Lessons from Piloting an Innovation Toolkit in Further Education

Final report

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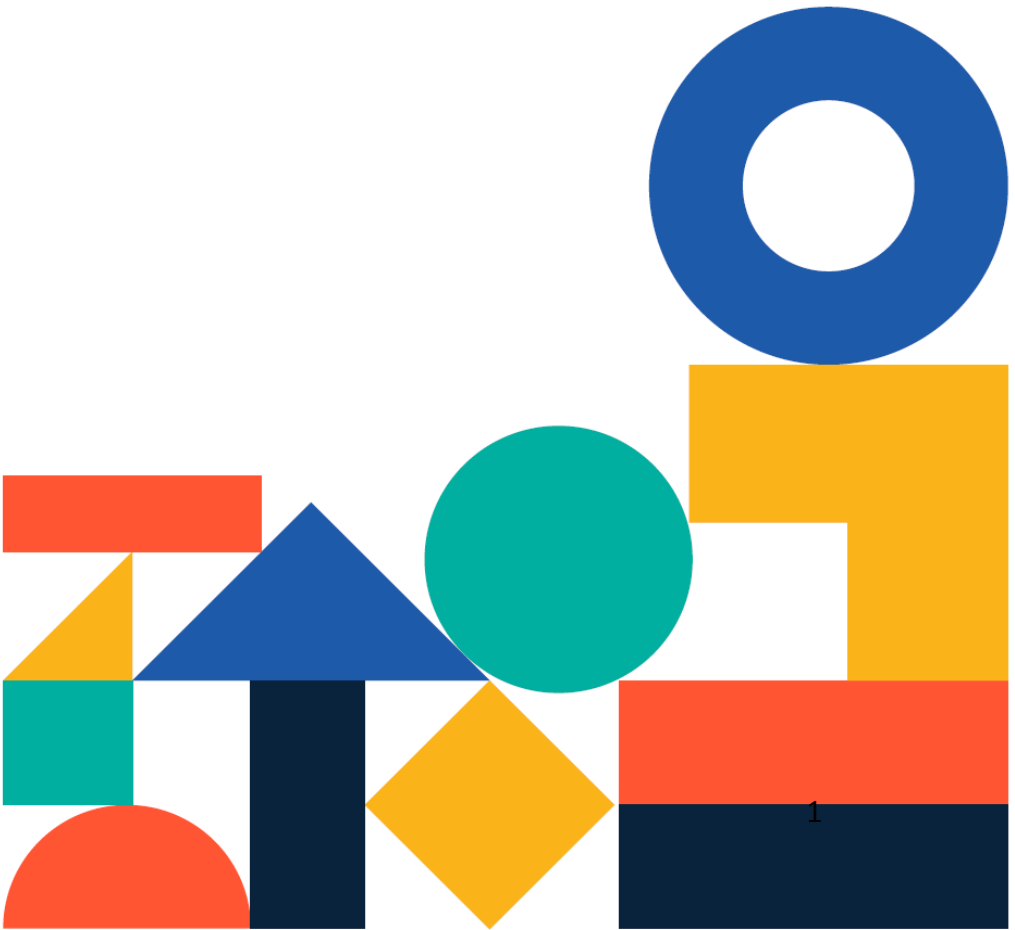


Executive summary

To help address the challenge of lost innovative potential in the UK, this project focused on Further Education (FE) colleges as a key setting for equipping underrepresented learners with innovation skills. The project's goal was to help fill a critical evidence gap on 'what works' in this area by assessing the feasibility of rigorously evaluating East Kent Colleges Group's (EKC Group) 'Think.Design.Do' (TDD) toolkit, an online Design Thinking programme designed to equip learners with practical problem-solving, creativity, and iteration skills. Conducted by IGL, EKC Group, and academic partners under the UKRI-funded "Unlocking Innovative Potential" programme, the primary aim was a feasibility study for a Randomised Controlled Trial (RCT).

While strong partner engagement initially suggested a full RCT might be possible, the pilot ultimately served its core feasibility purpose. Significant challenges, particularly in recruiting sufficient learners and ensuring survey completion within the college environment, demonstrated that a large-scale RCT was not viable without substantial adaptations to the experimental design and delivery model.

Despite the quantitative limitations, the pilot yielded valuable results. Qualitative research indicated learners responded positively to the TDD toolkit, developing problem-solving skills and confidence. The process also provided EKC Group with actionable feedback to optimise the toolkit for its wider rollout. Key lessons emerged regarding the practicalities of data collection in FE settings and the crucial role of teacher engagement. The pilot successfully generated critical knowledge, preventing investment in an unfeasible large-scale trial and providing a clear path forward for the TDD programme.

Introduction

This report details the findings from a pilot experiment designed to assess the feasibility of rigorously evaluating East Kent Colleges Group's (EKC Group) 'Think.Design.Do (TDD) - a new toolkit designed to equip further education learners with innovation skills. This pilot experiment was conducted by the Innovation Growth Lab (IGL), East Kent Colleges Group (EKC Group), and external academic researchers, as part of the "Unlocking Innovative Potential" programme.[1]

As the pilot was designed and implemented, the strong engagement from the delivery partner suggested an opportunity to go beyond the initial feasibility scope and attempt a full Randomised Controlled Trial (RCT). However, the pilot ultimately served its primary purpose as a feasibility study, providing critical, actionable insights into the practicalities of conducting experimental research in a complex further education setting. It revealed significant challenges in student recruitment and survey completion, which confirmed that a larger-scale RCT would not be viable without significant adaptations to ensure student engagement and take-up - an issue in educational interventions that require a system-level approach (Asanov et al., 2023). Although the RCT required further work on the take-up process, the response to the toolkit still indicated the potential benefits of the toolkit, which EKC Group is continuing to adapt for future application, utilising the evidence gathered through this research project. This report outlines the pilot's journey, summarises the qualitative findings, and shares the lessons learned.

Background

East Kent Colleges Group (EKC Group) is a provider of technical and vocational education in the south-eastern English county of Kent. More than 12,000 students are enrolled at its six colleges and adult training unit.

EKC Group had recently established a new unit focused on driving innovation, spurred by the opportunity to broaden their impact on the development of the economic and social prosperity of their diverse community. During their scoping phase, which took place before engagement in the UIP project, they had discovered an evidence gap in the literature regarding the development of innovative capacity and skills within a further education and vocational education training context. This led them to consider ways to gather robust evidence through pilots. Discovering and joining our initiative was a natural next step in the journey that EKC Group had already started to become more innovative, and better contribute to innovation in the Kent region.

[1] A UKRI funded research project, Ref ES/Z502662/1

EKC Group approached IGL with three new initiatives that they were hoping to pilot in the near future: equipping learners with entrepreneurial and innovation skills; connecting manufacturing learners with businesses to solve real-life industry problems; and using technical staff in colleges to help micro and small businesses to innovate.

Of these, the one for which plans were most developed was a programme to introduce learners to design thinking. This was seen as particularly amenable to experimentation, in that there would be a large number of learners and that tangible outcomes could be measured both in the short term (changes in understanding of design thinking, as well as in self-confidence and ambitions) and in the longer term (in actual decisions about further study or employment). There was also a clear link to the UIP programme, given that this was intended to enable an underserved group (vocational further education learners) to participate more actively in innovation activities. Key staff and management at EKC Group were enthusiastic about what they could learn from experimentation, particularly to inform decisions about rolling the design thinking programme out more widely.

EKC Group developed the design thinking toolkit, known as “Think.Design.Do”, in conjunction with a specialist contractor. The toolkit was created to complement students’ core studies, as one of a range of employability, enrichment and pastoral (EEP) activities offered by EKC Group. It was designed as a self-guided online course, with no requirement for reinforcement from a classroom teacher. The toolkit consists of five modules, taking learners through the fundamental concepts involved in design thinking. The content is highly interactive, featuring short videos, case studies, quizzes and access to tools to aid in applying design thinking in practice. The intended causal pathway for how 'Think.Design.Do' was expected to impact learners, from initial engagement through to longer-term outcomes, is detailed in the logic model presented in Appendix A.

Early in the process of planning the experiment, IGL introduced EKC Group to two researchers with extensive experience in conducting experiments of educational interventions: Professor Gerhard Riener from the University of Southampton, and Dr Igor Asanov from the University of Kassel. They worked closely with EKC Group and IGL over a 10-month period, leading the design of the experiment and the data-collection tools as well as advising on the design of the toolkit itself.

Further Education Colleges and Design Thinking

There is a growing interest in the role of Further Education (FE) colleges as central players in the UK's innovation landscape. Innovation agencies like UKRI and Innovate UK have highlighted the importance of a diverse, skilled workforce for driving economic growth, increasingly viewing FE colleges as potential "catalysts for regional business innovation" due to their strong connections with local employers (Vorley et al, 2021).

This project aligns directly with that focus by aiming to build robust evidence on how best to implement and scale the teaching of innovation skills within the FE environment (Nelles et al. 2025; Rao, Puranam, and Singh, 2022). Interest from policymakers on the testing the feasibility of experimentation in this area remained high throughout this project given its potential to inform future policy decisions. Throughout the Community of Practice meetings, policymakers were kept informed of the development of pilot ideas and provided steers on how the emergent, localised findings might be of use to them.

This project aims to address the limited robust evidence on implementing and scaling innovation skills, including those that are aligned with the Innovation Execution skills detailed in the Innovation Skills Framework.

East Kent Colleges Group (EKC Group) developed the 'Think.Design.Do' toolkit, a programme centred on Design Thinking. The methodology's focus on creativity, iteration, and problem-solving was selected as it aligned well with EKC Group's goal of equipping learners with the adaptable skills needed to succeed in a rapidly changing workplace.

While a recent meta-analysis of Design Thinking in education found a moderately large positive effect on learning outcomes, most of the studies were not randomised, and the small number of existing randomised experiments presents a promising but mixed picture (Yu, Yu & Lin, 2024). For instance, one study (Rao, Puranam and Singh, 2022) in India found a design thinking programme increased students' confidence but decreased the originality of their ideas, while another in Thailand found it improved academic performance and critical thinking skills (Ekvitayavetchanukul et al., 2025). During the delivery of the pilot there was also an opportunity to explore the potential of AI-based assistance within the toolkit. This innovative technology shows mixed effects on cognitive process, e.g. on creativity (Doshi and Hauser, 2024), and with concerns about a gender gap in usage (Otis et al., 2024), it also has the potential to improve learning outcomes (De Simone et al., 2025) and to engage students in learning, irrespective of gender (Bao et al, 2024).

Designing and Implementing the Pilot: A Phased Approach

EKC Group, IGL and the researchers worked together to develop an experimental test of the impacts of the design thinking toolkit on learners. Four research questions emerged from this process:

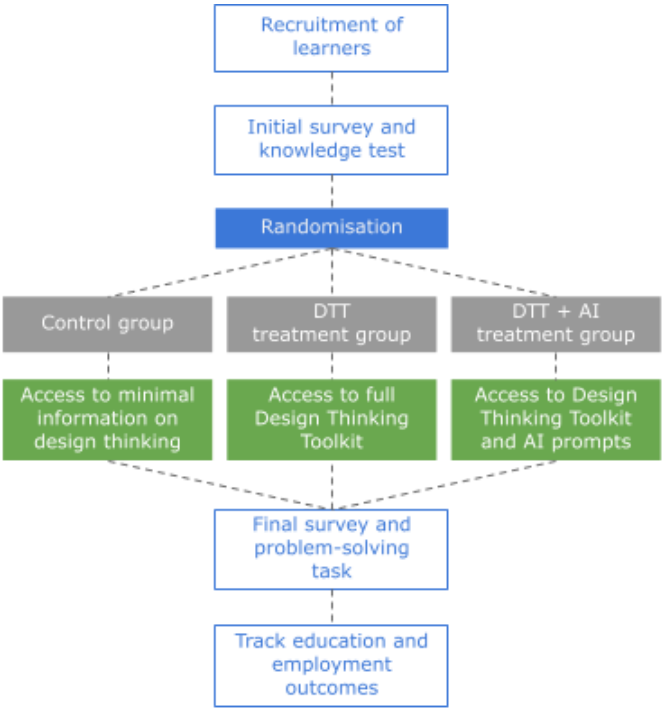
1. Does participation in an online training programme in design thinking (the Design Thinking Toolkit, DTT) improve further education learners' knowledge and application of design thinking principles?

2. How does engagement with the DTT affect learners' self-perceived creativity, problem-solving skills, and confidence in tackling complex challenges?
3. What impact does the DTT have on learners' future educational and career aspirations?
4. How is learners' engagement with the DTT and the subsequent impact affected by complementing it with assistance from an AI chatbot?

From these the central research question that shaped the design of the pilot experiment can be summarised using the PICO framework:

Participants	Vocational further education learners at East Kent Colleges Group
Intervention	The 'Think.Design.Do' online toolkit (with and without AI enhancement).
Control	A control group of learners receiving minimal information about design thinking.
Outcome	Changes in learners' knowledge of design thinking, innovation skills (e.g., creativity, problem-solving), mindsets (e.g., grit, growth mindset), self-confidence, and future career aspirations."

Figure 1: Envisaged trial diagram



The early ambition was to run a randomised controlled trial as the first stage, to provide early evidence to inform decisions about scale-up of the intervention. However, it soon became clear that a phased approach would be required. A first pilot phase to inform the development of the toolkit and research methodology, before launching a field experiment in the second phase.

Ethical review for both phases of the research on Think.Design.Do was carried out and approval granted by the University of Southampton's Research Integrity and Governance team.

Phase 1

The first test of the design thinking toolkit was carried out between February and June 2025. This pilot had several purposes:

- Test the use of the digital platform used to deliver the toolkit.
- Gather feedback from learners on the content of the toolkit.
- Assess how best to deploy the toolkit and provide support to learners as they work through it.
- Test the use of the data-collection tools and processes that would be used for a larger-scale randomised experiment.
- Test the processes involved in randomly allocating study participants between treatment arms.

The opportunity to participate in the pilot was disseminated through EKC's constituent colleges to classroom teachers and by them to students in their classes. Interested students then filled in a registration form.

To test the use of randomisation, vocational students who signed up for the pilot were randomly allocated to one of three trial arms:

- Standard treatment: Learners were given access to the toolkit
- AI-enhanced treatment: Learners were given access to the toolkit and received prompts to use AI tools to enhance their learning experience
- Control: Learners were not given access to the toolkit

A total of 330 learners were enrolled in the pilot. Initial recruitment efforts were targeted at vocational (level 3) students, the group for whom the toolkit was primarily intended. However, in response to demand from the colleges, participation was opened to level 2 students and also A-level students (that is, those studying for more academic qualifications). In the end, just over a third of the participants were A-level students.

Evaluation of the pilot involved tracking the data on learners' engagement through the toolkit platform, qualitative interviews with a selection of participants, and a comparison of quantitative measures before and after participating in the toolkit.
The outcome measures collected through surveys completed by the learners were largely based on existing widely-used scales:

Primary outcomes:

- Knowledge of the material covered in the DTT
- Expectations for education level
- Future employment and salary expectations

Secondary outcomes

- Wellbeing (WHO-5 Well-Being Index – Topp et al. 2015)
- Growth mindset (three-item 'Implicit Theories of Intelligence Scale for Children' – Blackwell et al. 2007)
- Zero-sum mindset (seven-item scale – Fearon et al. 2021)
- Grit (Short Grit Scale – Duckworth et al. 2009)
- Empathic concern (Davis 1983, Sommerlad et al. 2021)
- Perspective-taking (Davis 1983, Sommerlad et al. 2021)
- Adaptation–innovation (Kirton Adaption–Innovation Inventory – Bagozzi and Foxall, 1995)
- Attitude to risk (Balloon Analogue Risk Task – Lejuez et al. 2002)

Qualitative interviews were carried out with a selection of learners in March 2025, several weeks after the launch of the toolkit. These interviews focused on learners' perceptions of the toolkit and gathering recommendations for adjusting the toolkit itself or the way it was deployed. Learners were asked to opt in to be interviewed, so they were a self-selected group, and tended to have progressed relatively far through the toolkit. Three of the 11 interviewees had been involved in the co-design process for the toolkit.

Basic data on learners who were enrolled in the pilot – including gender, age, indicators of socio-economic status (such as past eligibility for free school meals) and their course of study and academic performance – were made available to the researchers in anonymised form. All learners were then asked to complete a baseline survey, alongside a quiz that tested their existing understanding of design thinking concepts, before beginning the programme. The baseline survey included questions on additional indicators of socio-economic status, learners' innovation skills, psychological measures of growth mindset, grit, zero-sum mindset, empathic concern and perspective-taking, and expectations for future study and employment. The survey and quiz were repeated at the end of the pilot phase in May/June 2025. At this stage, learners were also asked to

complete a problem-solving challenge, intended to assess what they had learned about design thinking.

Although more than 300 learners were recruited, encouraging enrolment proved more difficult than expected. Feedback from teaching staff suggested that the recruitment difficulties were largely related to timing, with vocational students being particularly busy with their core studies in the spring term. They also suggested that more engagement with and resources available for classroom teachers would better enable them to promote the toolkit and support learners in working through it.

Getting learners to respond to the surveys, both at the start and end of the pilot, was another key challenge. Learners were informed that they would be entered into a prize draw[2] if they completed both of the surveys, though this apparently was not strong enough as an incentive. In the end 19 learners were admitted to the pilot without having completed the initial survey. At the end of the pilot, another barrier was that learners found it difficult to navigate and progress through the challenge task, which led to many of them giving up before reaching the final survey. As a result, final data was collected from 13 learners.

Phase 2

The goal of the 'Think.Design.Do' toolkit was of strategic importance to EKC Group, aligning with its core mission to equip learners with the modern, adaptable skills required for their future careers. Despite the implementation challenges of the first pilot, the positive qualitative feedback indicated that the toolkit itself held significant potential and was valued by the learners who engaged with it. This combination of strategic importance and promising early feedback provided a strong rationale for the project partners to design a second, larger trial for the summer term of 2025.

The second phase was designed to test whether the key barriers to a successful experiment could be overcome with a revised approach. To address the recruitment and retention issues from Phase 1, two fundamental changes were made. First, to ensure a larger and more stable sample, EKC Group leadership moved from an individual student sign-up model to allocating whole classes to the experiment. Second, to boost survey completion and engagement with the material, teachers were asked to allocate time to learners to complete the surveys in class, and additional support materials (including a teacher guide, a Sharepoint site with resources, and a summary video) were provided to teachers to help them support learners in the treatment groups to work through the toolkit. These adaptations were designed to create a more controlled and robust

[2] A £100 voucher was available to one participant from each of the treatment and control groups.

environment for the trial, directly tackling the logistical hurdles identified in the initial phase.

Phase 2 was launched in May 2025, with approximately 1300 learners from across all EKC Group's constituent colleges included. The list of learners was randomised between three trial arms (two treatment groups and a control group, as in phase 1). A two-week time window was allocated for students to complete the baseline survey, following which they would be informed about whether they had been randomly assigned to have access to the toolkit and given access to start on the programme immediately. Learners were to be given until the end of the academic year in mid-July to complete the programme and to fill in the final survey. Following best practice, the researchers preregistered this study on the American Economic Association's RCT Registry.

It again proved more difficult than expected to recruit learners. Competing demands on classroom teachers meant that many of them found it difficult to prioritise supporting learners to onboard to Think.Design.Do midway through the academic year. In spite of an extension to the timeline and offering a prize draw, only 12% of those in the classes allocated to the experiment logged into the platform, and only a small percentage went on to complete the initial survey and work through the DTT programme. As a consequence, phase 2 also served as a feasibility assessment rather than experimental assessment of the impacts of the DTT. Instead, this has effectively functioned as an extension of the feasibility study begun in phase 1.

Key Findings: Feasibility, Optimisation, and Outcomes

The two pilot phases have primarily functioned as feasibility studies, assessing whether the toolkit and the evaluation processes could be implemented successfully, to build the foundation for a full-scale experiment. This was in line with IGL's original concept for the Unlocking Innovative Potential project. However, the pilots have also provided EKC Group with insights that have helped to optimise the design of the toolkit, as well as some initial indications of the impact it has had. We consider each of these elements in turn.

Feasibility Findings: An RCT Proves Challenging

The conclusions about the feasibility of carrying out a full-scale randomised experiment of the programme are also mixed. There are some clear successes, particularly during the design phase:

- Identifying an experimental research opportunity with the potential to develop findings that would be valuable to the implementing partner and the wider research community.

- All parties collaborated closely on the design and implementation of the pilots, meeting weekly to coordinate, make plans and discuss emerging challenges.
- Establishing a legal and administrative framework for data sharing between the parties took time to agree, but provided the researchers with access to the information required for the analysis while protecting the confidentiality of learners' data.
- Incorporating data-collection systems into the toolkit platform.

The two pilot phases demonstrated that the design thinking toolkit worked well and was very positively received by learners. For example, learners praised the website's aesthetic and the engaging, interactive mix of content. One student described the experience as 'perspective-changing', while another found the real-world case studies of companies like Apple and Nike 'aspirational. No major difficulties were encountered with the technology platform or the content. Qualitative interviews highlighted that learners appreciated the opportunity to learn about design thinking, and felt that the toolkit had helped to develop their problem-solving skills, creativity and confidence. Most of them said that they were likely to recommend participation to others (though it should be remembered that the interviewees were a self-selected group).

On the other hand, levels of participation in both phases of the pilot were significantly below expectations. Feedback from teaching staff suggested that the recruitment difficulties in phase 1 were largely related to timing, with vocational students being particularly busy with their core studies in the spring term. They also suggested that more engagement with and resources available for classroom teachers would better enable them to promote the toolkit and support learners in working through it.

Even among the learners who signed up to take part, progress through the programme was slow, with a substantial number never having made a start. The decision to make participation compulsory in phase 2 did not consistently translate into action on the ground, apparently because of competing demands on teachers' time during the short recruitment window.

However, feedback throughout the piloting process has consistently shown that teachers are positive about Think.Design.Do in principle. The patterns of participation will likely be very different once the programme becomes a standard part of EKC Group's EEP offer and teachers can work with learners from the start of the academic year to allocate learning time to this.

As discussed in the previous section, getting students to start and complete the programme proved a critical challenge.

A large majority of targeted learners in the second phase (~88%) never completed the initial registration into the platform to start the survey. Qualitative feedback suggests that a major factor was the lack of protected time in the curriculum and competing demands for teaching staff during a busy period, which limited their capacity to onboard students effectively and to communicate the programme requirements and benefits. Without these enabling conditions participation could not be effectively mandated.

The requirement to complete a baseline survey was also identified as a friction point. Platform data indicates a 31% immediate bounce rate, and for those who started the survey, approximately 60% dropped out before completion. In qualitative interviews, learners reported that the survey felt like an unexpected hurdle.

However, other evidence suggests that the survey may only have been an “early warning indicator”. Progression into the toolkit content remained low even among those who successfully navigated the survey or who had been allowed to progress without having done so in phase 1. This suggests that even if removed or reduced, there would not have been significantly higher uptake.

The project team planned to use existing data sources to track outcomes from the DTT, including students’ subsequent performance on their core studies (available in EKC’s data) and on their decisions about employment and study after leaving the college (information which is routinely collected in a survey carried out by EKC Group, albeit with a modest response rate). But tracking the more immediate outcome measures, such as their understanding of design thinking and ambitions for the future, relies on being able to collect survey data.

This has two main implications. Data collection must be integrated as seamlessly as possible into the user journey and aligned with the practical realities of the delivery environment. However, this alone would be insufficient without addressing the systemic constraints, such as the lack of protected time, that prevented the vast majority of learners from engaging. Without these enabling conditions, adjustments to onboarding procedures are unlikely to raise engagement substantially.

This highlights the inherent value of the piloting phase. Ideally, extensive testing would be conducted to remove all risk and uncertainty. However, in complex educational settings, it is not always possible to test every variable or anticipate every structural constraint in advance.

Some of the other challenges encountered in putting systems in place to run the experiment included:

- Processing the data (including carrying out pseudonymisation before sharing with researchers and de-pseudonymising data after randomisation) represented a larger than expected administrative burden for EKC Group.
- In phase 2 there was a misunderstanding about the randomisation process, with teaching staff seeking to manually change some of the treatment/control allocations after randomisation. In this case the close coordination between the parties meant that this problem was identified straight away, and the randomisation was re-run after adjusting the sample as necessary.

Finally, as is common with projects of this nature, the pilot highlighted the importance of aligning the different priorities of delivery partners and researchers. Delivery partners are rightly focused on gathering timely, 'good enough' evidence to make immediate operational decisions, while researchers often aim for the level of rigour required to produce generalisable insights for policy and academia. Successfully navigating these different perspectives is a natural part of the collaborative process and requires open dialogue and a degree of compromise from all sides.

Optimising the Toolkit: Insights from Learner Feedback

The learners who were interviewed in phase 1 also provided several suggestions for how to improve and develop the toolkit further. Their suggestions included:

- Providing more detailed information (and with more consistency) on what the toolkit involves when recruiting learners, with a focus on the skills they can expect to learn, the relevance to future work, and the interactivity of the toolkit.
- Making the videos included in the toolkit more visually appealing.
- Outlining the approximate amount of time they should expect to spend working through each of the toolkit's modules.
- Providing dedicated time during class hours to work on the toolkit.

Teachers also reported that, in order to better support learners, they wanted access to the toolkit themselves, as well as to be given some supporting resources in line with system-level intervention in education (Asanov et al., 2023).

Some of the recommendations have already been taken on board in iterating the toolkit for phase 2, while others are expected to be incorporated before the wider rollout in the 2025/26 academic year. As a start the toolkit will be transferred to a new software platform and the final challenge will be simplified into a quiz, with a further review planned for the next academic year.

Indicative Learner Outcomes: Qualitative Insights and Quantitative Limitations

Given the very small number of learners in phase 1 who completed both the initial and final surveys, it is not possible to draw any meaningful conclusions from the quantitative data. Instead, the data collection served primarily as a test of the evaluation process itself and to provide EKC with an illustration of what could be possible should the data collection be scaled.

While the pilots were not implemented at a scale that could be expected to generate robust evidence of the impacts of the toolkit, the qualitative interviews provided some indications of the form those impacts might take.

The most commonly-cited benefit of participating in Think.Design.Do was in developing problem-solving skills. Learners felt better able to analyse a problem, consider it from multiple perspectives and break it into manageable steps. Some had already started applying the techniques they had learned to problem-solving in their coursework or managing their college workload. Some of the learners interviewed also reported developing their skills in self-reflection and creativity.

There was no indication from the interviews that the toolkit had had an influence on learners' aspirations for future study or employment. However, the interviews were conducted relatively early in the rollout of the programme, and any such impacts would probably take more time to become evident.

Unexpectedly, those who were involved in the process of co-designing the Think.Design.Do programme reported sustained changes in their confidence and team-working skills. This came about through the way the co-design sessions were conducted, which involved group and whole-class discussions. This experience will clearly not be available to learners who are working through Think.Design.Do as an individual, online programme. Although complicated to achieve at scale, this suggests that there may be benefits in incorporating an element of in-person delivery into the programme. It also highlights that using a similar co-design process for developing other new curriculums and materials would be welcomed by students and may have significant impacts for them.

Again, the qualitative interviews cannot be taken as firm evidence that Think.Design.Do has had these impacts (either on the interviewees or on the broader group of participants). Instead, these should help to inform which impacts should be examined in future evaluations of this programme and others like it.

Understanding Participation: Analysis of Selection Bias in Phase 2

To better understand the low participation rates encountered in Phase 2, an analysis was conducted to identify any potential selection bias. Using pseudonymised administrative data provided by EKC Group, we compared the characteristics of the N=1272 learners in the target group with two other groups: the N=147 learners who were "ever active" on the 'Think.Design.Do.' platform (i.e. logged in at least once) and the N=16 learners who started the programme (i.e. completed the first module).

The analysis indicated a selection bias at the initial "ever active" stage:

- Gender: The target group was 61% male, but the "ever active" group was only 52% male. This indicates female learners were disproportionately more likely to engage.
- Free School Meals: Participants were slightly more likely to be eligible for Free School Meals (14% of the active group vs. 11% of the overall group).
- Other Factors: Participants also tended to come from slightly smaller classes and participation varied by college campus, suggesting local implementation factors played a role.

This selection bias becomes even more pronounced when looking at the very small share of learners (N=16) who actually started the programme. This small group of completers was 75% female, a divergence from the target group (39% female) and the active group (48% female). None of the 16 completers were eligible for Free School Meals

These findings indicate that participation and completion were subject to selection bias, meaning that we need to be cautious in how the qualitative results and feedback from participants generalise to the wider student population.

Conclusions and Key Lessons Learned

The piloting process has provided EKC Group with valuable information about how best to deploy Think.Design.Do. Much has been learned through this process about the challenges of motivating students to participate in a new programme, the key role of classroom teachers in that process, the benefits of involving students in the curriculum design and testing process, and the difficulties that arise in rolling out a fully-online educational programme. These insights will be crucial in informing how Think.Design.Do is rolled out across EKC Group's colleges, and in future initiatives to develop new curriculum elements.

The project served as a preparatory phase to the goal of experimentally testing the programme's impacts on learners, as had been set for phase two. Both pilots functioned as tests of the feasibility of a randomised experiment, which had been the original objective for the project, and revealed two important barriers to implementing a successful experiment. Recruiting large numbers of students was challenging without the programme being fully embedded as one of EKC Group's standard menu of EEP activities. Additionally, the process of data collection was deemed an impediment to recruitment and led to complications and delays in the implementation process. Both of these barriers could doubtless be overcome with more resources and development, but not within the timetable and capacity available for this experiment.

This experience has been welcomed by EKC Group for the opportunity it provided to use an experimental approach in the broad sense: using an iterative approach to design and test a new curriculum, incorporating feedback from students at all stages, and adapting it to improve how it is perceived by students and teachers. On the other hand, the conclusions about the potential for randomised experimentation are more equivocal. The RCT was seen as "brittle", requiring a high level of management of the details (such as about the registration and participation of students, about the messaging given out by teachers, and about strictly following the allocation into treatment and control groups) which is difficult to achieve in a complex organisation when dozens of staff and thousands of students are involved across several different sites.

While this experience highlights the challenges of applying a strict RCT methodology in a dynamic educational setting, it also underscores the value of under experimentation in its broadest sense: a "test done in order to learn something". The introduction of Think.Design.Do was intentionally designed with a structured learning strategy to test assumptions and generate new knowledge to inform decisions.

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Appendix A: Logic Model for Think.Design.Do (TDD)

Need	*Input & Activities*	*Outputs*	*Immediate Outcomes*	*Intermediate Outcomes*	*Final Outcomes*
Skills Gap: FE learners, particularly from underrepresented backgrounds, lack specific, practical innovation skills (e.g., problem-solving, creativity) desired by employers. **Mindset/Confidence Gap**: Learners may lack the confidence, self-efficacy, and mindsets (e.g., growth mindset) to tackle complex challenges or pursue innovative career paths.	Inputs: 'Think.Design.Do' (TDD) online toolkit and AI chatbot component. TDD content focused on iterative processes. (Phase 1) Co-design process with learners. Activities: Learners complete online modules (e.g., Empathy, Ideation, Prototyping). Dedicated class time provided. Learners engage with toolkit content. Learners practice new	Learners complete TDD modules. Learners demonstrate understanding of the design-thinking process. Learners complete self-reflection elements of the toolkit	Improved knowledge of design-thinking principles. Improved skills in empathy and perspective-taking. Improved creative/innovative style (Kirton Adaption-Innovation Inventory). Improved practical skills in problem-solving and iteration. Increased confidence in tackling complex problems. Improved Growth Mindset.	Learners apply new skills to their college work or personal projects. Learners are better able to articulate their skills on CVs and in interviews. More learners see innovative career paths as viable for them. Increased self-efficacy and ambition regarding future study or careers	Learners are better equipped with the skills needed for the modern, rapidly changing workplace. More learners from FE backgrounds pursue innovative careers, helping to address the "lost innovative potential" gap.

	skills in a structured environment.		Improved Grit (Short Grit Scale). Reduction in zero-sum thinking. Improved personal wellbeing (WHO-5).		