourage the adoption of innovative approaches to e-assessment. This follow-on report focuses on specific practical opportunities and explains how they could be progressed.

The previous report concluded:

- Assessing technical education is inherently difficult. It is difficult to find assessment methods that are reliable and replicable that are at the same time valid and provide an authentic test of what is required in the workplace. This tension is reinforced by the need to fit within a wider system of academic credentials and levels of progression while still measuring workplace competency in a way that is credible for employers.
- The increasing use of digital technologies in the workplace and young people's lives creates opportunities, not only to streamline existing assessment methods but to transform them in ways that address some of the inherent challenges of assessing technical education. However, there are significant barriers to overcome, and progress has been relatively slow, particularly with the development of transformational approaches. But there are signs that the disruption caused by the pandemic may have provided a helpful shock to the system.

This follow-on report gives specific examples of what is possible, it identifies opportunities to do more, and looks at practical ways to remove some barriers and create a more supportive framework that encourages innovation and digital transformation. The main focus is on apprenticeships, and in particular end-point assessments (EPAs), but some attention has also been given to other types of technical education, including T-levels. Work has focused on two main areas:

- looking in detail at the potential for the transformative use of digital assessment for apprenticeship standards across a sample range of occupations
- reviewing ongoing national policy developments

The main findings and conclusions are set out below. These need to be understood in the context of the rationale for EPAs.

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<sup>1</sup> Edwards, S. (2021) *Review of the potential for e-assessment in technical education in England* Report to the Gatsby Foundation.

## THE ROLE OF END-POINT ASSESSMENT

Details of the EPA model, its philosophy, application, and its defining role in the transition from apprenticeship frameworks to apprenticeship standards are explained in the [Annex](#).

In summary, the EPA is a central and required element of the 800-plus apprenticeships recognised and supported for funding in England by the Institute for Apprenticeships and Technical Education (IfATE). The aim of EPA is to provide a holistic assessment of the knowledge, skills and behaviours (KSBs) an apprentice should have by the end of their apprenticeship, as defined in the occupational-based standard agreed by employers.

What happens in practice is that employer-led trailblazer groups<sup>2</sup> define the occupational standard for an apprenticeship and then set out EPA requirements in a plan that is followed by independent end-point assessment organisations (EPAOs). The trailblazer groups are guided through this process using an apprenticeship builder tool,<sup>3</sup> and further guidance and support is available from an IfATE product manager. IfATE has a generic list of requirements that must be included for an EPA plan to be approved. They also provide a menu of potential assessment methods which can be used in combination to cover the full range of KSBs in a standard. Guidance is given on the pros and cons of each assessment method and what it is most suitable for assessing. The trailblazer groups need to specify at least two different methods, one of which must assess KSBs synoptically.<sup>4</sup> They should choose the methods that are most relevant to how people actually work in the occupations being assessed.

Some of the features and requirements of EPAs that will shape how digital technology can be used for assessment include:

- *The essential nature of EPA.* The emphasis is on how KSBs are assessed at the end of the process, instead of developing a training programme or curriculum focused on acquiring KSBs, against which progress is assessed continuously. This separates training and assessment phases. So for example, a portfolio of accumulated evidence of achievements may be a gateway requirement<sup>5</sup> to start an EPA but it will not be directly assessed.
- *Requirements for independence.* The separation of training and assessment is reinforced by the requirement for the EPA to be carried out by an EPAO that is independent of both the training provider and employer. The EPA must be written in terms that are organisation neutral and cannot name a specific training provider or EPAO.

2 "Trailblazer groups are responsible for developing occupational standards which form a key component of an apprenticeship and underpin T Levels and other IfATE approved technical qualifications". IfATE (updated November 2023) [Trailblazer groups](#)

3 The [apprenticeship builder](#) helps trailblazer groups create the occupation proposal, the occupational standard and the EPA plan.

4 Synoptic EPA is the assessment of the full range of KSBs needed to meet the standard, and the ability of the apprentice to put different strands of learning together and apply them to different contexts. DfE and BIS (2013) [The future of apprenticeships in England: next steps from the Richard Review](#)

5 "The gateway refers to the requirements that need to be met in order for the employer to put forward their apprentice for EPA". IfATE (updated September 2023) [Developing an end-point assessment plan – 3. EPA gateway](#)

- *Feasibility, manageability and affordability.* Comparable assessment methods need to be available to all apprentices assessed against the same standard, regardless of the specific employer, training provider or EPAO. This limits the possibility of a particular assessment approach being specified if it is dependent on access to expensive or specialist technology.

There is nothing in the requirements and guidance that explicitly limits the use of digital technologies for EPA. Indeed, flexibilities introduced during Covid-19 restrictions so that technology could be used to make assessment methods more accessible have been retained. However, there is also nothing that explicitly encourages consideration of the transformational use of technology and some generic EPA requirements could pose challenges.

## EXAMINING DIGITAL POTENTIAL ACROSS APPRENTICESHIP STANDARDS

A sample of four occupational areas was selected. The choice was based in part on recommendations from IfATE and those involved in the external quality assurance of EPAOs. The other main consideration was for a range to be included, both in terms of scale and extent of digitalisation. This came from the conclusion in the previous report that the potential for the transformative use of digital technology for assessment was likely to be greatest in areas where there were significant numbers of apprentices and digital technology was already being used extensively in the workplace.

For each of the four occupational areas, apprenticeship standards and assessment plans were reviewed and examples were captured of interesting practice where digital technology was being applied or could be in future.

### (I) DIGITAL

Digital is one of the main apprenticeship routes and currently covers more than 30 individual standards ranging from Level 2 to Level 7. It was chosen as an area to examine because, by its very nature, the expectation is that the Digital route would be using digital technology to assess apprentices. The route also includes occupations with significant numbers of apprenticeships. The review looked at the range of assessment methods specified in EPA plans and then, in more detail, at examples of digital assessment.

Across the range of standards there are still relatively few examples of digital technology being used innovatively for assessment, but there are some interesting examples which could have wider application. These were based on two main assessment methods: practical demonstrations and projects.

### ***Practical demonstration of simulated assessment tasks in a virtual lab: Network Engineer Level 4***

This type of approach can be found in the EPA plans for Network Engineer Level 4 and Cyber Security Technologist Level 4. The Network Engineer EPA<sup>6</sup> and the technology seen in use by an EPAO was looked at in some detail. The main features were:

- The whole EPA consists of two methods: (1) simulated assessment and questioning (2) professional discussion underpinned by portfolio. The professional discussion, as in many EPAs, is used in effect to sweep up the KSBs that would not naturally occur in the simulated assessment. It is the simulated assessment and questioning that is of most interest.
- Apprentices are required to complete two simulation assessments online, in a virtual lab environment. They involve a network failure task and a network optimisation task. Each has a required list of activities that demonstrate the KSBs mapped to this assessment method. Each assessment task takes seven hours and must be completed over two consecutive days. An independent assessor or invigilator ensures that the apprentice completes the assessment independently. Invigilation can be face to face or online using a video camera.
- For each simulation assessment task the apprentice is required to submit a virtual lab report with evidence of the completed test activity and their decision-making including: the completed lab file; test plans; accompanying notes explaining why they chose a particular network engineering solution or explaining the approach they took during the simulation; and explanatory diagrams. This virtual lab report is uploaded to a secure online portal and provides the basis for the assessor to make their judgements against the relevant KSBs.
- The structured questioning is designed to draw out the apprentice's competence, covering the KSBs mapped to the simulated assessment activity. This takes place at least five days later so the independent assessor has time to assess the outputs of each simulation task and generate appropriate questions in advance. There is a mix of questions, some generated by the assessor based on their appraisal of the apprentice's lab report and some drawn from a bank of generic questions prepared by the EPAO. The session must last 45 minutes and have a minimum of 10 questions. The apprentice does not have access to the outputs from the simulated tasks in advance, but they are shared with them by the assessor online during the questioning. The session can be face to face or can use video conferencing.

The rationale given in the EPA plan for using the simulated assessment method is that it means apprentices can be assessed in a consistent way, irrespective of their role in their organisation. Also, because the activity is simulated, all the KSBs mapped to the assessment can be demonstrated in a reasonable timeframe, whereas the typical length of real network engineering projects could make observation in the workplace impractical. For the questioning element of assessment, the rationale given is that it is usual for network engineers to have detailed technical discussions, so the approach mirrors their day-to-day work.

EPAOs are expected to provide the virtual lab environment and develop 'practical specification banks' with enough different simulation tasks so they can be rotated to prevent predictability. In the example observed for this research, the EPAO created

6 IfATE (2021) *End-point assessment plan for Network Engineer apprenticeship standard [Level 4]* Please note: EPA plans are subject to revision or removal. All those included in this report were available at the time of publication.

its virtual lab using the Cisco Packet Tracer Network Simulation Tool, which is cross platform and available for free.

***Practical demonstration of simulated assessment tasks in a virtual lab: Cyber Security Technologist Level 4***

The Cyber Security Technologist Level 4 EPA<sup>7</sup> uses a similar approach for one of its assessment methods, described as “Scenario demonstrations with questioning”. In a simulated environment, the apprentice has to complete four timed scenario demonstrations covering (1) attack and threat research (2) risk assessment (3) set up and configure a system with security features (4) computer programme/script writing. They are questioned on their performance by an external assessor to bring out the relevant KSBs. As with the Network Engineer EPA, the Cisco Packet Tracer has been used to provide the virtual lab environment.

***Projects developing a software artefact: DevOps Engineer Level 4***

This approach can be found in the EPA plans for DevOps Engineer Level 4 and Games Programmer Level 7. The DevOps Engineer EPA<sup>8</sup> was of most interest as it combines the development of a product with its practical demonstration. The main features are:

- The whole EPA consists of two methods: (1) project and practical assessment (2) professional discussion. It is the project and practical assessment that is of interest.
- The project element involves the apprentice developing a piece of code based on a work-based project lasting approximately 12 weeks undertaken after the gateway. Specifications are given for what this should cover to enable the apprentice to demonstrate the KSBs being assessed.
- The apprentice must produce sufficient evidence of the form, technical breadth and specific technical outputs of the work so the independent assessor can familiarise themselves with the project output (ie the piece of code) before the practical assessment. A significant written report is not needed, instead the apprentice should produce a diagram showing the high-level system structure, a short analysis of the KSBs used in the project (max 300 words) and examples of practical implementation. So the focus of the assessment is the code that has been developed by the apprentice and on seeing that code in use.
- The apprentice has another week to prepare for the practical assessment during which they need to demonstrate the successful deployment of their piece of code. They will also be asked questions by the independent assessor on the methodology used to develop the code. The practical assessment lasts up to three hours and can be face to face or use video conferencing.

***Projects developing a software artefact: Games Programmer Level 7***

The Games Programmer Level 7 EPA<sup>9</sup> also uses an assessment method that assesses a software artefact as a project output, although the output is more complex, such as a complete working technical system or collection of systems. The main difference to the DevOps Engineer EPA is that, alongside being questioned by the independent assessor, the apprentice gives a presentation instead of a practical demonstration.

7 IfATE (2020) *End-point assessment plan for Cyber Security Technologist apprenticeship standard [Level 4]*

8 IfATE (2020) *End-point assessment plan for DevOps Engineer apprenticeship standard [Level 4]*

9 IfATE (2023) *Game Programmer [Level 7] – EPA plan*

### ***Significance of the Digital route examples***

These examples from the Digital route show that technology can be used in ways that satisfy EPA requirements but that also enable synoptic practical assessments. The model that uses a virtual lab to deliver practical, scenario-based assessments that are authentic, reliable and fully recordable is of most interest. That said, getting away from written project reports and assessing projects on their outputs, ie software artefacts and their practical demonstration, is also significant.

This raises questions of whether it would be possible and beneficial to use similar approaches to assess other occupational standards. It could be that these are just examples of occupations where the way technology is used, combined with easy access to industry standard simulation software, makes them particularly appropriate for such approaches. It is worth noting that even for the Digital route these are still relatively rare examples and cover only some of the KSBs, with others, particularly behaviours, needing to be assessed by alternative methods such as professional discussion. Reviewing a wider range of occupational areas gave further insight into what might be possible.

## **(II) ENGINEERING AND MANUFACTURING**

The Engineering and Manufacturing route includes more than 200 standards between Level 2 and Level 7, although some have been withdrawn and others are still under development. This area was chosen because digital technology is increasingly being used alongside mechanical processes, and there are occupations with significant numbers of apprentices. The review looked at the range of assessment methods specified in assessment plans, and at the experience of a large advanced manufacturing<sup>10</sup> company that employs apprentices and has embarked on a digital transformation project.

### ***Assessment methods specified in EPA plans***

Overall, there are few examples of standards where digital technology is being used innovatively for assessment.

The most interesting example found was for Nuclear Reactor Desk Engineer Level 6,<sup>11</sup> which uses a nuclear reactor desk simulator for the practical demonstration element of the EPA. Apprentices are provided with information on the tasks they must complete. However, they are not given the details of an unplanned shutdown that is part of the simulation, which is included to test their response to an unexpected event. This simulation-based practical demonstration gives apprentices the opportunity to demonstrate KSBs that could not be assessed in the real working environment. It also covers half the required behaviours specified in the standard.

Another example of the innovative use of digital technology in EPAs is the High Speed Rail and Infrastructure Advanced Technician Level 4,<sup>12</sup> which offers flexibility in how the practical observation method is delivered. This includes simulations based on augmented and virtual reality or using real equipment – though the simulations are presented very much as fall-backs when access to the real workplace is impractical.

<sup>10</sup> The key distinction between manufacturing and advanced manufacturing is the "Use of innovative technologies to create existing products and the creation of new products. Advanced manufacturing can include production activities that depend on information, automation, computation, software, sensing, and networking". Manufacturing.Gov (accessed 2024)  
*Advanced manufacturing*

<sup>11</sup> IfATE (2021) *End-point assessment plan for Nuclear Reactor Desk Engineer apprenticeship standard [Level 6]*

<sup>12</sup> IfATE (2017) *Assessment plan for the High Speed Rail and Infrastructure (HSRI) Advanced Technician apprenticeship standard (Level 4)*

Looking at Engineering and Manufacturing standards as a whole, the most common combinations of assessment methods used in EPAs are either a work-based practical observation and a professional discussion based on a written portfolio, or a project with a written report and a professional discussion based on a written portfolio. Sometimes a knowledge test is added. There are also instances where qualifications linked to professional standards are specified, and no practical demonstration or project is required as part of the EPA (see also (IV) Care).

KSBs related to the use of technology and specific types of hardware and software are sometimes covered explicitly by practical observation in the workplace, but there is also significant reliance on these activities being talked about at interviews and during professional discussions based on portfolios. For example, the Engineering Design and Draughtsperson Level 3 EPA plan notes that employing “appropriate use of computer based technology” is a core skill not covered by its practical test and recommends that it is assessed as part of a structured interview.<sup>13</sup> Many of the Engineering and Manufacturing standards rely heavily on the professional discussion to assess the whole range of KSBs, particularly the behaviours. As many as 30 different KSBs can be covered during a 60-minute discussion.

#### ***Digital transformation at a large engineering apprentice employer***

The issues were also looked at from the perspective of a major engineering employer as well as from reviewing apprenticeship standards and EPA plans. The following observations were made during discussions and during a workshop:

- Although the company is in many respects highly digitally advanced and its apprenticeships are well-regarded, training content had become detached from and out of pace with the digital transformation of the workplace. This led to concerns about future relevance. It was recognised that a major project with significant investment was needed to address both the cultural and technological issues.
- Initial issues encountered with technology were not directly linked to transforming training and assessment but were about efficiency and the need for greater compatibility between learning management and portfolio systems to streamline how evidence is recorded.
- Beyond that, it was possible to map a transformational path that would make better use of existing technology assets and capabilities within the company and identify where these needed to be supplemented. A wide variety of technologies were available, at least on some sites. These range from, at the top end, VR Caves creating fully immersive virtual environments with projectors and headsets like HoloLens, through smaller visualisation studios, to individual pieces of mobile equipment such as welding simulators, headsets and phones. However, use of these technologies was not necessarily aligned or optimised and there were insufficient links between the use of technology on the education side and that used in the core business. So the project sought to develop a vision for the future use of technology and more specifically a model for AR/VR use, and a pathway for how to get there.
- The focus to date has been primarily on training and the use of data and analytics for formative assessment within the training process. Use for summative assessment will likely be implemented at the end, when everything else is in

<sup>13</sup> IfATE (2016) *Engineering Design and Draughtsperson apprenticeship standard assessment plan [Level 3]*



place. But there could be challenges because EPA requirements are set for apprenticeships across the whole of the industry and are administered by independent external assessors. Even if the digital transformation project is successful, there is still a risk that an EPA model that has to be accessible to employers with widely varying levels of digital capability, could either act as a drag on how apprenticeships are conducted in a digitally advanced company or become an anachronistic add-on.

### (III) MARINE PILOT

Marine Pilot is a Level 5 standard in the Transport and Logistics route. This specific example was chosen because, even though it is a relatively small-scale occupational area, there seemed potential for the use of digital simulation.

The EPA has three parts:

- (1) written examination based on case study questions
- (2) professional discussion
- (3) practical assessment based on observation of an act of pilotage<sup>14</sup>

Because of its current limitations, it is the practical assessment that appears to have most potential. Currently the method involves an assessor observing the apprentice at their normal workplace (ie their home port) piloting an inbound vessel to a suitable berth and asking them questions. The limitations of the method come from it only being an assessment of the pilot's competence in the specific geography of their home port. It is also something of a lottery what the assessor is able to observe on a pre-booked day – the type of vessel, how it is crewed, the weather and tides are all variables that cannot be realistically controlled. So, while this assessment method is realistic and authentic, it is not consistent or comparable.

Technologies such as bridge simulators, can simulate different types of vessels, in different conditions in different ports and they are already used in the industry. They could be used to create scenario-based assessments that would be controlled, consistent and more wide-ranging. This approach was considered during the pandemic, but a number of obstacles became apparent. First, although all those taking the apprenticeship are experienced mariners, there was a strong view reinforced by industry culture that the practical had to be undertaken in real sea conditions to be credible, no matter what other advantages simulation might offer. Second, the port-specific character of the practical assessment was not seen as a major disadvantage because most pilots operate from a single port and rely on their local expertise; so in this sense, there is no fully accepted national standard. Thirdly, although simulator technology is quite widely available in the industry, it is expensive and would not necessarily be accessible to all. A case could still be made for using a simulated scenario-based assessment but it would be a supplement to the sea-based practical rather than a replacement, and issues of cost and access would need to be addressed.

The Marine Pilot example illustrates the role industry- and occupation-specific practical and cultural considerations play in the introduction of technology-based approaches to assessment. There is similar potential to use digital simulation in the rail industry, for example in the Train Driver Level 3 apprenticeship. Interestingly the EPA plan (currently subject to revision) specifies that the observation of practical

<sup>14</sup> IfATE (2018) *Marine Pilot - Level 5 apprenticeship end point assessment plan*

activities must be in part simulation based.<sup>15</sup> For planned activities the preference is for observation in the actual workplace, but simulation is allowed if that is not possible. But simulation is required to assess emergency activities and responses to hazards and defects, due to their unpredictable and potentially dangerous nature.

#### **(IV) CARE**

The Care Services route covers nine standards between Level 2 and Level 7. The main interest was in those standards with significant numbers of apprentices but with limited use of digital technology in the workplace, such as Adult Care Worker Level 2 and Lead Adult Care Worker Level 3. The restrictions placed on care homes during Covid-19 raised questions about whether more could be done with simulation.

The EPAs for Adult Care Worker Level 2 and Lead Adult Care Worker Level 3 both have two parts:

- (1) situational judgement test based on real-life scenarios with multiple-choice questions
- (2) professional discussion based on a self-assessment and testimony from service users<sup>16 17</sup>

No practical assessment or observation is required for the EPA, but significant on-programme assessment will have already taken place to meet the required standards for the Care Certificate and the Diploma in Care. These are mandatory for all Adult Care Worker apprentices who can only progress to the EPA once they have been achieved.

No significant developments were found in relation to the EPA itself. However, there are training providers that have developed scenario-based immersive simulations of care home settings. These could potentially be used to provide a more realistic situational judgement test in which scenarios are simulated rather than presented in writing.

#### **(V) BEYOND APPRENTICESHIPS**

While the focus of this review is apprenticeships and EPAs, some attention has been given to the wider landscape of technical qualifications. The most significant development is the introduction of T-levels at Level 3 and the progressive removal of government funding support for other, more established, technical qualifications as the coverage of T-levels is extended.

One question is whether this could have implications for using technology for assessment, and whether this could, in turn, impact apprenticeships. Two features of T-levels are noteworthy in this context. Firstly, in each occupational area there is a single qualification run by a single awarding body instead of there being competition between awarding bodies to offer their own qualifications, or between EPAOs in the case of apprenticeships. Secondly, T-level outline content is aligned with apprenticeship standards. Because of the different market dynamic and the chance to start afresh, T-levels could be an opportunity to make more innovative use of digital technology approaches in assessment.

<sup>15</sup> IfATE (2018) *Train Driver (Level 3) end-point assessment plan*

<sup>16</sup> IfATE (2018) *Adult Care Worker – assessment strategy*

<sup>17</sup> IfATE (2018) *Lead Adult Care Worker – assessment strategy*

All T-levels have to follow the same assessment framework:

- a core exam – one or more assessment of core knowledge and understanding, set and marked by the awarding organisation
- a core employer-set project – a project based on a brief, set by the awarding organisation working with relevant employers, which assesses core skills
- an occupational specialism(s) – a substantial assessment relating to a particular occupational area, enabling students to draw together KSBs

Looking at how this framework has been applied in the T-levels available from September 2022, there appears to have been little innovation and still a heavy reliance on conventional written exams and reports. This is to be expected for the core exam component assessing knowledge and understanding, but there could be scope for innovation in the employer-set project and occupational specialisms, particularly where practical skills are involved. In practice, there still seems to be a lot of writing and talking, and limited opportunities beyond that to demonstrate practical skills. As with apprenticeships, there are a few interesting examples, such as assessment of the use of CAD software to design 3D models in the Design, Surveying and Planning for Construction T-level. However, overall, if anything, there appears to be less innovation than in apprenticeships, perhaps indicating a reluctance to take risks with a new product that is seeking equivalence with academic qualifications for university entry and which has limited opportunities for industry placement. There is also some evidence that the accompanying removal of recognition of other qualifications may adversely affect some that had been taking a more innovative approach to the use of technology for assessment, an example being in the creative music industry where extensive use has been made of video performance evidence for assessment.

## POLICY DEVELOPMENTS IN THE USE OF DIGITAL TECHNOLOGY FOR ASSESSMENT

One of the recommendations of the previous review was for more concerted system leadership by those responsible for regulating the assessment of technical education in England to encourage the use of digital technology. Evidence of that leadership has begun to appear. In his introduction to Ofqual's three year corporate plan, published in May 2022, their chair, Ian Bauckham, stated, "The pandemic has, rightly, catalysed questions about not if, but when, and how, greater use of technology and onscreen assessment should be adopted".<sup>18</sup> In the body of the plan, there is clearer recognition than previously of the potential benefits of digital transformation and that Ofqual, as a regulator, has a leading role to play in encouraging and facilitating innovation, as well as in shaping the efficiency of the market, and in ensuring quality and fairness. The plan includes specific commitments, working in strategic partnership with IfATE on technical education, to "produce refreshed guidance, following consultation, on end point assessments" and to "consider optimal approaches to assessing competencies valued by employers".<sup>19</sup>

<sup>18</sup> Ofqual (2022) *Ofqual corporate plan 2022 to 2025 – Foreword by the Chair, Ian Bauckham CBE*

<sup>19</sup> Ofqual (2022) *Ofqual corporate plan 2022 to 2025 – Ofqual's priorities*

Discussions took place with both Ofqual and IfATE during this review. Ofqual's initial focus is on the practicalities of how conventional exams can be taken online, rather than on what scope there is for technology to change the nature of the assessment itself. IfATE developments have included:

- Confirmation that many of the flexibilities adopted to enable EPAs during Covid-19 would continue as options beyond April 2022. The most relevant for the use of digital technology are included in the Flexibility Framework:
  - “Observations taking place in simulated environments
  - Remote delivery of assessment (including invigilation)
  - Exams/tests being online instead of on paper (where originally specified as paper-based only)”<sup>20</sup>
- Changes made following consultation, so the assessment of any qualifications that are a mandatory part of an apprenticeship, where possible, must be integrated into the apprenticeship EPA.
- Adoption of a digital skills framework<sup>21</sup> designed to support the inclusion of appropriate and relevant digital content across all occupational standards.
- Publication of the Future-Facing Innovation Strategy,<sup>22</sup> designed to ensure that the technical education system is sufficiently dynamic to meet future skills needs, while maintaining its stability.

These developments are helpful but their potential for encouraging the transformative use of technology for assessment is limited. It is noteworthy that neither the digital skills framework, nor the innovation strategy, say anything about assessment, instead they focus almost wholly on how digital and emerging skills can be addressed through developing course content and occupational standards. This seems like an omission, or at least a missed opportunity, particularly given how EPA defines the apprenticeship model. If the object is to keep up with digital innovation in the workplace, how apprentices are assessed is not neutral: the medium is the message.

## CONCLUSIONS

The main conclusions of this review are:

- I) There are limited examples of the potential of digital technology to transform assessment being realised in the English apprenticeship system or in wider state sponsored technical education. This matters for two main reasons:
  - i. EPA plans using conventional assessment approaches are far from perfect and often struggle to fulfil the role originally envisaged for them by the Richard Review.<sup>23</sup>
  - ii. An apprenticeship system that is defined by its assessment model risks looking increasingly anachronistic if its use of technology for assessment is rarely more than superficial.

<sup>20</sup> IfATE (accessed 2024) *Apprenticeships: Flexibility framework – introduction*

<sup>21</sup> IfATE (accessed 2024) *Digital skills and characteristics framework*

<sup>22</sup> IfATE (accessed 2024) *Future-facing innovation strategy*

<sup>23</sup> Richard, D. (2012) *The Richard Review of apprenticeships*

Elaborating on the first point, the current apprenticeship model is shaped by the premise that an EPA can holistically capture the KSBs defined in an occupational standard. But it has not addressed the inherent difficulty of assessing technical education consistently and validly – instead it has raised the stakes by assuming that it is always possible to do so. In practice, current EPA plans are often a heroic attempt to do the impossible. This is illustrated by the weight often placed on professional discussions, assuming that up to 30 individual KSBs can be assessed in an hour and that talking about behaviours equates to demonstrating them.

- 2) Features of the EPA model (whatever other merits they may have) make it more difficult to adopt transformative technology for assessment of apprenticeships. In particular:
  - i. The separation between in-programme training and the EPA creates a barrier to introducing technology that can be used for both training and assessment, which undermines any business case.
  - ii. The requirement for EPAOs to be independent, and for it to be feasible to provide assessment that is equally accessible to apprentices at any relevant employer (regardless of size or technological sophistication), makes it difficult for there to be an expectation that a particular piece of technology will be used in an EPA unless its use is virtually universal by an industry.
  
- 3) There are no quick and easy solutions, but there are steps that Ofqual and IfATE could take to encourage more progress. Here are four suggested areas for action:
  - i. Regulators could make it an explicit objective to encourage more innovative use of technology to address assessment challenges in apprenticeships and wider technical education.
  - ii. More practical advice and encouragement could be offered, such as:
    - challenging trailblazer groups and those devising assessment plans to consider where they could make more innovative use of technology for assessment, including through guidance in the apprenticeship builder tool and advice given by IfATE product managers
    - giving specific guidance on the pros and cons of digital simulation rather than assuming simulation is just a fallback for when real-world is impractical
    - gathering and publicising examples to show what is possible, such as the use of virtual labs for simulation exercises to assess Network Engineers and software artefacts as evidence of project work completed by DevOps Engineers
  - iii. More direct forms of intervention could be considered, such as:
    - encouraging or sponsoring the development of a 'sandbox' type environment where innovative approaches to using technology to assess technical skills can be tested out
    - commissioning the IT industry to develop digital tools to assess the digital characteristics listed in the digital skills framework, so the tools could be used for apprenticeships and T-levels across all occupational areas

- looking at the practicality of creating a generic 'virtual lab' that could be used to run assessments customisable to a wide range of different occupational areas
  - exploring the relationship with vendor certifications (provided by Microsoft, Cisco, etc) and whether more use can be made of their digital assessment capabilities
- iv. Given the constraints identified with EPA, an alternative focus could be newer developments with arguably more initial scope for innovation, such as:
- using the Skills Bootcamps<sup>24</sup> proposed by the Future-Facing Innovation Strategy as a rapid response to the emerging skills, to develop and test innovative uses of technology for assessment
  - looking at where technology for assessment could support the accumulation of credit-bearing modules envisaged under a future Lifetime Skills Guarantee<sup>25</sup>
- 4) Finally, a reflection on artificial intelligence (AI), which is currently receiving so much interest. There is little doubt that AI will be directly relevant to and will extend the capabilities of how technology can be used for assessing technical education. However, it could also raise questions about which competencies should be assessed. If it is common practice in a workplace to use AI for certain tasks, does the competency to use AI effectively need to be assessed instead of being able to complete the work without it?

Another potential impact is that AI may undermine conventional academic assessment models. It is arguable that the assessment of technical education has been skewed by a presumption it needs to conform to an equivalence with academic assessment, ie writing down or answering questions about how to perform practical skills competently instead of demonstrating them in action. It will be interesting to see if the challenges created by AI to the integrity of academic assessment models create some space to give more recognition to alternative, more practical approaches, perhaps facilitated by technology.

<sup>24</sup> Skills Bootcamps are free, short courses offering sector-specific skills, designed to help close skills gaps in the UK.

<sup>25</sup> DfE (2021) *Skills for jobs: lifelong learning for opportunity and growth* p.5.

## ANNEX: APPRENTICESHIPS AND END-POINT ASSESSMENTS

Central to the apprenticeship reforms introduced in England following the 2012 Richard Review<sup>26</sup> were the overhaul of assessment and the requirement for an independent EPA. Richard recommended moving away from apprenticeship frameworks with continuous assessment for competency-based qualifications. In their place, he recommended occupation-based standards based on employers agreeing the KSBs that an apprentice could be expected to have learnt by the end of their apprenticeship. In doing so he placed much greater emphasis on defining the standard that was to be achieved as the final outcome and how this could be assessed accurately and consistently at the end of the process.

Richard's main criticisms of the previous assessment model were that it:

- did not provide a holistic view of whether the apprentice had reached an occupational standard
- was time consuming, often using time that could otherwise have been spent on training
- relied heavily on paper-based evidence of completed tasks and competencies
- was carried out by the same people who provided the training, so it was not independent
- did not involve employers enough and they did not necessarily have confidence in it

He advocated:

*“Instead, there needs to be a test that demonstrates that the apprentice can take the knowledge and expertise they have gained and apply it in a real world context to a new, novel problem. The final test and validation must be holistic, in that it seeks to test the full breadth of the relevant competencies not merely the incremental progression of the apprentice. That may take the form of a project or an assessment in front of an examiner. It should be performance and real world based, rather than just theoretical. It should be primarily at the end of an apprenticeship, not measuring progress during it. And the examiners should be neutral parties with no interest in the outcome, drawn from the ranks of employers as well as educators, since employers themselves are best able to assess what makes an apprentice employable.”*

Current IfATE requirements for assessing apprentices are closely based on this model. Employer-led trailblazer groups define the occupational standard for an apprenticeship and then set out EPA requirements and the EPA plan to be followed by independent EPAOs. The trailblazer groups are guided through this process by the apprenticeship builder tool, with further guidance and support available from an IfATE product manager. The apprenticeship, including the EPA plan, is then scrutinised by an employer-led route panel made up from the wider occupational sector. The route panel makes recommendations to the IfATE Approvals Committee.

<sup>26</sup> Richard, D. (2012) *The Richard Review of apprenticeships*

The IfATE guidance and approvals process sets out clear requirements for EPAs:

- **“Deliver valid and accurate judgements of occupational competence**  
*The assessment methods must be fit for purpose and appropriate to the content of the occupational profile. They must include a mixture of valid assessment methods that will lead to a synoptic EPA that truly measures occupational competence. This is underpinned by having at least one synoptic assessment method (a method that tests a combination of knowledge, skills and behaviours) ...*
- **Produce consistent and reliable judgements**  
*The assessment methodology and tools used must ensure that employers can have confidence that apprentices assessed in different places, at different times, by different assessors have been judged in the same way and to have therefore reached the same standard of occupational competence ...*
- **Ensure independence**  
*The organisation delivering the assessment and the individual assessors making assessment decisions must ensure independence. For integrated degree apprenticeships the organisation does not have to be independent but the individual assessor must be ...*
- **Apprenticeships should be graded using at least one level (merit or distinction) above pass**  
*Apprenticeships should be graded using at least one level (merit or distinction) above pass for the EPA as a whole ...*
- **Feasibility, manageability, and affordability**  
*Feasibility, manageability, and affordability within the constraints of funding policy ...*
- **Enables EPAOs to make reasonable adjustments**  
*Enables EPAOs to make reasonable adjustments for conducting an EPA in compliance with equality legislation”.*<sup>27</sup>

It is also emphasised that the EPA plan must be organisation neutral, “meaning that it must not name any specific training provider or EPAO”.<sup>28</sup>

To meet these requirements, EPA plan developers are offered a menu of assessment methods that can be used with guidance about what they are most suitable for, their advantages, what they are not suitable for, and other factors to take into account. The EPA plan also needs to specify gateway requirements that the apprentice must fulfil before their employer can put them forward for the EPA. These include the employer confirming they are confident that the apprentice is occupationally competent and working at or above the level of the occupational standard. Other requirements include minimum levels of English and maths, any mandatory qualifications specified, and any outputs such as logbooks, portfolios or projects needed to underpin the EPA assessment methods. “Work completed prior to the gateway can be used to support an assessment method but cannot be an assessment method in its own right”.<sup>29</sup>

<sup>27</sup> IfATE (updated September 2023) *Developing an end-point assessment plan – 1. End-point assessment requirements*

<sup>28</sup> IfATE (updated September 2023) *Developing an end-point assessment plan – 1. End-point assessment requirements*

<sup>29</sup> IfATE (updated September 2023) *Developing an end-point assessment plan – 3. EPA gateway*



EPA assessment methods included in the IfATE guidance are:

- **“observation based:** *the assessor will observe how the apprentice undertakes one or more duties in the workplace. This can be supplemented by the assessor asking the apprentice questions during or/and after the observation.*
- **practical demonstration based:** *an assessment of skills (and sometimes knowledge and behaviours) that takes place in a practical skills facility such as a simulated work area in an assessment centre or a skills development facility. This can be supplemented by questioning during or after the demonstration.*
- **test based:** *an assessment taken under controlled and invigilated conditions. The types of questions used may vary (for example, multiple-choice, open-answer and scenario/case study based tests or a combination thereof). The test could be presented on paper, as an online series of questions or pre-loaded onto a computer.*
- **project based:** *a defined piece of work undertaken after the gateway to demonstrate a particular aspect of the occupation – a project could be marked in its own right and/or used to inform a presentation or interview/discussion. This could be a written-assignment or a practical project, and wherever possible should have a business benefit and include the production of verifiable and assessable work outputs.*
- **presentation based:** *the apprentice making a presentation to an individual independent assessor. This will often be followed by questioning from the independent assessor.*
- **discussion based:** *could be either an interview (where a series of questions is posed to the apprentice about an aspect of their occupation and how they have demonstrated different competencies) or a professional discussion or viva (which is an in-depth, two-way discussion between an independent assessor and apprentice to assess theoretical or technical knowledge). Questioning and answering (where short, focussed questions are asked in support of another assessment method for example observation or presentation) would also be classed as being discussion based types of assessment”.<sup>30</sup>*

In terms of suitability:

- Workplace observation and practical demonstration both enable the holistic assessment of KSBs and are particularly suited to assessing practical and procedural skills. Workplace observation has the advantages of authenticity and validity but may not always be practical to arrange. Practical demonstration in a controlled environment has the advantages of being consistent and enabling the testing of scenarios that could not be created safely or appropriately in a real workplace.
- Projects are another way to holistically assess KSBs and are suited to occupations where workplace observation is impractical because the work cycle is too long.
- Tests are primarily a way of assessing knowledge. Multiple-choice tests are best suited to assessing knowledge where there are clearly right and wrong answers. Written tests can be used to assess understanding and skills such as data handling, reasoning and problem-solving, and written communication. Both forms of test are relatively easy to both administer and control to produce reliable results. However the marking of written tests involves interpretation and may not be consistent.

<sup>30</sup> IfATE (updated September 2023) *Developing an end-point assessment plan – 4. Assessment methods*

- Professional discussions, interviews, and a presentation with questions, are all ways of assessing knowledge and understanding, and some skills and behaviours that may not naturally occur in a workplace observation. Professional discussion enables more in-depth assessment of understanding through two-way dialogue rather than simple question and answer. A presentation with questions enables skills and behaviours that may be relevant to the occupation to be assessed through the presentation.

The most common EPA activity is an interview or professional discussion, used in 65% of standards. Tests/exams are used in 38% of standards, projects in 29% of standards, observations in 23% of standards, practical demonstrations in 17% of standards, and presentations in 9% of standards. Observations, practical assessments and tests/exams are most commonly used at levels 2 and 3. Projects are most commonly used at Level 4 and above.<sup>31</sup>

31 Molkenthin, J. (2022) *The benefits, challenges and best practice of remote end-point assessment*. FE News, 12 September 2022.

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