



Using Labour Market Data to Support Adults to Plan for their Future Career:

Experience from the
CareerTech Challenge

CAREERTECH
CHALLENGE →

L&W LEARNING AND
WORK INSTITUTE

This work has been developed by Learning and Work Institute (L&W) based on our experience as the evaluation partner on the CareerTech Challenge, an ambitious innovation programme led by Nesta and Nesta Challenges in partnership with the Department for Education, to encourage bold solutions to improve people's working lives and unlock employment opportunities for the future.

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We are challengers and we are innovators, but we never work alone. We are part of the innovation foundation Nesta, and we work with governments, NGOs and businesses all over the world, as both advisory and delivery partners - helping them reach ideas far beyond their own boundaries. Together we can be game changers.

Find out more about [Nesta Challenges](#).

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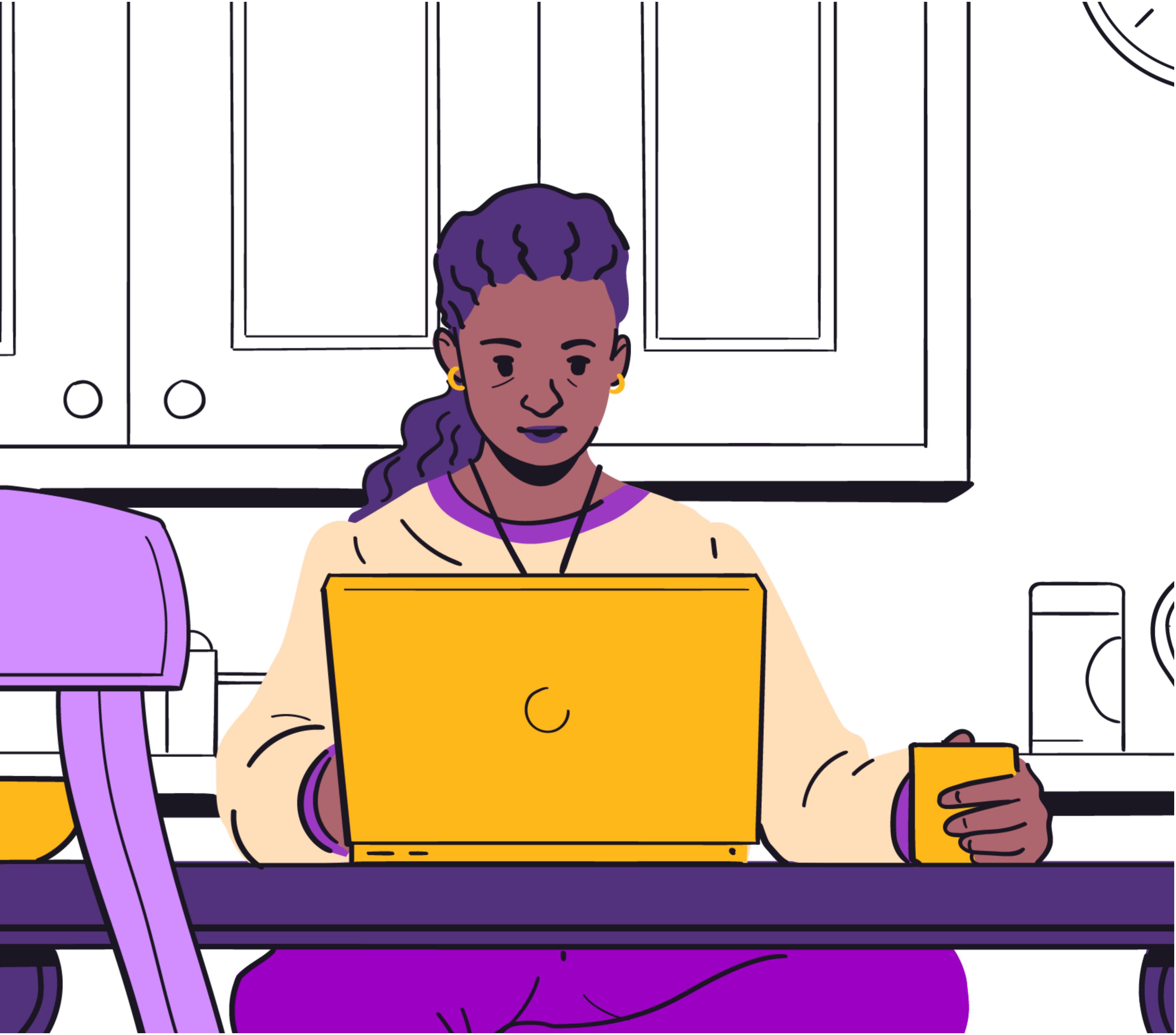
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Executive summary

The **CareerTech Challenge**, launched in 2019 by **Nesta** and **Nesta Challenges** in partnership with the **Department for Education**, aimed to support the development of new solutions to help people find rewarding future careers. Out of the 31 innovators supported by the CareerTech Challenge, 20 of these focused on developing digital solutions that connect people with data-driven information, advice and guidance to help them navigate the labour market. Solutions aimed to help users identify their own skills, and the skills needed for a rapidly changing labour market; identify jobs available in local areas; and provide pathways to prepare for and secure new, future-proof roles.

Learning and Work Institute conducted research with the 20 innovators to explore the process of building these data-driven solutions. This final report shares key findings on:

- Identifying, accessing and analysing existing labour market data
- Developing new and experimental data
- Translating and communicating labour market data

Key findings



Identifying, accessing and analysing existing labour market data

- Those innovators who engaged with jobseekers and careers advice specialists at the design stage produced more engaging tools. This approach helped innovators to understand how to make their solutions attractive and appealing to their target audience and therefore supported them to identify suitable data.
- Innovators used a range of approaches to identify and select the most appropriate data for their solution. Some created visual tools to map out existing data, others commissioned commercial data providers to supply bespoke aggregated data to meet solution aims.
- The most common challenge encountered by innovators was the accessibility of labour market data which hindered the scale and pace of solution development. This included poor communication from public data holders on content, financial

barriers to accessing data, issues with usability and format of publicly available data, inconsistencies in terminology between the way different data holders label data points (e.g. skills), absent and incomplete data, and limited local-level, jobseeker and 'live' data.

• Innovators took a range of creative approaches to overcome barriers to data access and quality, including: rethinking their financial model to access high-quality commercial data, manually completing data sets that they saw had gaps, building a taxonomy that matched terminology between different data sets, and using local level data sourced directly from local employers, organisations and training providers.



Developing new and experimental data

- Innovators who developed solutions on a smaller scale were able to produce local information about jobs in growth and priority sectors.
- Innovators that matched data sets – for example aggregated skills, course and job ad data – built solutions that provided personalised careers information, advice and guidance.
- Establishing a skills taxonomy that anchored the data to one definition enabled some innovators to overcome inconsistencies in how data points (for example, skills, qualifications, occupations) are described, enabling them to match data points. Only those innovators with existing experience of matching data were able to do this.



Translating and communicating labour market data

- Most innovators noted the role user testing played in refining and improving solution's usability and readiness for the market.
- A considered approach to the visual design of platforms supported user engagement. For example, the development of platforms that only surfaced the most relevant information for careers advisors worked more effectively in maintaining engagement. Platforms that incorporated visuals, such as interactive traffic light systems, or gamification, also maximised accessibility to support engagement.
- Users engaged well with solutions that provided tailored advice and guidance. For example, solutions that collected users' personal information about current circumstances, existing skills, qualifications and experience, identified high levels of jobseeker engagement in testing.
- Innovators who secured buy-in from careers advisors, providers and local stakeholders developed solutions that better met the needs of the market. Innovators who worked in partnership with key local organisations also found it easier to pilot tools.
- Those innovators who had an existing presence in the career advice and guidance space were more easily able to roll out targeted communications at scale, stimulating interest in the market.
- Investing time in communicating the specific data sets used in the development of tools helped to broker access to key partners and improve the credibility of solutions.



Conclusions and future considerations

Drawing on the findings from the CareerTech Challenge, seven considerations are presented here, to inform future decisions focused on how to design, develop and effectively implement labour market data- driven solutions that support effective careers advice and enable people to pursue fulfilling careers.

Future considerations for data providers



Greater collaboration between public data providers and developers is needed to overcome access and quality issues

By working closely and building stronger relationships with public data providers, developers can play a key role in increasing awareness of how public data can be used to add value to people's career decision-making.



Data holders should make efforts to test publicly available data with innovators.

Before publication waves, data holders should ensure there is opportunity for innovators to 'test' new data releases for practical application across different types of intelligent solutions and communicate improvements on data access and quality on a regular basis.



Development of a central labour market data repository should be considered as a medium-term solution.

A central website setting out all existing data sources – including case studies of how the data has been applied in practice to create different tools – would support developers to identify and access suitable labour market data to meet their solution aims.



Skills and labour market taxonomies would facilitate consistency and support more intelligent solutions.

Future consideration of how skills descriptions are indexed using standardised, consistent formats, would facilitate more intelligent and agile solutions.

Future considerations for innovators



Engaging with the right stakeholders is key to building data-driven solutions

The development of future data-driven solutions should place emphasis on collaborative ways to engage the target market and build partnerships through the design process.



Product testing is critical.

Developing usable solutions can only be achieved by understanding the needs, circumstances, challenges, fears and aspirations of the users.



Incubating at a local level can support the development of hyper-local, context-specific solutions.

Future consideration should be taken to consider how incubation and small-scale piloting can further contribute towards our understanding of 'what works' in data-driven solutions for careers advice and guidance.

02

Introduction and background

The rise of automation and technological innovation means new career options and ways of working are emerging alongside the decline of certain industries and sectors. The Covid-19 crisis was a new and sudden shock that exacerbated and sped up some of this trend, with the UK set for the **sharpest rise in unemployment on record**. With today's working age population likely to have several jobs and careers throughout their working lives, careers advice and support to navigate a more complex job market is more important than ever. The recent **Skills for Jobs White Paper** also outlines ambitions for the skills sector to better connect providers, FE and employers to address skills

mismatching in local areas¹. Data-driven solutions provide a unique opportunity to do this but there remain stagnant issues with labour market data access and quality to overcome in order for people to seek out retraining opportunities and secure future-proof jobs².

¹ Skills for Jobs: Lifelong Learning for Opportunity and Growth

² Boosting labour market intelligence for local decision-makers

The CareerTech Challenge

The CareerTech Challenge launched by Nesta and Nesta Challenges in partnership with the Department for Education in 2019, aimed to support the development of new solutions to help people find rewarding future careers. The CareerTech Challenge programme was designed to support adults who were most at risk of rapid labour market change. The original criteria focused on a cohort of learners who would have been eligible for the National Retraining Scheme (NRS) but as this was then rolled into the National Skills Fund and given the additional challenging circumstances of the COVID-19 pandemic, the criteria was expanded – specifically:

- Aged between 24 to 65 years old.
- Located in England.
- Educated below degree level.
- Working in insecure roles. These workers may be employed, furloughed or recently made redundant due to rapid labour market change, but should not be long-term unemployed.

From a wider cohort of 31 innovators, the CareerTech Challenge awarded 20 early stage innovators £50,000 each, as well as comprehensive packages of non-financial support to develop digital solutions that connect people with data-driven information, advice and guidance to help them navigate the labour market (see page 26 onwards for an overview of each of the innovators and their solutions). The innovators comprised a mix of tech start- ups, established developers and data providers including partnerships between developers and community organisations or local authorities. Solutions aimed to help users identify their own

skills, and the skills needed for a rapidly changing labour market; identify jobs available in local areas; and provide pathways to prepare for and secure new, future-proof roles.

The majority of the 20 innovators used data from multiple sources to build their solutions including live job postings, educational and skills-based courses (e.g. from Coursera) alongside labour market data such as official Office for National Statistics (ONS) labour market statistics, National Online Manpower Information System (NOMIS) labour market data (providing access to claimant data for example), Education and Skills Funding Agency (ESFA) course data, O*NET and European Skills/Competences and qualification and Occupations (ESCO) to name a few. This enabled them to develop careers advice, skills matching and job search tools that were more tailored for those looking to retrain or change careers. In April 2021, a judging panel awarded the winning solution £120,000 and a runner-up £80,000 to support the further development and roll-out of solutions³.

³ CareerTech Challenge Prize Winners

03

Findings

This section presents the key findings from interviews with the 20 innovators on their common experiences, approaches, facilitators and barriers to:

- Identifying, accessing and analysing existing labour market data
- Developing new and experimental data
- Translating and communicating labour market data



Identifying, accessing and analysing existing labour market data

Innovators entered the CareerTech Challenge with a range of existing experience in designing and developing tools using labour market data. Those with existing tools focused on careers advice tended to have more knowledge of the space which, facilitated their ability to select and use suitable data to build their solution. Overall, these innovators were less likely to face some of the common barriers in identifying and accessing labour market data. Similarly, innovators with existing knowledge of labour market data were more likely to be able to overcome financial barriers as they had planned in financial resources to support partnerships with commercial data providers.

This section explores a number of common approaches, facilitators and barriers to identifying, accessing and analysing labour market data.

Building solutions in collaboration with jobseekers and careers advisors

Those innovators who took a proactive approach to engaging with jobseekers and careers advisors built more engaging tools. For example, one innovator conducted in-depth research with careers advisors for eight months. They identified that careers advisors did not work with LMI to power career recommendations as they found it too time-consuming and the amount of information too overwhelming. The innovator therefore sought to develop a solution that enabled careers advisors to access LMI easily to fit in with their busy schedules.

Others tested a specific data set with users before deciding to integrate it into their platform. For example, one innovator tested their solution with ESCO data to assess how relatable the information was to jobseekers. The feedback

suggested that jobseekers responded well to how skills were described. This approach enabled innovators to build solutions that more effectively met jobseekers' needs.

Identifying and selecting labour market data

Innovators took a number of approaches to identify and select the most appropriate data for their solution. This included investing time and resources to map out the existing data landscape to help identify suitable sources for their solution. For example, creating a visual tool to map out existing data and its content against their 'ideal' data needed to build the solution. Others commissioned commercial data providers to supply bespoke aggregated data⁴ to meet solution aims. These contractual agreements also provided an opportunity to build the capacity of some innovators through informal advice provided by data scientists.

The most common challenge encountered was a lack of awareness or easily accessible information about labour market data which hindered the scale and pace of solution development.

The majority of innovators faced challenges in knowing which data sources existed and then once identified, the accessibility, relevancy and validity of each data source. Searching for data and assessing its suitability for their solution took time and, in many cases, delayed solution development. For example, one innovator proposed to use regional salary data, data on growing sectors and risk of automation data to develop a tool for users. However, they were unable to identify suitable sources of data that meant aspects of their tool were not fully developed.

⁴ Aggregated data is high-level data which is acquired by combining individual-level data. It is information collected from multiple sources and/or on multiple measures, variables, or individuals and compiled into data summaries or summary reports, typically for the purposes of public reporting or statistical analysis - i.e., examining trends, making comparisons, or revealing information and insights that would not be observable when data elements are viewed in isolation.

Automation risk

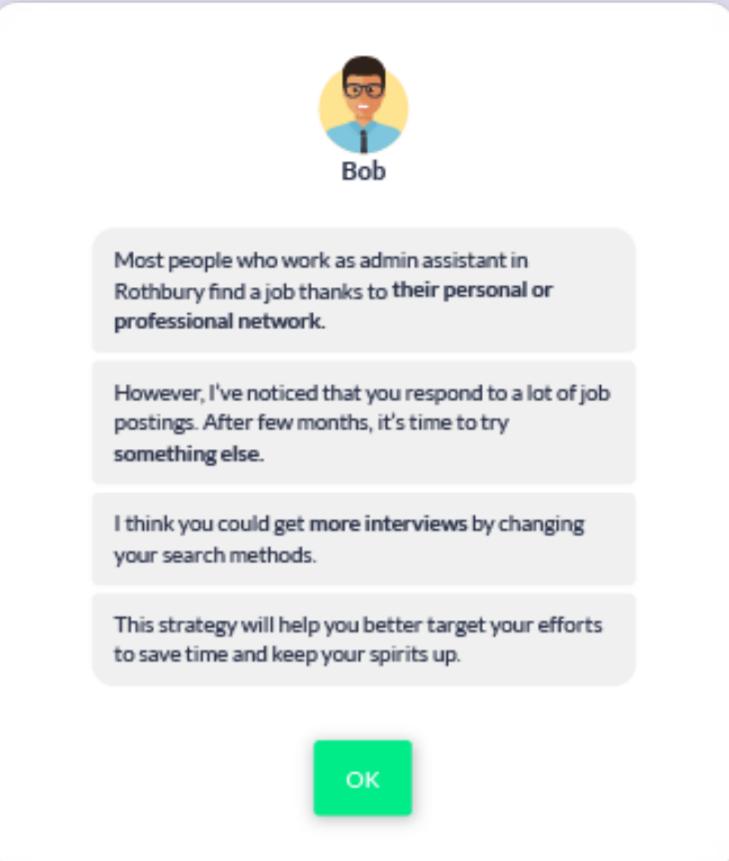


Bob helps users understand the risk their chosen job could be automated, and helps them explore alternatives.

BOB UK BY BAYES IMPACT

Bob is designed to provide free, instant, online advice, removing the waiting time that users would usually experience before meeting a face-to-face career coach. The platform relies on multiple sources of data to make tailored and accurate judgements on potential job search challenges, and appropriate live recommendations of jobs likely to be hiring. Initially developers spent time trying to source UK data which directly replicated data sources used to develop the French version of Bob, but it became apparent that equivalent sources of data rarely existed.

Context-specific advice



Most people who work as admin assistant in Rothbury find a job thanks to their personal or professional network.

However, I've noticed that you respond to a lot of job postings. After few months, it's time to try something else.

I think you could get more interviews by changing your search methods.

This strategy will help you better target your efforts to save time and keep your spirits up.

OK

The advice Bob provides is evidence-based, tailored to the context of the user, and delivered with empathy.

In response, the team visually mapped the variables included in the original version with UK data sources that most closely matched. Underpinned by a commitment to platform functionality, the Bob team settled on a combination of UK data sources (such as Local Authority job postings, the ONS automation risk register, the Royal Society of Arts Covid and Automation Risk Register) and carefully selected non-UK data focused on how people secure employment to build their final tool.

Barriers and workarounds to accessing and analysing data

A range of barriers to accessing and analysing data were experienced by innovators which in some cases delayed the development of their solutions. In many cases, innovators developed creative workarounds enabling them to build solutions that aligned with their original aims and objectives. This section explores the common barriers and workarounds:

Communication and misinformation issues with public data holders

Many innovators found the process of accessing publicly available data – such as Labour Market Information (LMI for All), course data from Education and Skills Funding Agency (ESFA) and labour market statistics from the Office for National Statistics (ONS) – challenging. Issues with communication and misinformation about the granularity of the data hindered or delayed innovators' ability to get hold of this data. For

example, one innovator was unable to find job vacancy data by region within the ONS data set despite this being advertised on the website. Another was told that ESFA data would be accessible via an Application Programming Interface (API) but later discovered this was not the case which delayed progress. Others found that high staff turnover at ESFA and ONS interrupted communication via email and caused delays to data access. Some innovators commented that the 'messiness' of data sets reflected the administrative complexity in England comprising of local authorities, local enterprise partnerships (LEPs) and mayoral combined authorities (MCAs) and their commissioning remits.

Financial barriers to accessing data

Some data sets – including UCAS Higher Education data as well as those provided by commercial providers such as Emsi or Burning Glass⁵ were not free to access. Many innovators, particularly small start-ups, had not anticipated costs related to data access. For some innovators, this meant rethinking their financial model so that

they could access this data. For others, it meant adapting their solutions to account for 'missing data', limiting some innovative aspects of their tools. For example, one innovator was unable to show commuter times by different modes of public transport as the cost of this data (held by Google) was beyond their budget⁶.

Usability issues with publicly available data

Publicly available data, such as ESFA data, tended to be downloaded in CSV/Excel format which required significant manipulation before they could be applied to a number of innovator solutions. This resulted in some innovators dedicating time and resources to ensuring data were in a suitably usable format. In comparison, most commercially owned data sets are accessible via API, providing data that can be directly fed into solutions. Approaches to overcome these challenges varied across innovators – with some opting to manually reformat the data and others choosing to enter a commercial agreement with a data provider. These decisions depended on internal resources and budget.

⁵Both Emsi and Burning Glass are commercial labour market data providers that use data from multiple sources including job ads/postings, LMI and profile information, to provide a comprehensive and up-to-date picture of the labour market.

⁶In light of financial challenges identified, Nesta provided financial support for innovators to access Adzuna vacancy data in summer 2020. 14 of the 20 innovators accessed this data.

{≡} wordnerds

Inconsistent terminology

Some innovators faced challenges in identifying commonalities between the way different data holders labelled skills, learning/education courses and occupations. One innovator aimed to develop a platform that could quickly and easily show an individual the skills they needed to acquire for the types of roles and sectors they were interested in. However, there was vast variation in terminology across data sets. They attributed this to the lack of a globally accepted definition of skills in the UK and universality in the skills required for certain roles. For example, the innovator identified that different employers commonly describe the skills required for the same job in different ways – especially across different regions. Equally, the way a jobseeker describes their skills might vary significantly to how they are described by an employer, thus creating further mismatch. To overcome this challenge, the innovator built their own taxonomy of skills that anchored the various data to one definition. This enabled them to match skills to jobs or course options to an extent.

Absent and incomplete data

Common examples of absent data sets included; volunteering and work experience opportunities, traineeship opportunities, commute times by different transport options and some jobs that are not posted online (for example self-employed, some lower-skilled jobs or specialist artisan roles). One innovator aimed to build a solution that matched jobseekers with personalised and relevant career pathways based on their existing skillset. However, given the significant gaps in skills descriptions across course, qualification and occupation data the innovator faced challenges in matching existing data with the jobseekers' data. For example, occupations with only a few skills attached to them resulted in weak matching to the jobseekers' existing skillset and increased the probability that they viewed career pathway recommendations that had a low level of skills match. As a workaround, this innovator manually inputted relevant skills against each job vacancy. This took time and resources but enabled them to develop a solution that offered personalised recommendations.

WORDNERDS JOBS

Wordnerds Jobs is a platform which 'translates' between jobseekers and employers, using AI and advanced linguistic understanding to cut through the jargon of job ads for beneficiaries trying to find work in a new sector.

Working with the North East Local Enterprise Partnership, Wordnerds had originally intended to scrape data from job sites, an incredibly time-consuming process. However, Nesta's partnership with Adzuna allowed them to quickly source hundreds of thousands of job ads from the North East of England, complete with metadata on sector, salary and location. Wordnerds were able to use this data to train a suite of AI which can identify key soft skills in job ads, regardless of the specific vocabulary used – this allows careers advisors to work with their clients to identify good-fit jobs, in their own words.

Limited local level data

Barriers in relation to the granularity of labour market data were present. For example, job vacancies by region are absent from ONS data to support local solution development. Some innovators overcame this by obtaining local level data directly from local organisations such as Local Enterprise Partnerships (LEPs), employers and training providers.

Limited jobseeker data

Innovators faced a range of barriers when trying to access data related to jobseekers themselves. For example, the number of people looking for jobs, how long have they been searching, and their current skills. This had implications for understanding the competitiveness of the labour market and therefore determining roles the innovator solutions should recommend to jobseekers. One innovator identified a workaround by undertaking a detailed scoping activity, directly engaging with local careers advisors to understand supply and demand at the local level.

Limited 'live' data

Innovators also faced ongoing challenges in accessing timely, up-to-date labour market data. Many decided against using sources they felt are not updated regularly and therefore do not provide a current picture of the labour market. For example, some innovators did not use [LMI For All](#) as they were wary of showing jobseekers or careers advisers information less relevant or accurate that would not support good career-related decision making. Only those innovators who had budgeted for commercial access to live labour market data (such as commercial providers like [Emsi](#)) could take advantage of this.



Developing new and experimental data

Many innovators embarked on developing new and experimental data sets. This section outlines some key examples of how innovators developed these to support their solution.

Local level solutions

Some innovators developed new data sets by accessing and using primary data via partnerships with local organisations, businesses and training providers. For example, they worked with FE colleges for course data, local employers for job ad data and the local authority or LEP for sector intelligence. This information enabled innovators to develop solutions that generated accurate, granular and reliable hyper-local information about jobs in emerging growth and local priority sectors. For example, one innovator used information from the LEP to show jobseekers opportunities based on sectors that have received local investment – including construction, cyber tech and green energy. This surfaced information about sustainable roles (rather than job ads data that showed available roles) – supporting people

to move into longer-term careers and break the job search cycle. While this approach was clearly beneficial for jobseekers in that area, further work is needed to understand the scalability of this kind of approach.

Combining existing data sets

By combining a range of different data sets, innovators were able to develop careers advice, skills matching and job search tools that were more tailored for those looking to retrain or change careers. For example, one innovator used aggregated data and details about individuals to build job matches underpinned by individual interest and career ambitions. The resulting job options presented (powered by live vacancy data) not only matched individual skills sets but also aligned with career ambitions and personal interests. Jobseekers could then apply for opportunities directly through the solution. Other innovators integrated [Coursera](#) and [FutureLearn](#) data into their tools to support jobseekers to identify education and training opportunities that would help them to build skills for their desired careers (see Would You Rather Be case study).

The image shows a mobile application interface for 'Would You Rather Be'. At the top, there's a decorative header with the letters 'ub' and colorful confetti. Below it, a banner says 'Your results' and 'PERSONALISED PATHWAY AVAILABLE'. A section for 'Events Manager' is displayed, showing a salary range of £17,000 - £80,000, a description of the role ('Events managers organise and run promotional, business and social events'), and tags like '#MANAGING - PROJECTS' and 'AFFECTED BY COVID'. The background of the app screen is yellow. To the right of the app, the text 'WOULD YOU RATHER BE' is written in bold black capital letters. Below it, the text 'Would You Rather Be combines user data on qualifications and interests, matching this with careers, live job adverts and courses in their local area to build skills that are in demand.' is written in a smaller black font. Further down, another block of text describes the data integration and personalized pathways provided by the platform.

WOULD YOU RATHER BE

Would You Rather Be combines user data on qualifications and interests, matching this with careers, live job adverts and courses in their local area to build skills that are in demand.

Data gathered by the platform on the user's location, age, qualifications and work history is combined with data from Udemy, Ofqual, ONS, National Careers Service, O*NET, ESFA and HESA, along with hundreds of career-specific resources to present individuals with personalised pathways into a range of careers.

These pathways allow users to compare the time, cost and available funding for that individual to move into each career, as well as including training opportunities to support skills development, alongside live job adverts from Adzuna.



Translating and communicating labour market data

An important part of developing solutions was effectively translating labour market data into an easy to access and functional tool for target audiences – namely jobseekers and careers advisors. This section outlines some key examples of how innovators approached this process.

User testing

User testing at key stages of developing solutions was a key success factor in refining, simplifying, and improving their usability and readiness for the market. Innovators invested heavily in engaging with jobseekers and careers advice providers, undertaking interviews and focus groups to test the validity of solutions. Gathering first-hand insight provided a clear understanding of what information their target cohort would find most useful. This was particularly pertinent for those

innovators who utilised Artificial Intelligence (AI) approaches.

A 'test and learn' approach allowed innovators to generate desirable and attainable options for learning, training and earning. For example, one innovator ran a series of sessions with users from the outset to pilot stage. At the beginning, gathering information on the challenges jobseekers face when making career decisions – such as which qualifications are needed to move into their desired role – allowed them to identify which data would most effectively meet this need. Later on, the innovator ran prototype testing sessions with users to assess how well the solution's features worked in practice. This revealed that a stripped back version of their tool that showed simple and easy to understand recommendations was most attractive to jobseekers. This resulted in them removing some of the data sets from their solution in response to user needs.

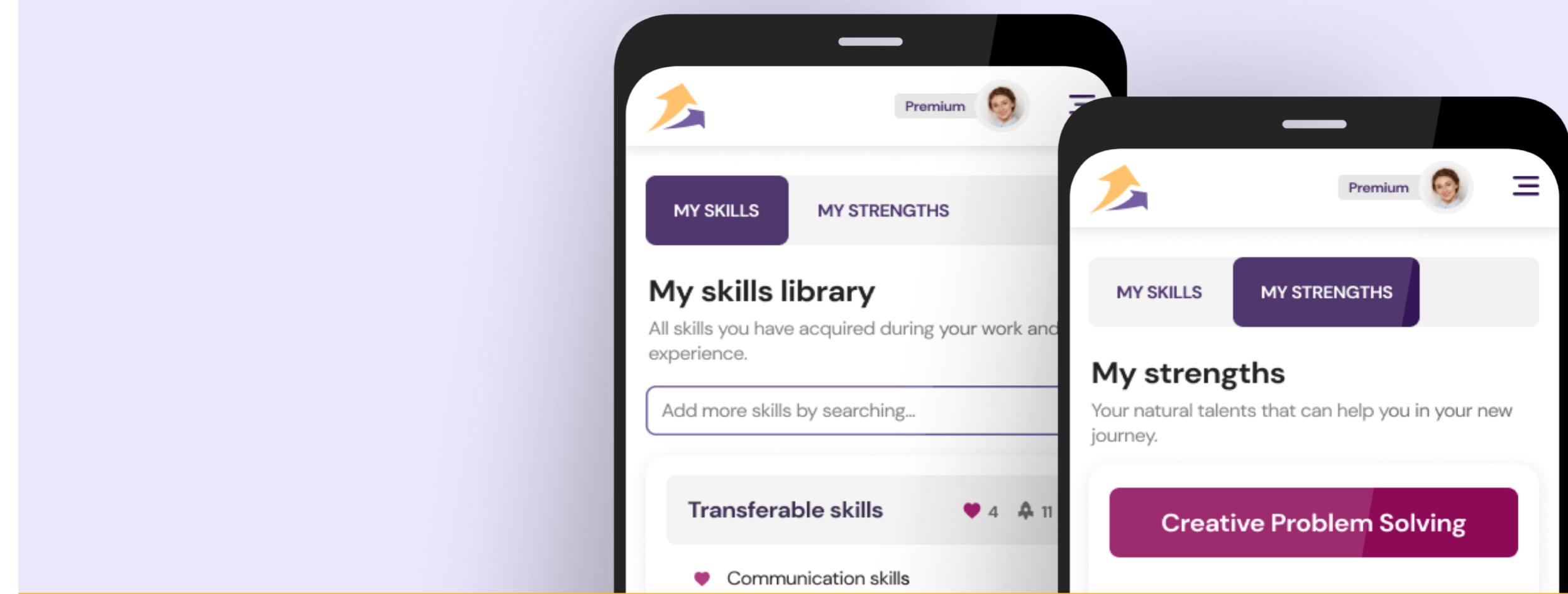
Prioritising & visualising information

Platforms that only surfaced the most relevant information for careers advisors worked more effectively in maintaining user engagement. In some cases, this enabled careers advice providers to work more efficiently as they were able to use the solution to sift a high volume of information quickly. Extraordinarily, some solutions enabled careers advisers to use labour market information to power careers recommendations for their clients for the first time. Previously this was considered too time-consuming to fit with busy caseloads. Platforms that incorporated visuals, such as interactive traffic light systems, or gamification, also maximised user accessibility to support engagement.

Tailoring and personalising solutions

Solutions that offered tailored advice and guidance were more attractive to jobseekers. For example, most solutions had an 'onboarding questionnaire' or similar where jobseekers or careers advisors input personal information about current circumstances, existing skills, qualifications and experience and future ambitions. Personalised and relevant recommendations, powered by labour market information, for example job opportunities filtered to match people's skills set, health needs or travel requirements, were then surfaced to the user.

Many jobseekers felt that it was most helpful to be able to speak to a careers adviser who had access to a data-driven solution, rather than using a self-service tool. This approach proved to be highly effective when working with precarious workers who can face digital skills barriers or may have worked in the same industries for decades having had limited or no experience of retraining or changing careers (see Stay Nimble case study).



STAY NIMBLE

Stay Nimble's platform offers users highly personalised occupations, live vacancies and course recommendations based on a number of variables, and outcomes are supported by qualified career coaches.

Users' data on their strengths, their skills based on previous experience are used by the platform to suggest a variety of occupations to suit each user's personal strengths, skills and career goals. The platform identifies the skills gaps users have for each of the suggested occupations and aggregated free courses with the Open University, FutureLearn and Coursera are available which can help fill these.

Stay Nimble partnered with Burning Glass to provide labour market data for the platform that identified the skills required across a wide range of occupations and maps occupation demand trends across the UK based on Travel To Work Areas. The platform also integrates with Indeed to provide users with personalised live and local vacancies which match their skills and aspirations.

The platform provides users with access to a network of careers coaches, all sourced through the Career Development Institute. Coaches offer video calls and an in-app chat service to users, ensuring that advice and guidance is tailored throughout their journey.

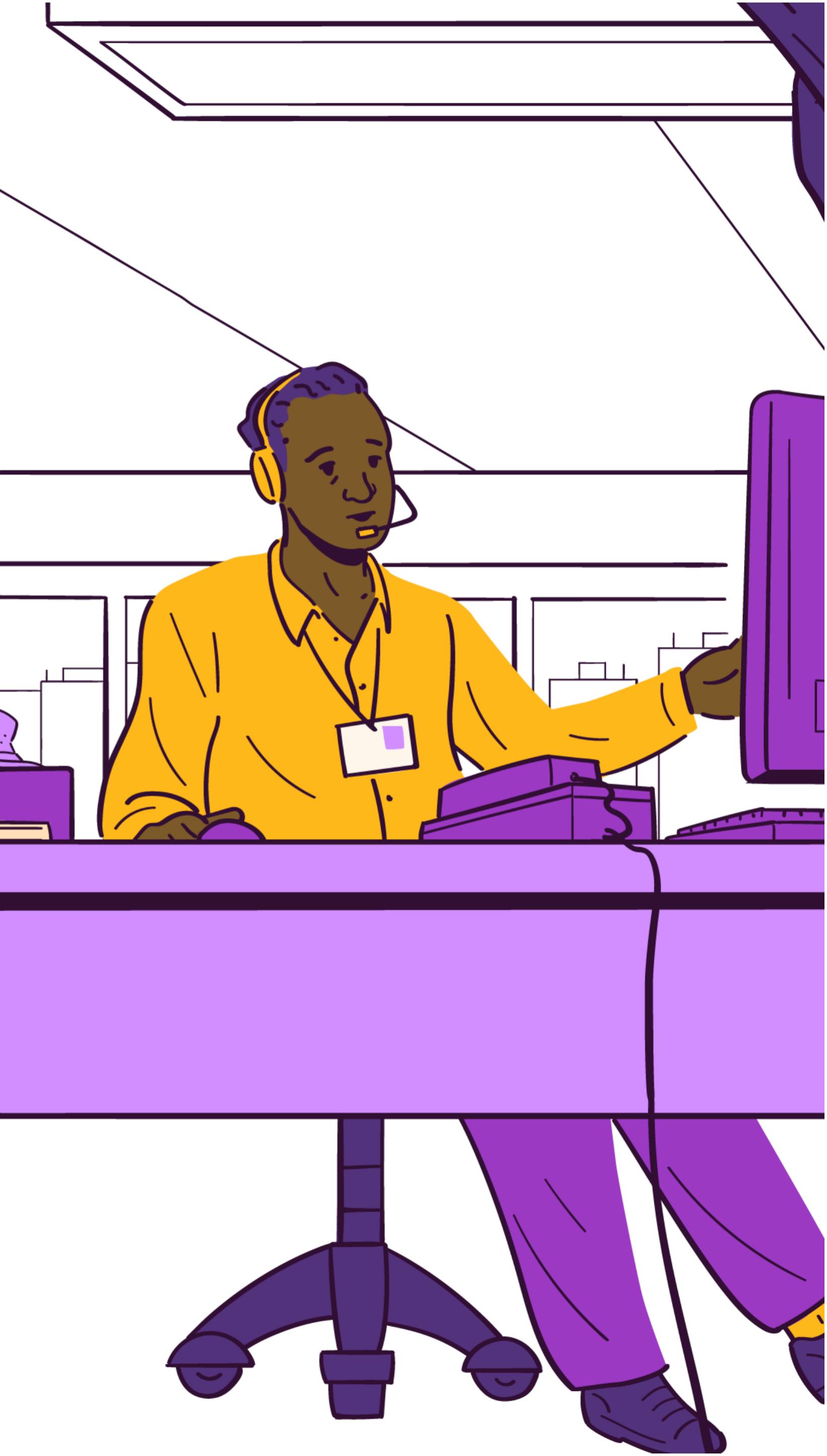
Building partnerships to support collaborative development and learner engagement

Being part of the CareerTech Challenge supported buy-in of key partners. 67% of innovators felt that the Challenge supported them to secure valuable commercial partnerships, with a further 77% identifying the Challenge as supporting them to form new partnerships and collaborations⁷. Some innovators, who entered the Challenge as part of a formal partnership between the developer and community

organisation, found this approach mutually beneficial. Firstly, this optimised their ability to design and develop a solution that met their target audience's needs. Secondly, they could more easily communicate the added value of using their solution to support career transitions via local area networks.

Those innovators who invested time in establishing accessible communications explaining the benefits of their solution and demystifying data-driven solutions were more likely to secure new partnerships with careers advice providers.

⁷ End of Career Tech Challenge survey (2021)



04

Conclusions and future considerations

This report has presented key findings from research with the CareerTech Challenge innovators to explore the process of building data-driven solutions. As a result of this learning, seven considerations are presented here to inform future decisions focused on how to design, develop and effectively implement labour market data-driven solutions that support effective careers advice and enable people to pursue fulfilling careers. These future

considerations contribute to existing calls by Nesta and partners to improve the data landscape across skills, retraining and jobs in the UK⁸.

⁸Open Jobs

Future considerations for data providers



Greater collaboration between public data providers and developers is needed to overcome access and quality issues

By working closely and building stronger relationships with public data providers, developers can play a key role in increasing awareness of how public data can be used to add value to people's career decision-making. Greater understanding of this would incentivise public data providers to offer up-to-date, consistent, standardised, easily accessible and high-quality data sets⁹.



Data holders should make efforts to test publicly available data with innovators.

Data holders should make efforts to test publicly available data with innovators. Through the CareerTech Challenge, innovators designed small-scale but highly effective data sets. There is now opportunity to expand this approach to ensure national-level, publicly available data is supporting data-driven careers advice. Before publication waves, data holders should ensure there is opportunity for innovators to 'test' new data releases for practical application across different types of intelligent solutions and communicate improvements on data access and quality on a regular basis.



Development of a central labour market data repository should be considered as a medium-term solution.

The visibility of both publicly available and commercially held labour market data varies considerably. A central website setting out all existing data sources – including case studies of how the data has been applied in practice – would support developers to identify and access suitable labour market data to meet their solution aims. In the longer term, significant efforts should be made to consider how the UK's data infrastructure could be improved to create richer data sets that produce detailed insights at lower costs.



Skills and labour market taxonomies would facilitate consistency and support more intelligent solutions.

Skills taxonomies that anchor data to one definition supported some innovators to overcome inconsistencies in how different skills were identified¹⁰. Future consideration of how skills descriptions are indexed using standardised, consistent formats would facilitate more intelligent and agile solutions.

⁹This is in line with similar recommendations as part of Nesta's Offices for Data Analytics programme: Offices of Data Analytics

¹⁰The UK Needs a Skills Map

Future considerations for innovators



Engaging with the right stakeholders is key to building data-driven solutions.

Those innovators who built good relationships with Local Enterprise Partnerships (LEPs), training providers and careers advice intermediaries were more able to develop solutions that catered to specific needs and challenged persistent issues faced by stakeholders. The development of future data-driven solutions should place emphasis on collaborative ways to engage the target market and build partnerships through the design process.



Product testing is critical

Collecting users' perspectives and experiences via interviews and focus groups was a key to developing tools that jobseekers wanted to use. Future consideration should be given to how target audiences can support the design and testing of solutions.



Incubating at a local level can support the development of hyper-local, context-specific solutions.

Some innovators demonstrated that using data directly from local organisations, such as Local Enterprise Partnerships (LEPs), results in a highly effective solution for users in the local area. This approach overcame some of the challenges of using existing data on education and training opportunities. Future consideration should be taken to consider how incubation and small-scale piloting can further contribute towards our understanding of 'what works' in data-driven solutions to careers advice and guidance.

Nesta's efforts to improve Labour Market Intelligence

At Nesta, the Data Analytics team have launched a number of initiatives that aim to fill gaps in the UK's supply of labour market information:

Creating a skills taxonomy

With funding from [ESCoE](#), the team created the first ever data-driven skills taxonomy for the UK that is open. A [skills taxonomy](#) allows us to track the demand for skills, as well as map the distribution of skills across the UK. We are currently updating the taxonomy and hope to publish the next version towards the end of this year.

Mapping viable transitions for workers

In [Mapping Career Causeways](#), supported by [J.P. Morgan](#), the team used machine learning to

measure the similarity in the skills and work activities required in more than 1,600 jobs. This information can be used to suggest 'viable transitions' to job seekers, based on their most recent role. The underlying algorithm can also identify the skills gap between any two jobs which can inform decisions around training. The code for this project is open and is [available on Github](#).

Measuring automation risk

With funding from [The Gatsby Foundation](#), the team provided the first ever estimates of [automation risk for apprenticeships](#). Policy recommendations included increasing awareness about the types of tasks that were found to raise risk (such as routine and repetitive activities) and those that lower risk (such as tackling unstructured problems in changeable environments).

Providing free insights on skill demands

In partnership with the [Department for Education](#), the team is creating an [Open Jobs Observatory](#). The Observatory will contain free insights from online job adverts, with a focus on the skills requested by employers. The team is collecting the adverts ourselves, with the permission of job sites. A pilot version of the Observatory will be launched this year.

Identifying green jobs

The team's next focus is developing a methodology for tagging green jobs. At present, the UK has no way of identifying individual jobs in green sectors. Developing this methodology is a necessary step in transitioning towards a greener economy.

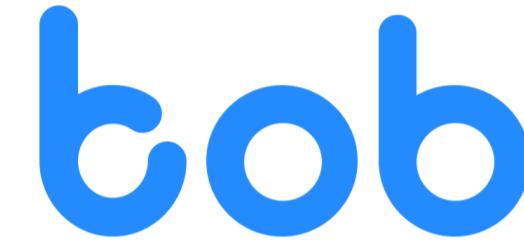
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Innovator summaries



Innovator Summaries

Click each finalist's name to watch a pitch video of their solution



Bob is an automated AI online coach that gets crucial, life-changing employment advice to people who need it, quickly, easily and for free. Bob turns data from relevant sources into actionable career insights. It links the information provided by the individual with practical advice and concrete resources, making the information actionable and relevant to a person's situation. Bob identifies the main barriers to employment, proposing a phased, progressive strategy, whilst being an unbiased, well-informed job counsellor, available anytime to help people navigate their job search. It allows people to adapt to sector change and automation, and understand the skills that are in demand.



Adzuna CareerPaths is a digital solution that helps job seekers explore new career development opportunities based on their current skill set. The tool identifies potential for upskilling and/or retraining into sectors that will likely flourish over the coming decades. By uploading a CV or listing existing skills through an on-page editor, users can understand their transferable skills better and choose a suggested career path based on their profile. The technology and recommendations will be based on a training dataset consisting of over 500K CVs, 1M salary data points and real career paths taken by Britons.



Sparq is an Ai-powered platform empowering data-driven decisions for career advisors. Sparq's career advisors work with vulnerable, long-term unemployed people. These interactions change lives. Sparq is technology to make human interactions better. Helping humans, help humans better. Sparq empowers career advisors to focus on relationship building and empathetic decision making, which humans are really good at. Meanwhile, Sparq's back-end technology takes care of manual work and delivers labour market information fast. Sparq is digitally accessible, built for purpose and ethically designed together with end users.



CiCi is a unique careers chatbot powered by Artificial Intelligence (AI), Natural Language Processing (NLP) and data. It provides adults and employability professionals with quick and easy 24/7 access to trustworthy labour market intelligence, careers support and personalised advice 'all in one place'. The chatbot offers a personalised career learning journey for adults (aged 18+ in England) including those in 'at risk' or low-skilled jobs. It is quick and easy to use and presents information in a user-friendly format. CiCi allows users to reflect, explore, find out and identify pathways and access to new learning and work opportunities.



This project has transformed the community focused CareerEar platform into one which is also data-driven. Individuals can now explore tailored content, ask questions to industry professionals and access career opportunities from events and training programmes through to entry and mid-level roles. Using big data, CareerEar highlights to individuals if they are in or pursuing at-risk job functions and industries, assesses individuals' skills and enables them to understand the transferability of their skills. This allows them to combine accurate information with relevant, real world insights to make informed decisions about their futures.



Emsi is creating a set of 'skills clusters' defining different common job roles in skill terms bottom-up from job postings activity. The clusters help individuals to identify their own skills, to see what career pathways those skills open up, and to identify the skills gap to achieve their career ambitions. UK Skills Match is particularly aimed at people in the workforce. For many such people their job history is how they understand what they have to offer. By using labour market data to help translate their individual job history into a common language of skills, drawing on Emsi's Open Skills Library, UK Skills Match can bring Labour Market Information to yield precise, personalised insights.



FutureFit AI partners with companies, staffing firms, and workforce development organizations globally to provide an AI-powered GPS to help workers navigate career transitions, supporting them from career navigation, to reskilling, to job search. FutureFit AI uses over 350 Million global talent profiles, live labour market data and projections, and proprietary algorithms to identify an individual's skills, recommend possible career paths in their local labour market, and create a personalized roadmap of learning programs, career resources, and human guidance to drive successful outcomes.



An accessible career exploration tool that provides tracking and planning of an individual's careers journey. By producing an interactive financial roadmap, the thought-provoking app drives individuals to 'play' with their careers journey, exploring different career paths, aims and ambitions. Individuals can plan a careers journey using Labour Market Information data, that includes training, career path changes and ambitions such as property, pensions, loans etc., to explore different scenarios, predict future earnings and visualise the impact on their cumulative wealth. A complete digital profile of skills, training, experience, and career aspirations is provided and can be updated throughout an individual's careers journey.



The Heart of the South West LEP Digital Skills Partnership and Skilllab B.V. are developing a solution to bring Skilllab's mobile app to assist mature workers in Devon whose roles may be at risk through automation. Through the app, which links to supplementary learning, we hope to re-set and re-frame mature workers to access the increasingly digitised world of work; a situation that has increasing relevance in the context of the COVID-19.



Learnisa is an AI-powered platform that makes personalised recommendations of online courses. By intelligently profiling a learner, Learnisa conducts a smart matching process to recommend the most suitable courses to learners. With Learnisa, learners can avoid lengthy and ambiguous searches for courses, and invest time and money on learning the RIGHT content. Whether you're taking an online course to upskill for your career or even a hobby, Learnisa can help you find your ideal course(s).



We will bring more skills learning to more people, more of the time. 49% of men and 48% of women regularly play mobile games, gaming suits our intuitive digital behaviour and requires minimal smartphone literacy to adopt. Imagine playing short skill development games anywhere at any time and receiving real-time hyper-local training and employment opportunities as a reward. Many platforms provide skill-based gaming but miFuture's Skill Bursts will go further and pull beneficiaries into education, training and employment routes and create a pipeline of more talent developing relevant skills and qualifications in the competencies that employers need.



SignedUp Skills helps economic regions empower citizens with an online one-stop-shop to access employment and training opportunities, careers information advice & guidance (CIAG) and labour market information (LMI). Digital Pathways expands SignedUp Skills' current offering by shifting from guiding the user to carrying them. It takes career explorers through career pathways which bridge the disconnect between where people are, what skills they currently have, and what the labour market demands. Using a combination of automation and direct interactions, while monitoring progress, effectiveness and potentially generating new LMI, Digital Pathways funnels people along pathways into the careers of the future.



If you're struggling to find a job, SkillsTree works out the best skills for you to learn, and how to learn them, to maximise your employment prospects. SkillsTree builds a personalised learning path based on your location, the skills you currently have, the time you have available to learn, and the sort of job you are after. SkillsTree's Skills Recommendations are based on the latest data from jobs across the UK, and personalised to you.



Sort/Switch, will provide an end-to-end service, using an innovative user-controlled algorithm to support and enable those who want to, or need to, make a career change, but don't know where to start. Sort/Switch will, simply and intuitively, help users to understand the skills they already have, discover potential career paths that might be compatible with them now or with further training, understand which options are available in growth industries in their area, access advice, support, and training to help them get there, and finally, apply for opportunities relevant to them.



Stay Nimble is a tech social enterprise with the vision that everyone is empowered to find their purpose in the new world of work, equipped to escape in-work poverty and prepared for the 4th industrial revolution. To achieve this, Stay Nimble delivers career and performance coaching via a digital platform using real-time labour market data, co-created with people in the CareerTech Prize target demographic. Over 9,000 people across the UK are building confidence, envisioning future career options and being equipped with tools to get there. Stay Nimble's Prize project will develop new features to facilitate digital relationships between members and career advisers.

{≡} wordnerds

Wordnerds uses cutting-edge text analysis to help bridge the chasm of miscommunication between employers and their potential employees. Wordnerds have built a software platform that helps brands uncover and understand the true voice of their customers. By combining cutting-edge artificial intelligence (AI) with old-school linguistics, their disruptive tech is a new way to train computers to read – and genuinely understand – language, and not just count the words. Wordnerds combines Artificial Intelligence (AI), Natural Language Processing (NLP) and Advanced Corpus Linguistics to provide automated understanding of unstructured text data.



Workerbird's mission is to help everyone find a happier working life. Workerbird's solution is the Career Mapper, which helps workers to reflect on their working life, analyse the skills they already use and understand how these skills can be applied in new career pathways visualised with real labour market data. The Career Mapper consists of two related tools - the Skills Assessment and Job Explorer. The Skills Assessment breaks down roles into their component skills giving the user confidence in what they can currently do. In the Job Explorer, users are able to see their skills open up career opportunities in different areas, supported by creative visualisation of data from the ONS on wages, risk of automation and other factors. If a user is interested in a specific job they can see relevant vacancies and if skill gaps are identified, options for training are presented. Workerbird's approach combines practical information with reflective processes that build understanding and confidence amongst users.



Would You Rather Be helps people find career happiness through our AI-powered app. By answering 10 minutes of quick-fire questions on your job interests, skills, qualifications and experience, our algorithm will calculate the careers you are best suited to and generate hyper-personalised pathways into each one, starting from where you are now. Would You Rather Be believes that everyone deserves to be happy in their career, and we want everyone in the world to use our software to help them find that happiness – so we can all look forward to Monday morning more than Friday afternoon.





Yuno is a mobile app connecting a hugely underserved section of the UK workforce with upskilling opportunities. Workers create anonymous profiles by playing a simple card sorting game that tests for personality, interests, and values. This enables Yuno to provide highly personalized and locally relevant career recommendations as well as to connect workers with employers willing to train them. The underlying machine learning models are trained on workers who already possess the respective skills. Yuno augments its career recommendations with labour market information retrieved from the web, the Office of National Statistics, as well as the Department for Education.

Future Builders

Future Builders was building a platform that enables individuals to gather insight into the point at which natural aptitude and personal passion intersects. They believe that many people simply don't know what they could be good at or what they really enjoy. The simple assessment tool looks at interests and passions rather than experience and existing skills in order to determine a learning pathway that could lead to a good, sustainable job in the digital sector. After being badly impacted by the COVID-19 pandemic, Future Builders was decommitted and wound down in late 2020.

CREATED BY

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DESIGNED BY

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