WILD for Meta Skills 2.0 Research Project

Evaluation Report

Project team: Professor Ruth Crick, Cat Lumb, Natalie Brooks, Shaofu Huang and Cara Clark

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We're NCFE: an educational charity and leader in vocational and technical learning. **We combine over 170 years of education experience** with deep insight, working with a network of expert collaborators to shape smarter solutions around the greatest learning needs. In doing this, we're working for a fairer education system for all learners to power inclusivity and choice.

In 1848, we were born from the belief that no learner should be left behind. Today, we're taking up that cause with fresh energy. Our vision and goals will be achieved through:

- → Creating education for a fairer world
- → Moving towards a smarter education eco-system
- → Using our influence to shape real change
- → Promoting the idea that potential is personal.

Ufi VocTech Trust

NCFE are a co-funder of this pilot together with Ufi VocTech Trust which has been supporting the development of pilot projects with grant-funding and enrichment. Ufi VocTech Trust will continue to support the development, helping to extend the pilot period and enable deeper evaluation of the platform's impact.

Our Purpose is to empower the world to learn and thrive for a healthy, sustainable future.

We enable business, education and community to achieve their purpose by providing a fresh approach to learning and upskilling. We embed future skills into the everyday flow of work, study and collaborative projects to drive a culture of continuous improvement. We provide a digital capability for scale, powered by unique learning analytics at multiple levels. We build the internal capability necessary for sustainable change.

We empower people to develop a sense of purpose, take control of their learning, their actions and consequences, by creating the conditions where diverse abilities, skills, attitudes and values can flourish for improved wellbeing and performance.

At WILD we will empower and inspire you to prepare your workforce, students or community to be fit for the Future of Work. We offer a fresh approach to the development of in demand 'future skills' of Self Leadership, Learning Relationships and Complex Problem Solving through deliberately designed, personalised, supported and scaffolded learning experiences on the job. We build capacity internally for sustainability and cost efficiency and enjoy co-designing learning solutions that are one of a kind and fit for purpose. Our playbook of learning design principles combined with thought leadership, a team with diverse expertise and a digital capability helps us to adapt and integrate our ideas into any context or culture for maximum impact and powerful learning experiences.

Nottingham College is one of the largest FE colleges in the country, enrolling more than 25000 Students each year, employing more than 1300 staff, across 10 campus sites each with different specialisms. WILD and Nottingham College share a common purpose and their strategic plans are aligned to changing lives by re-forming assessment through project-based learning, making the College Future Ready.

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Executive Summary

Project Summary

The aim of the research project was to develop a digital self-evaluation tool to enable students to purposefully achieve employability outcomes through formative, feedback which develops their self-leadership, learning relationships and complex-problem solving skills in authentic, work-based contexts.

This research project WILD4 Meta Skills (NCFE) built on and enhanced Nottingham College's adoption of the WILD Learning Journey App to develop and measure Self Leadership, Learning Relationships and Complex Problem-Solving meta-skills in students and staff across the Automotive, Business and Foundation faculties of the College.

WILD worked collaboratively with Nottingham College using focus groups of students across multi disciplines/age groups (GCSE up awards) to test a 'meta-skills' on-line self-evaluation tool to develop employability skills. The scope of the project included developing a rubric into 'Student voice' language, translating this into a newly designed on-line self-evaluation form. The form would then be tested for principally 'useability' in this first stage across a range of c150 learners including GCSE/Business/Foundation/Automotive.

WILD took a collaborative approach to the research project, building relationships with Lauren Stott (Advanced Practitioner) at Nottingham College, a working group of Practitioners/Tutors and students across the areas noted above. WILD provided training and coaching to build their understanding and confidence of the tool, Learning Power resources and Coaching for Learning approach which they could embed into their practice.

The project design built on the research evidence complied by the Helix Project for (McdDermott et al., 2021, Hutchison et al., 2019) Systems Thinking which developed a competency model for complex problem solving which incorporated self-leadership, learning power and collaborative learning relationships. The evaluation process for this project was therefore to 'translate' the variables identified by Helix into a self-evaluation tool that would be efficacious and effective for young people in Further Education. The methodology proceeded with the development of the Helix variables into practical, behavioural indicators for young people in a rubric. This was then tested with young people through qualitative data collected in focus groups, and then converted into an online form to explore whether these were salient and achievable as an online-self-evaluation framework. The final phase of this part of the work was the development of a wireframe to build out the tool into a user-friendly App within the Plan, Do and Review stages of the Learning Journey App. In a future phase, the project will also be able to test the qualitatively derived variables against the statistical measurement models through the online learning analytics. The project was jointly funded by Ufi VocTech Trust and NCFE. It began in March and ended in September 2023.

Pilot Findings

Research Question	Findings
What is the usability of the Thinking Skills online form for users of age 16 to 24.	• The wording of the questionnaire can be well understood by most users. • The length of the questionnaire has been a challenge for unprepared users, but this should not be a problem when it is used as an integrated part of a curriculum. • One in two participants found the form easy enough to use and saw a value of it. Given these are unprepared users, there are reasons to believe the tool will be more effective when it's fully developed and integrated into a curriculum.

Additional Findings

Overall, the findings suggest that the self-evaluation (questionnaire) tool is suitable for college students and when rolled out in the future would be most effective to integrate with the school's curriculum and projects. The questions enabled focused conversations engaging them in broader aspects of life both and out of college which were important to them. The partnership of having a language of learning power and thinking skills proved to be inclusive regardless of academic ability – particularly when accompanied by metaphor, image and story.

With a shared consistent language for learning, relationships form and deepen and this is powerful for future growth. When combined with a digital solution targeting future skills this can provide the scaffolding for scaling and supporting different ways of thinking and further development in a project-based learning approach in various contexts.

Introduction

The Purpose of the Project

The purpose of the project was to develop a digital self-evaluation tool to enable students to purposefully achieve employability outcomes through formative feedback which develops their self-leadership, learning relationships and complex-problem solving skills in authentic, work-based contexts.

Background and Rationale

Existing approaches to assessment in education generally focus on measuring 'outcomes' of learning in a manner which is standardised and focused on narrow set of indicators, such as the acquisition of knowledge or a particular performance. The evidence is that a focus on high stakes, summative assessment depresses students' motivation for learning and self-directed change. This is a significant learning design fault and a matter of social justice. This project will build on twenty-two years of research into the assessment of learning power to explore how student learning journeys can be enhanced by digital formative self-evaluation tools that track three important flows of personal change which are key to agency and sustainability in learning: self-leadership, learning relationships, and complex problem-solving capabilities.

We know that the world is increasingly volatile and unpredictable. Today's students are preparing for jobs that don't exist, jobs that will use technology that hasn't been invented yet, to solve problems, we don't even know are problems yet! There are a multitude of competing lists, for example, The World Economic Forum, OECD, and US Department for Education[6] are amongst many organisations globally that have compiled 'their' list of the top, most important employability skills for the future workforce. Whilst these lists are all useful and have a lot in common, current approaches to skills development in the workplace tend to overlook the context, the agency and purpose of the learner, the importance of linking reflection to real work and the need for 'mindset' shifts in learners. These lists are taken out of context and delivered through learning design that fails to engage the learner in meaningful, self-directed change.

All lists of skills are valid in their context and time, but that they are transitory and dynamic. Identifying the underlying meta-competencies that enable learners to intentionally acquire the transferrable future skills they need in their particular context aligned to their own self-directed purpose, is a more sustainable and integrated approach. The research informed meta-competencies we focus on are Self-Leadership, Learning Relationships and Complex Problem Solving. We have further de-composed these against variables from our learning power research, the Helix research into systems thinking competencies as well as a full range of 21C skills from different sources.

Meta Skills and Learning Journeys

In 2022 WILD successfully built, tested, and launched a completely new Learning Journey App, optimised for mobile devices. This supports an end-to-end self-directed learning journey through the development of learning power (with pre and post measurement points), coaching-for-learning relationships, student choice in self-improvement strategies and thinking skills for knowledge building as well as guidance for a student led compilation of an 'end product' with evidence of personal change (Me), evidence of skills development (My skills) and evidence of complex problem solving (My Project).

This WILD for Meta Skills project will enable us to add substantively to scalable student learning journeys and concurrently support tutor professional learning.

This project was designed to enhance user experience in work-based learning through prototyping an Employability Skills Self-Evaluation tool, which built on a student's learning power and pointed them towards specific strategies for change in authentic work integrated learning projects. Framed by the three learning meta-competencies of Self-Leadership, Learning Relationships and Complex Problem Solving, the tool invites students to explore their own sense of identity and purpose and the purpose of their project; to select and develop tools for thinking skills and functional skills that enable them to achieve that purpose; and to present the outcomes of their learning through narrative self-assessment (me), qualitative peer evaluation (my skills) and evidence of intellectual rigor in complex problem solving in their chosen domain (my project). The Employability Skills self-evaluation tool drew on the Intellectual Property of the Helix Project, integrated it with learning power research evidence and adapted it into an educational package suitable for 14–19-year-olds.

Research Foundations

The research teams evaluated the Helix model of systems competences for engineers, which was designed as a career long self-evaluation tool (Hutchison and McDermott 2019,2020). This resulted in three published academic papers which explored the common learning design principles shared between the Helix model and the Learning Journey research base and demonstrated that the three meta-competences were common outcomes of both learning journey processes and systems engineering thinking skills. In addition, the research team compiled a mind map of 7 significant 'lists' of future skills to explore the conceptual similarities and common underlying learning design structures and principles. (Refs 2020, 2021, 2021 Crick, McDermott and Hutchison). This supported the overarching description of these three meta-competencies[1] as common to all lists and a-priori meta thinking skills which are necessary for learner agency and choice in selecting which functional skills to utilise on any given project or learning journey.

Project Team

Ruth Crick – Founder and CEO, WILD Learning Ltd,

Founder and Director, Wild Learning Sciences CIC

Cat Lumb - Managing Director, Professional Coach

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Natalie Brooks - Professional Coach and Learning specialist

Shaofu Huang - Data Scientist and Digital Development

Cara Clark - Business Operations Manager

Research Aims/Objectives

This research project WILD4 Meta Skills (NCFE) built on and enhanced Nottingham College's adoption of WILD Learning Journey App to develop and measure Self Leadership, Learning Relationships and Complex Problem-Solving meta-skills in students and staff across the Automotive, Business and Foundation faculties of the College.

The research project seeks to achieve best value for money for all stakeholders and to strengthen the collaboration and the strategic efforts of both WILD and Nottingham College who are aligned in a shared purpose and vision to change lives through reforming assessment for project-based learning. WILD aimed to co-ordinate efforts across three different tracks of WILD activity at the College for maximum impact, operational and cost efficiency.

The aims/objectives for the research project are:
An NCFE/Ufi VocTech grant-funded R&D project at Nottingham College using focus groups of students to test a 'meta-skills' self-evaluation tool to develop employability skills.

The key workstreams involved in the design and development of an on-line self-evaluation in readiness for initial testing are noted below. It's important to note that detailed later in the report is also a summary of our intended next steps to further test, validate and develop the tool if time and funding had been permitted: -

> WWP1 – Design and develop a self-evaluation rubric on employability skills: Self Leadership, Learning Relationships and Complex Problem-Solving skills. Test with a small group of students. Create an on-line Google Form tool to Pilot.
>
> WWP2.1 Onboarding and planning with practitioners. Showcase early findings from the research project to engage professionals.
> WWP2.2 Implementation 1: Professional Learning Consultancy including Tutors training sessions CPD Workshops.

WWP2.3 Implementation 2: Professional Learning Consultancy – ongoing see monthly reports

WWP3 Production Wire Frames for a new meta skills self-assessment tool.
WWP4 Final evaluation and report including Implementation Guidance and Research findings.

** WILD will seek further funding to develop this into LJ APP – WILD is committed to continued research and development of the tool and have continued to be proactive in seeking further funding and maintaining relationships with Nottingham College beyond the project end date so that we can continue to develop the tool and further measure its impact.

Research Methodology

Methodology for Rubric Development

This integration of systems thinking research with learning power research led to the creation of a rubric under the headings of Self-Leadership, Learning Relationships and Complex Problem Solving. The rubric first briefly defines each meta competence, then describes 'what good looks like' in practice on projects by describing typical behaviours of people who are using meta skills to solve problems.

For the rubric, the three meta skills were described as Dimensions which were each decomposed into four discrete Aspects, worded as high-level competency statements. These Aspects were then decomposed into indicators which articulate the externalising behaviours which would be manifest, and observable, through an individual's actions during a project where they are solving a complex problem.

The purpose of the rubric is to support individuals to identify the problem-solving behaviours they regularly do, or don't, employ when working on a project. By reflecting on their own problem-solving behaviours visualised through the rubric, they can (i) develop a language to use in problem solving (ii) identify their strengths and skills gaps and (iii) use the rubric for prospective planning as well as retrospective self-evaluation. Like the learning journey app, the tool also scaffolds teacher/tutor thinking and provides additional support for learning design.

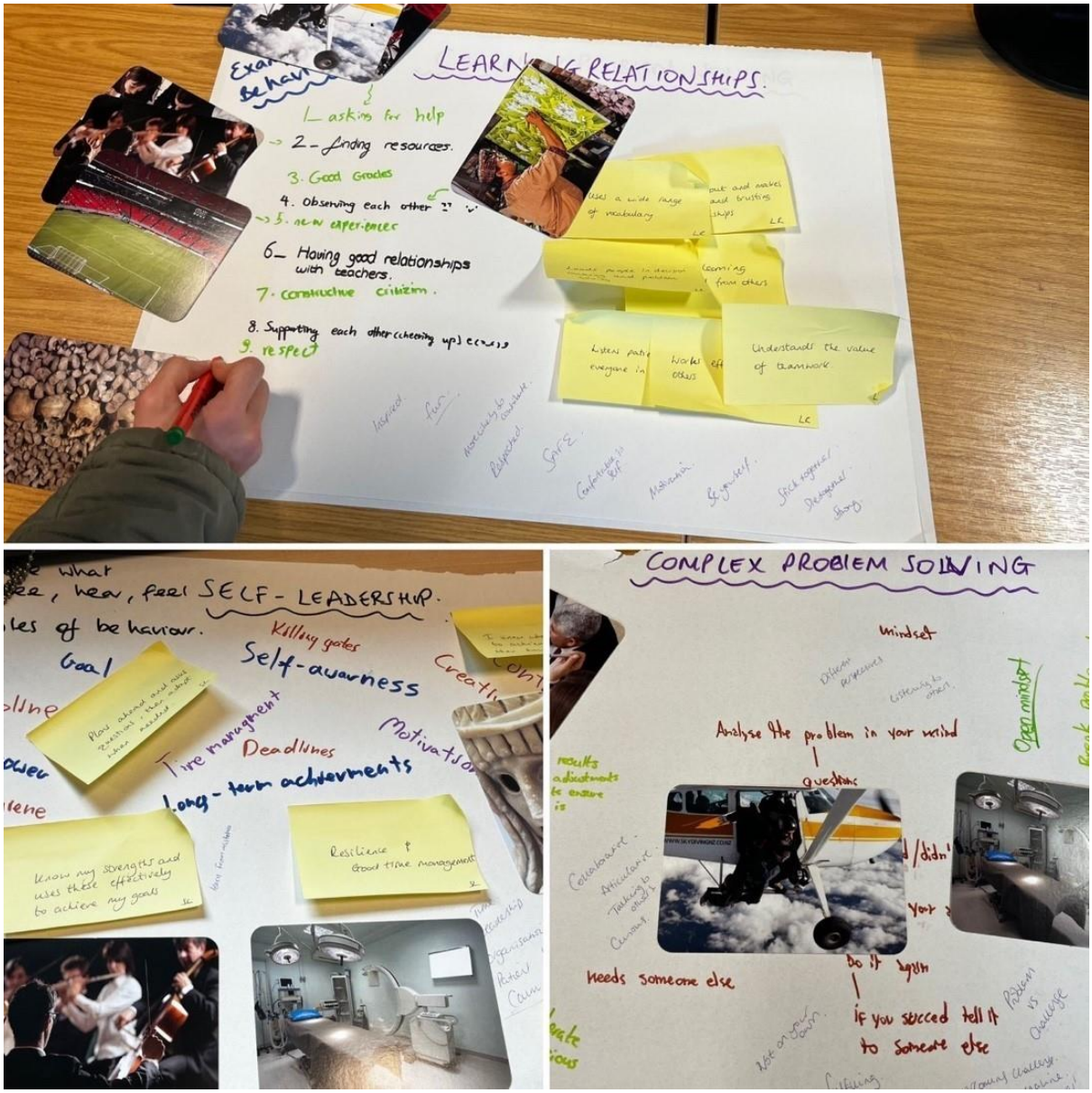
Through observation and discussion, the indicators are intended to contribute to learning relationships (particularly coaching) highlighting areas for development and next best actions for the learner's specific project needs. In the future they may also be used for peer and self-assessment of wider learning outcomes.

a. Validity and Reliability of the Rubric Development

Aspects, Descriptors, and Indicators of each dimension were derived from an alignment of the variables identified in the Helix and Learning Power research base and in particular the mind map referred to above. Helix categories of technical leadership, systems mindset and intra and interpersonal skills were decomposed to identify key and congruent behaviours within each of the three Dimensions in the rubric, which provided the Aspects of that Dimension. The Helix behaviours were then used to frame the wording of the Indicators for the Aspects of each Dimension. An Indicator is a behaviour that can be empirically observed in practice in context. For example, the Dimension of learning relationships aligned with the Helix themes of 'listening and comprehension', 'communications', 'working in a team', 'influence, persuasion and negotiation'. Wording for the indicators of these Aspects was built on the integration of the language derived from the frameworks used in creation of the Helix tool.

Validity of the process was enhanced by the experience and sense-checking of the WILD Research Fellow who is an experienced science teacher and learning design specialist. The first stage of the rubric development was using 'adult professional tone of voice' and indicators derived from the Helix project which focused on the workplace.

The second stage of the rubric development was its 'translation' into a 16–24-year-old 'tone of voice' suitable for use in Further Education with face validity for this age group. This was achieved through the facilitation of four focus groups totalling over 45 students in Nottingham College. They were first introduced to the learning journey app and their own learning power profiles. Next, they worked in groups on the three Dimensions, using picture cards and facilitated coaching conversations to provide language and contextual data which was suitable for them. The outcomes of these focus groups were used to adapt the language of the rubric for this population. A visual display of the key words the students identified with for each of the x3 meta skills is displayed in a word cloud in the Findings section of the report.



The rubric was then the focus of a rubric moderation workshop with the full research team, and experienced practitioners.

Rubric has gone through a rigorous review and moderation process by the WILD team. Building on the insights already gathered from the focus groups and CPD day we have continued to revise and refine the ‘Student Voice’ version of the rubric whilst applying the following logic: -

1. Remove extraneous words and simplify the statements.
2. Remove duplications within or across aspects.
3. Seek to create no more than 6 indicators per aspect. (There are a few aspects with more than 6 indicators which will need to be reviewed as part of testing)
4. Write the text as if it followed on from the self-evaluation question which would be a frequency likart type scale – How frequently do you do….on six points scale.. Possibly with a time frame mentioned.
5. Make sure the text describes action statements that can be verified.

6. Use learning power language where appropriate so it flows on in the learning journey as ‘actions’ for doing the job and scaffolding for tutors.

Each part of the rubric was reviewed, adapted, and agreed as suitable for version one.

Creation of an on-line self-evaluation tool for pilot

WILD’s Data Scientist has developed a Microsoft Forms Self Evaluation tool following the same structure of the rubric. Both Google and Microsoft platforms were considered for the form, but it was decided that Microsoft was better suited to the style and functionality needed for the form. NC Practitioner Lauren Stott confirmed that the Tutors and students are more familiar with this platform.

Self- evaluation form Testing – May – July (Extended to September)

Preparation – A range of Practitioners and Tutors across different disciplines of the college including Pastoral, Foundation, Business and Automotive were engaged with and consulted on the Self Evaluation form before testing with their students. An overview of the form and initial feedback was requested as part of a working session in May and discussions via email/in person with both WILD and Lauren Stott (Advanced Practitioner).

The Tutors were invited to go through the form themselves as an ‘end user’ and provide any further feedback/comments. We discussed and agreed the best approach for reaching students, how to set them up to start testing, what support they may need and agreed next steps.

Testing Approach - A blended approach was taken including sending direct emails to learners and via Tutors, incorporation into lesson plans to enable the tutors to provide an introduction and create time for them to complete, promotion across the NC site through visual displays and conversations.

First design and development of On-Line form using the Rubric – example shown below in findings & results.

Testing started in June and ran through to September with approximately 350 learners across multi disciplines and age ranges from GCSE Students upwards being invited to give feedback on the self-evaluation tool.

At this stage in the research project, the following key testing principles (but not limited too) were considered. An additional design feature was also incorporated into the form based on feedback to include space for capturing more general comments/feedback:

- Form useability
- Is it clear and easily understood?
- Language and phrases – inviting suggestions for different/better words and phrases.
- Flow of the form
- Length of the form

- How would it be most useful for students in the context of a learning journey?
- Inclusivity – discussed and asked for Tutors to review the form with this in mind.

Access to Students before the end of July and during the summer holidays remained the biggest challenge. Therefore, to try and mitigate this first stage of testing in the summer term we expanded our reach to other Tutors within NC and across the WILD network through a practitioner who is based at Australian Trade College.

WILD continued consulting to build confidence, understanding and coach Lauren Stott as Advanced Practitioner to lead on this project within Nottingham College through face to face and remote sessions with WILD and a collaborative approach was taken to designing and proactively planning for key activities.

It was decided to extend the testing period into the beginning of the Autmn term to mitigate the risk of not reaching significant numbers as part of the trial. The testing window extension enabled WILD to support NC Lead, Lauren Stott to focus on accessing students during Induction week by setting an Induction task during lesson time on more than one occasion. This created the space, time and on-hand support available via the Tutors if required for the Learners.

Lauren Stott was provided with a QR code to be able to distribute the on-line form easily and quickly to Tutors and Practitioners across her network to set students up with completing the form as part of their Induction and LS continued to promote the use of the form across the site.

These proactive adjustments to the plan during the testing period we believe will add rigour and depth to the testing process and on-going research by including a varied sample from different disciplines/locations/age ranges.

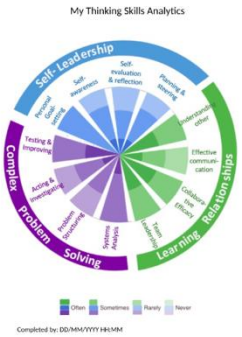
During this testing period our Data Analyst was able to review results, provide updates on completion rates and capture any key learning points as part of the on-going analysis and development of the tool.

Work Package 3 Design Wireframe – August – September

Design and development of the Wireframe began during August, developing the wireframe for the new Meta-skills/employability skills self-assessment tool. Our approach to the development proceeded using a transdisciplinary and agile methodology as described below:

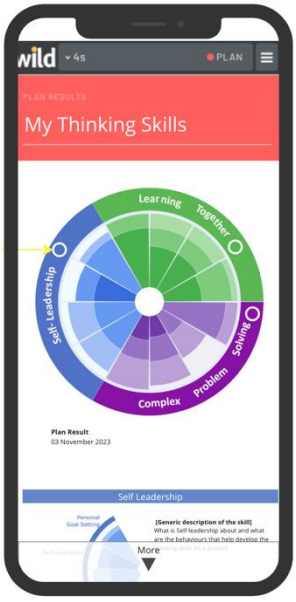
A series of five-hour long workshops was held throughout August, including the whole team plus WILD's Consulting CTO. The purpose was to work through the design and construction of the wireframe taking all perspectives into account. Based on findings to date from student and tutor experience and the construction of the rubric, the thinking skills learner journey was located in the Plan and Do stage of the Learning Journey App, with the tools and strategies identified in the aspects of the rubric understood as a self-led conversation about what the student might actually do

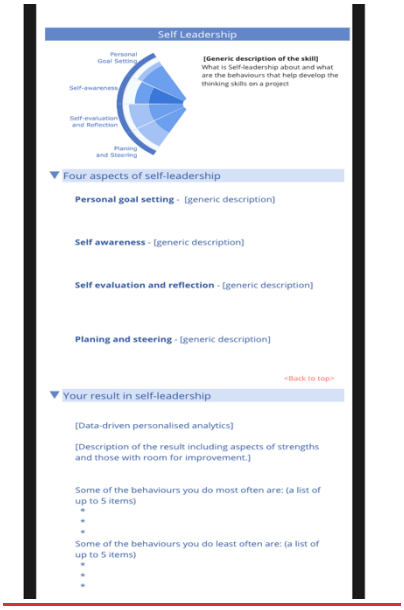
differently throughout the various stages of project-based learning. The learner will already have focused on learning power strategies for change and, in keeping with the wholistic philosophy underpinning the project, the tools and strategies for thinking skills provide a way of embedding behaviour change throughout the course of a project.

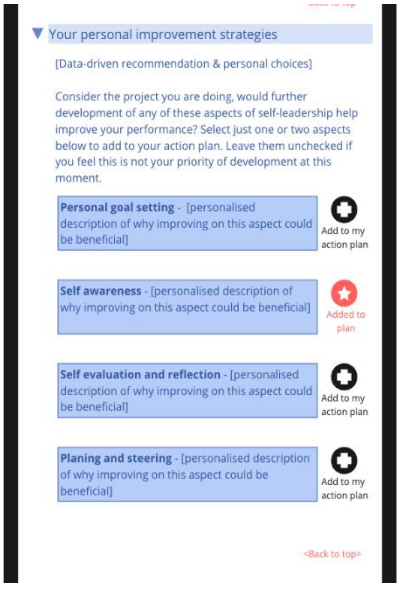


The first part of the wireframe process was focused on high-level proposed visual feedback to the learner about their typical learning behaviours in project-based learning. The first draft example is presented here. This was critiqued by the whole team and resulted in a simplified initial visual designed to invite the learner to reflect on their particular strengths and areas for development in self-leadership, learning relationships and complex problem-solving skills in a manner that was consistent with their understanding of their own learning power and the purpose of their learning journey/project. A python tool was developed by our Data Scientist to create this feedback automatically from the data currently collected via the Microsoft form for feedback to students in the next stage of the project.

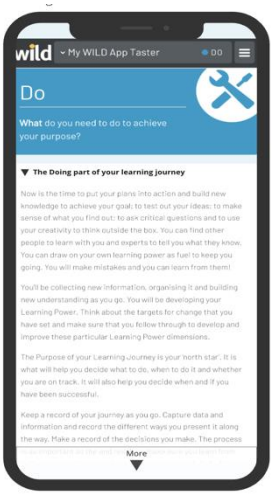
The workshop team then clarified the proposed learner experience as being able to dig deeper into each of the three dimensions in their own time and explore (i) the meaning of the data for them personally without prescription and instruction and (ii) identify change strategies might could choose to implement on their project. The learning intention of the tool here was to deepen a learner's self-understanding and their experience of using that to change their behaviour. Accordingly, the drop-down menu capability was 'wireframed' for each of the three dimensions of employability skills (see appendix for full details).



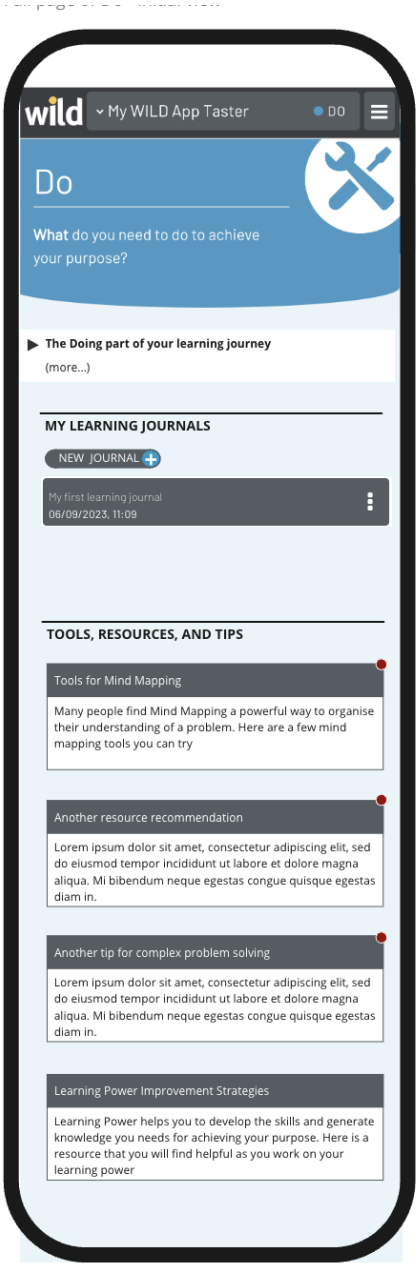




The next phase of the wireframe development focused on how this would be developed in the ‘Do’ stage of the learning journey. As can be seen in the example above, the learner is invited to identify an area for development and add it to an action plan in the ‘Do’ stage. The landing page for Do the Job is presented here. This builds on the existing experience of the team, develops the use of the private learning journal and extends it to include diagnostically appropriate tips, tools and strategies for behaviour change – using the learner agency and thinking capability to select and develop the most salient opportunities for their project, rather than providing them with a list to choose from, or worse, a prescription.



The Journalling capability and affordances already in the Learning Journey App would then be enhanced by links to examples of strategies and tools that could be pursued and implemented on a project by the learner – with the learner retaining the capacity to explain why, how and what they chose to do to develop their meta skills.



At this point the commercial feasibility of the build, which we hoped would start in November, was evaluated and deemed to be achievable within the proposed budget.

The team also identified additional options to explore the use of AI and GPT to enhance the ‘Do’ the job stage of any project, with the agency and thinking skills capability providing a mechanism for privileging human intelligence to critique and utilise artificial intelligence.

This development of methodology for the wireframe was agile, transdisciplinary and based on a user-led improvement science approach, which addresses real world practical problems but brings together a range of relevant experts in dialogue in co-design and prototyping solutions.

Although the WILD Team was not successful in their bid for further funds to build this out, using the same approach with their development team, the work significantly developed our thinking and understanding of the problem space and the opportunities, and we will continue to pursue this as resource allows.

Findings & Results

Student Focus Groups

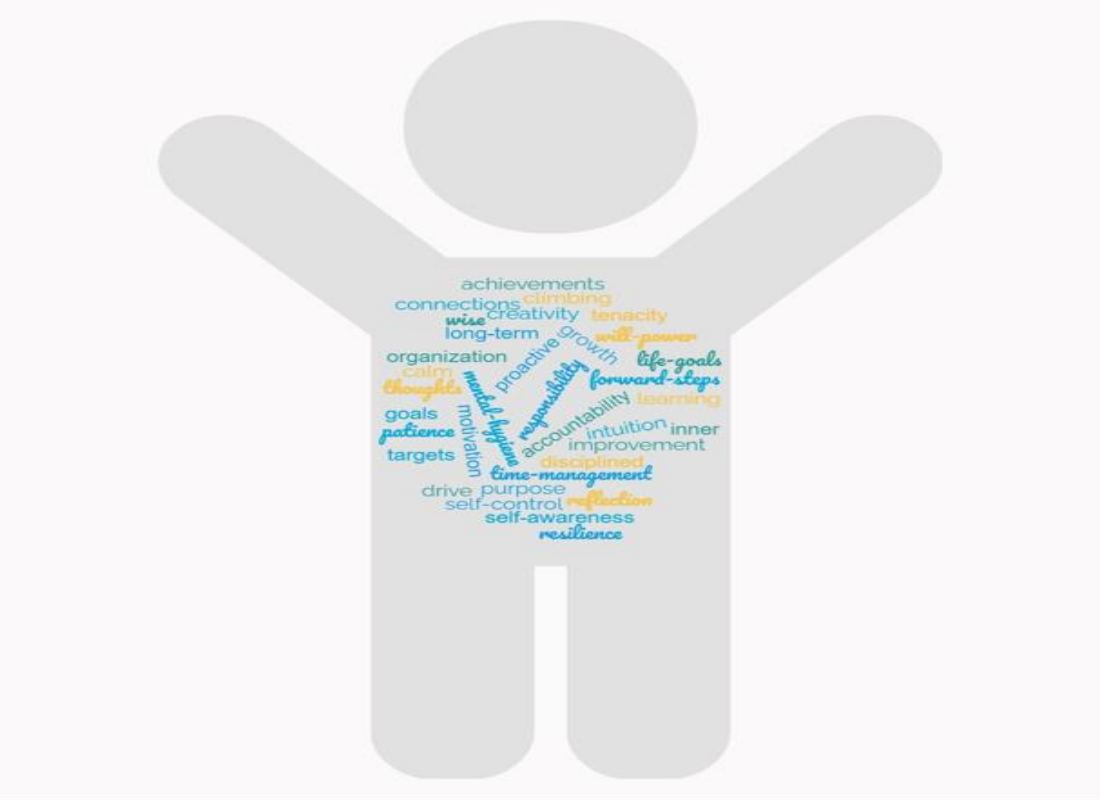
In summary during the focus groups the students exceeded our expectations in terms of being able understand the x3 Meta Competencies and what they mean, then use clear, developed language during our research. The use of statements, words and in particular picture cards was a beneficial aid in stimulating thinking and helping students previously less confident to speak up to the be able to share their thoughts willingly and confidently. Creating an encouraging and relaxed open learning environment where the students were able to talk in small groups (learning relationships in practice) or alone if they chose (self-leadership) also seemed to help increase engagement.

The tutors at Nottingham College are convinced about the need for learning design and assessment for future skills – the key issue is time and the capacity to adapt the requirements of the curriculum. The College has embarked on a long-term process of change and it appears that there is sufficient leadership commitment to the process which WILD can work with.

The insights above informed our thinking and approach to further sessions/next steps in a positive way. A key ‘take away’ is to work with ‘early adopters’ and build for the long term, starting small and gradually expanding.

Word Clouds – Captures the key words the students associated with for each of the x3 Meta Skills; Self Leadership, Learning Relationships and Complex Problems Solving which help inform the development of the rubric and then subsequently the on-line self-evaluation ‘Thinking Skills' form

SELF LEADERSHIP



LEARNING RELATIONSHIPS

COMPLEX PROBLEM SOLVING

The Rubric Extract

The rubric consists of three categories (or dimensions) of meta-skills i.e., Self-Leadership, Learning Together, and Complex Problem Solving. Each dimension is unpacked into four aspects, and each aspect is measured by a small number of behavioural indicators. The detail of the rubric is provided in the appendix.

THINKING SKILLS FORM EXTRACT

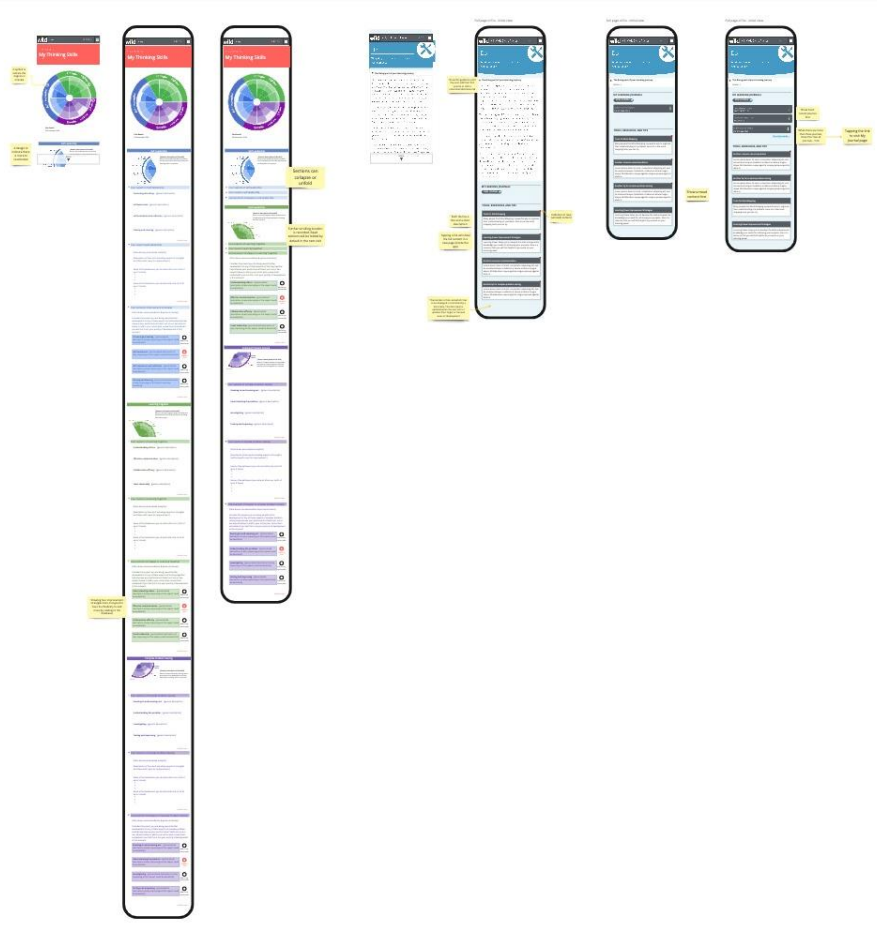
The rubric has been implemented as a Microsoft Form in order to test out the efficacy of the questions in terms of students' understanding and their face validity. The form is made of 16 pages. It starts with a brief introduction and a data privacy notice. Participants are asked to give consent before responding to the questions of the rubric. Each page in the rubric section covers one aspect and ends with an open text question which asks for comments and suggestions for the questions presented above on that page. The main rubric section is followed by a page for general feedback about the usefulness of this self-evaluation tool.

Here is an example set of screenshots of the online form, and the full set of screenshots is provided in the appendix.

The Thinking Skill online form has received 82 responses. A summary of the result is in the appendix.

WIREFRAME EXTRACT

The wire frame completed to date is presented here.



The wireframe in its full scale is provided in appendix.

Analysis

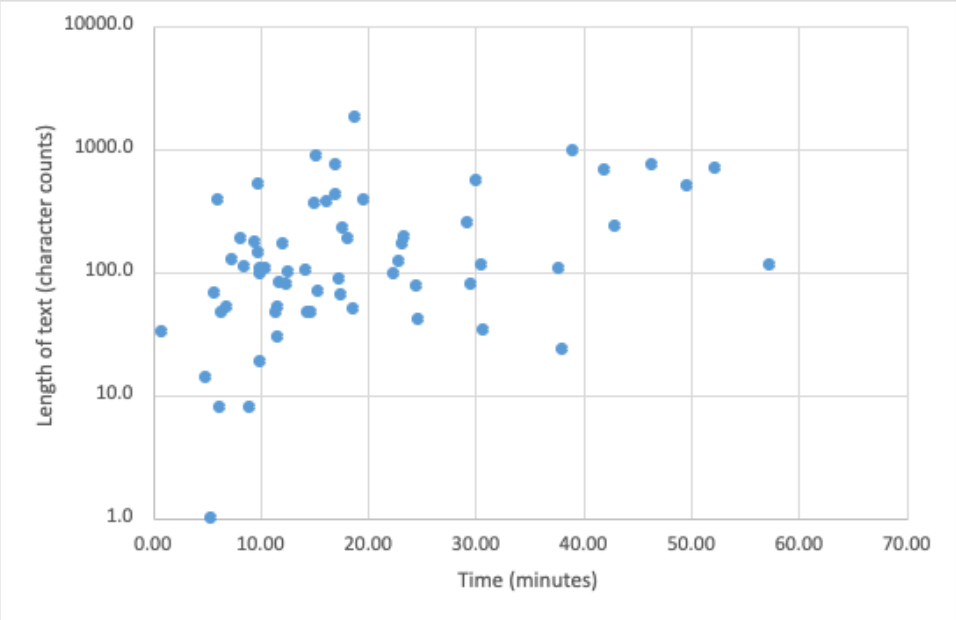
Analysis of the trial online form data

This analysis is based on a dataset of 74 valid case recorded using the Thinking Skill online form, as other 8 participants who submit the form did not want to proceed after having read the data privacy notice.

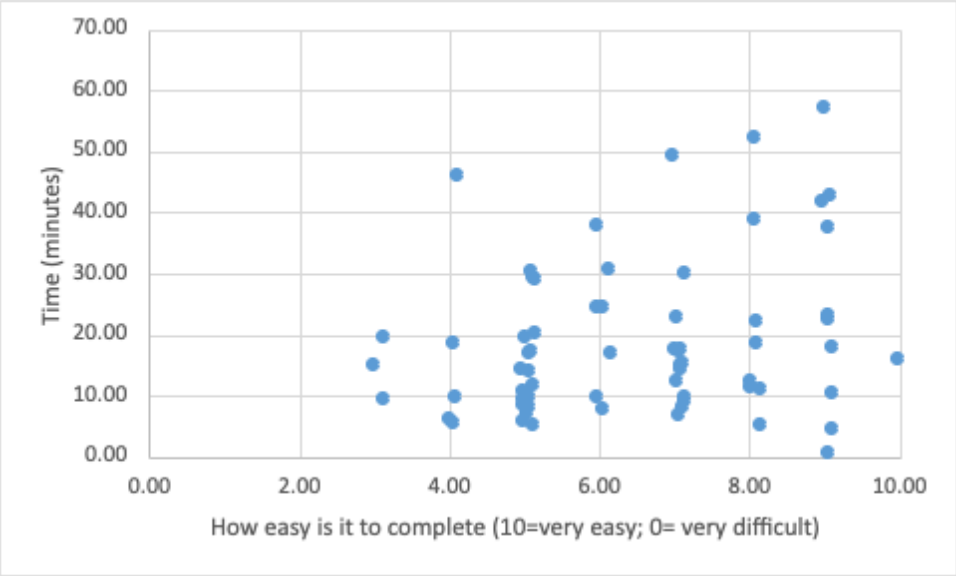
Length of the questionnaire

The lead practitioner said that some students felt the questionnaire was too lengthy, and she thought that might have caused the low response rate. This is not anticipated to be an issue in future iterations because the student will receive real time feedback about themselves which, in our experience, is motivational for questionnaire completion.

Microsoft Form records the time someone starts the form and the time of submission. This form asks participants to complete the self-evaluation questions and at the same time to review and comment on the usefulness of this form. It's likely that those who typed more spent more time completing the survey; this was examined in the scatter plot below. There is a slight trend that people who typed more word in the commenting boxes spent a bit more time to complete, however, it doesn't seem to have much explanation power.



The second scatter plot explore whether a longer time taken was due to participants finding the questionnaire more difficult to complete. There doesn't seem to be a clear dependancy between these two factors: some of those who found it easy to complete took some of the longest time to finish, while some found it difficult despite having completed it well within 20 minutes

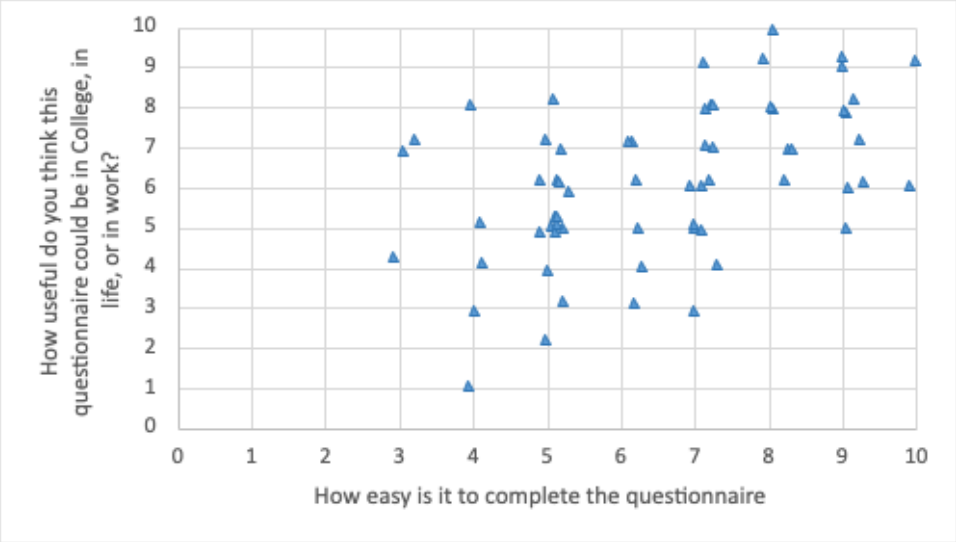


Taking all of these into account, it probably is down to individuals' speed of processing the material and their thought, or even the time they were willing to spend on this task. Therefore, there is reason to assume that the self-evaluation tool (where users only need to focus on themselves) can be completed within 25 minutes or less if it is so required by the time schedule of school curriculum or timetable.

Overall Impression of the questionnaire

We asked the participants to rate, in a scale from 0 to 10, how easy they found it to complete the questionnaire, and how useful they thought this self-evaluation tool could be in college, in life, or in work. In this analysis, a rating of 9 or 10 is considered as a positive opinion, a ration of 7 or 8 is neutral, and a ration of 6 or below a move conservative view.

The scatter plot below shows a tendency that those people who find it easy to answer are more likely to also believe the tool could be useful.



REGARDING HOW EASY IT WAS FOR THEM TO COMPLETE THE QUESTIONNAIRE:

1 in 5 participants (22%) said it was very easy to complete. They generally found the questions simple, clear, and straightforward. The consistent layout of the questionnaire was also mentioned as being helpful.

3 in 10 participants (30%) expressed a neutral view about the easiness of answering the questionnaire. These people also found these questions easy to understand and relevant to them in general, and the four-point scale made it easy to respond as opposed to only yes and no. A common downside mentioned by these people is there being "too many questions." A couple of them said that it was "reconsideration and thinking back" that got them stuck at times.

1 in 2 participant (45%) did not feel it was easy for them. According to the further elaboration they gave, there were two types of factors. The first type was primarily due to the length or wording:

> *"The length of the questions. the words used is hard to understand the question without any further help or explanation"*
>
> *"The questions felt incredibly vague, and the ones at the ends of sections were unanswerably so."*

The second type of factors are more about the challenge of self-reflection and locating themselves on a scale:

> *"...sometimes you don't know if you do certain things"*

"Lack of range in the answer options which made me take longer to identify with an answer"

"Some questions were difficult as I had to be completely honest with myself and think deeply about how I am as a person when it comes to thinking skills."

"It's hard because it's not something I think about every day"

This second type of challenge above is intended by design of this questionnaire and might not be a problem once the tool is adopted as an integrated part of a curriculum as the students will then have more prior background knowledge about these skills when they answer these questions.

The first type of difficulty will be a challenge for further improving the usability of the tool when it is built out into the learning journey app. In particular, the phrasing of the question in the complex problem-solving section requires appeared to be the most difficult among the three skills. The solution to this problem must consider how these skills are taught in the school. In general, factor analysis might help to inform the possibility of reducing the number of questions without losing the construct validity. Both are out of the scope of this current project.

REGARDING HOW USEFUL THIS TOOL COULD BE IN COLLEGE, IN LIFE OR IN WORK:

One in every two participants (50%) felt unsure about the usefulness of this tool in the context of college, life or work. One factor to bear is that the tool hasn't been fully developed and there was no immediate feedback to the user

"I don't think it would be useful unless it showed you some sort of chart at the end of what the results are and what they mean"

Other reasons cited include that it being too long

"not particularly usefull due to the length"

And the applicability of it being a generic tool:

"I don't really see how most questions were relevant"

"Doesn't apply to everything"

On the positive side, three out of ten participants (31%) felt it is potentially useful, and one out of ten felt it would certainly be useful. Interestingly, it being a domain agnostic framework could also be a good thing

> *"The question on the questionnaire is suited for all types of Situations"*
>
> *"I think it would be helpful in most team-based environments as it allows you to assess what each member thinks their own skills are and then tackle the perceived flaws whilst being able to see what everyone can bring to the table"*

And quite a few people saw the need that this tool was intended to address:

> *"I think this questionnaire could be useful for those who are struggling to complete a project and/or task."*
>
> *"I feel like these questions would be very important for the future"*
>
> *"Understanding your thinking skills can allow you to grow as a person and better learn or work."*
>
> *"Very useful, as it allows u to understand new ways u can understand things in life, or work. And understand the way u communicate and solve problems a bit more"*

Feedback about wording of the questions

Most participants who made comments at the end of each page said that the questions generally made sense, but they could be made clearer and using simpler word.

> *I feel like the questions do make sense to a certain extent. However, I feel like the words used in the questions is quite hard to grasp and understand with no further help or support of breaking the question down.*

Quite a few comments were specific to an indicator question, which will be of great help to future improvement of the questionnaire.

Some further comments were about the terms that they have yet learned, such as "learning power," "mindful agency," "sense making," "forward thinking skills," or "broad network."

Overall, these comments suggested that the questionnaire is suitable for college students. When it is rolled out in the future, it would be most effective to integrate the tool with the school's curriculum so that students will be familiar with some of those key terms before they answer the questionnaire.

Discussion and Conclusions

These Meta-Skills are readily understood by FE students, who can engage with them and apprehend what they mean in practice on projects and outside of college life. The rubric and questions enabled conversations to be focused on broader aspects of student's life that were important to them and bring those experiences into the classroom. Our view is that the regular curriculum provision discounts these student attributes – particularly those who have 'not succeeded' in traditional performance terms.

The survey approach with questions which invite students to reflect on their actions and behaviour on project-based learning as part of a learning journey, is a promising approach which merits further development.

Positive changes in student experience are dependent upon tutors and leaders' ability to learn for themselves and create the conditions where these types of conversations – which empower and value student experience and wider attributes – can be a regular feature of college life.

Context is important in the design of pedagogies for meta-skills. Project based learning provides a more authentic curriculum experience for students to engage with in this way and this is a powerful context for developing employability skills and the meta skills that develop them. Once students are authentically engaged the purpose of what they are doing or learning, they are most likely to own the process and take pride in their achievements. Learning analytics and assessment of this nature, therefore, need to be designed for real-world contexts – feedback needs to be immediate and meaningful.

Where there is a consistent and shared language for learning, relationships form and deepen, and this is a powerful fuel for growth. The language of learning power and thinking skills proved to be inclusive – particularly when accompanied by metaphor, image and story. It creates a non-judgemental, psychological safe space for authentic relationships and conversations.

Any digital solution targeting futures skills is necessary but not sufficient. It provides scaffolding for scaling and supporting different ways of thinking but cannot replace the human activity which it is there to enhance. This a commercial challenge because there is no silver bullet.

Next Steps

The next step for WILD is to secure funding to progress the build out of the Self Evaluation Tool with Nottingham College and to test its impact on tutors and students and its efficacy as a digital learning analytic.

As part of WILD's ongoing relationship with Nottingham College, WILD is supporting tutors in embedding the Learning Journey App as part of project-based learning. Although we will not be proceeding with the build out of the Meta Skills Self Evaluation tool at this point, work we have done on assessment, particularly the rubric, is informing WILD's professional learning programmes with tutors. The types of projects Nottingham College intend to link this is their 'Social Action' projects which they see as having the potential to engage with all learners on an individual level and have a significant impact on both personal development and key future skills. The feedback from tutors is that they can see the potential of using this type of framework, resources and coaching style conversation to support the learners' journey within and beyond Nottingham College.

Appendices

1. Rubric List for On-Line Form
2. Thinking Skills On-Line Form
3. Thinking Skills On-Line Form Results
4. Thinking Skills On-Line Tool Design Wireframe

References

HUTCHISON, N., TAO, H. Y. S., BURKE, P., LUNA, S., ZAVALA, A., KOTHARI, S., SONEJI, S. & RAMIREZ-MARQUEZ, J. 2019. Evolution of the Helix Project: From Investigating the Effectiveness of Individual Systems Engineers to Systems Engineering Organizations. *INCOSE International Symposium,* 29**,** 652-668.

MCDDERMOTT, T., CRICK, R. & HUTCHISON, N. The Evolution of HELIX: A Competency Model for Complex Problem Solving. 31st Annual INCOSE Internationl Symposium (IS2021), July 17-21 2021 2021 www.incose.org.