

Appendix A: User trial evaluation questionnaire

Question 1 (Q1)	Please indicate your level of agreement with the following statements regarding the usability of the C³ - IoC:							
Answer format	<table border="1"> <tr> <td>1 (Strongly disagree)</td> <td>2</td> <td>3</td> <td>4 (Neither disagree nor agree)</td> <td>5</td> <td>6</td> <td>7 (Strongly agree)</td> </tr> </table>	1 (Strongly disagree)	2	3	4 (Neither disagree nor agree)	5	6	7 (Strongly agree)
1 (Strongly disagree)	2	3	4 (Neither disagree nor agree)	5	6	7 (Strongly agree)		
Sub-question	I would use it frequently							
Sub-question	It was unnecessarily complex							
Sub-question	It was easy to use							
Sub-question	I would need the support of a technical person to be able to use it							
Sub-question	The various functions were well integrated							
Sub-question	There was too much inconsistency							
Sub-question	Most people would learn to use it							
Sub-question	It was very cumbersome to use							
Sub-question	I felt very confident using it							
Sub-question	I needed to learn a lot of things before I could get going with it							
Question 2 (Q2)	In terms of usefulness, how would you rate the following C³ - IoC components?							
Answer format	<table border="1"> <tr> <td>1 (Not at all useful)</td> <td>2</td> <td>3</td> <td>4 (Neutral)</td> <td>5</td> <td>6</td> <td>7 (Extremely useful)</td> </tr> </table>	1 (Not at all useful)	2	3	4 (Neutral)	5	6	7 (Extremely useful)
1 (Not at all useful)	2	3	4 (Neutral)	5	6	7 (Extremely useful)		
Sub-question	CV skill extractor							
Sub-question	Skills questionnaire							
Sub-question	Skills suggestions							
Sub-question	Skills radar charts							
Sub-question	Job roles list							
Sub-question	Job roles map							
Sub-question	Job roles overview							

Question 3 (Q3)	Please indicate your level of agreement with the following statements regarding the usefulness of C³ - IoC:							
Answer format	<table border="1"> <tr> <td>1 (Strongly disagree)</td> <td>2</td> <td>3</td> <td>4 (Neither disagree nor agree)</td> <td>5</td> <td>6</td> <td>7 (Strongly agree)</td> </tr> </table>	1 (Strongly disagree)	2	3	4 (Neither disagree nor agree)	5	6	7 (Strongly agree)
1 (Strongly disagree)	2	3	4 (Neither disagree nor agree)	5	6	7 (Strongly agree)		
Sub-question	It helped me identify the non-technical skills required for my career path							
Sub-question	It helped me identify the technical skills required for my career path							
Sub-question	It made me realise that I had relevant non-technical skills							
Sub-question	It made me reflect more about my skillset							
Sub-question	It gave me a broader perception of the range of careers							
Sub-question	It will probably help me find a more suitable job according to my skills							
Sub-question	It identified the job and career path that I was expecting							
Sub-question	It identified jobs and career paths beyond what I was expecting							
Sub-question	The career path identified seemed inconsistent or wrong							
Sub-question	I would use it to explore my career options							
Sub-question	It could help me identify learning opportunities to develop my skills							
Sub-question	I prefer face to face career coaching							
Sub-question	I would pay to use it in the future							
Sub-question	I can see its value in my career							
Sub-question	I can see its value in my personal development							
Question 4 (Q4)	To what extent did you find the C³ website to be:							
Answer format	<table border="1"> <tr> <td>1 (Not at all)</td> <td>2</td> <td>3</td> <td>4 (Neutral)</td> <td>5</td> <td>6</td> <td>7 (Extremely)</td> </tr> </table>	1 (Not at all)	2	3	4 (Neutral)	5	6	7 (Extremely)
1 (Not at all)	2	3	4 (Neutral)	5	6	7 (Extremely)		
Sub-question	Inclusive							
Sub-question	Accessible							
Question 5 (Q5)	Do you have any additional comments about the C³ - IoC?							
Answer format	Long free text							

Question 6 (Q6)	Age:																			
	<table border="1"> <tr> <td>16-18</td><td>19-24</td><td>25-40</td><td>41-54</td><td>55-64</td><td>65 and over</td><td>I do not want to declare</td></tr> </table>	16-18	19-24	25-40	41-54	55-64	65 and over	I do not want to declare												
16-18	19-24	25-40	41-54	55-64	65 and over	I do not want to declare														
Question 7 (Q7)	Gender identity:																			
Answer format	<table border="1"> <tr> <td>Male</td><td>Female</td><td>Non-binary</td><td>I do not want to declare</td></tr> </table>	Male	Female	Non-binary	I do not want to declare															
Male	Female	Non-binary	I do not want to declare																	
Question 8 (Q8)	Please choose one option that best describes your ethnic group or background:																			
Answer format	<table border="1"> <tr><td>White - English/Welsh/Scottish/Northern Irish/British</td></tr> <tr><td>White - Irish</td></tr> <tr><td>White - Gypsy or Irish Traveller</td></tr> <tr><td>Other White background</td></tr> <tr><td>Mixed/Multiple - White and Black Caribbean</td></tr> <tr><td>Mixed/Multiple - White and Black African</td></tr> <tr><td>Mixed/Multiple - White and Asian</td></tr> <tr><td>Other Mixed/Multiple ethnic background</td></tr> <tr><td>Asian/Asian British - Indian</td></tr> <tr><td>Asian/Asian British - Pakistani</td></tr> <tr><td>Asian/Asian British - Bangladeshi</td></tr> <tr><td>Asian/Asian British - Chinese</td></tr> <tr><td>Other Asian background</td></tr> <tr><td>Black/African/Caribbean - African</td></tr> <tr><td>Black/African/Caribbean - Caribbean</td></tr> <tr><td>Other Black/African/Caribbean background</td></tr> <tr><td>Arab</td></tr> <tr><td>Other ethnic group</td></tr> <tr><td>I do not want to declare</td></tr> </table>	White - English/Welsh/Scottish/Northern Irish/British	White - Irish	White - Gypsy or Irish Traveller	Other White background	Mixed/Multiple - White and Black Caribbean	Mixed/Multiple - White and Black African	Mixed/Multiple - White and Asian	Other Mixed/Multiple ethnic background	Asian/Asian British - Indian	Asian/Asian British - Pakistani	Asian/Asian British - Bangladeshi	Asian/Asian British - Chinese	Other Asian background	Black/African/Caribbean - African	Black/African/Caribbean - Caribbean	Other Black/African/Caribbean background	Arab	Other ethnic group	I do not want to declare
White - English/Welsh/Scottish/Northern Irish/British																				
White - Irish																				
White - Gypsy or Irish Traveller																				
Other White background																				
Mixed/Multiple - White and Black Caribbean																				
Mixed/Multiple - White and Black African																				
Mixed/Multiple - White and Asian																				
Other Mixed/Multiple ethnic background																				
Asian/Asian British - Indian																				
Asian/Asian British - Pakistani																				
Asian/Asian British - Bangladeshi																				
Asian/Asian British - Chinese																				
Other Asian background																				
Black/African/Caribbean - African																				
Black/African/Caribbean - Caribbean																				
Other Black/African/Caribbean background																				
Arab																				
Other ethnic group																				
I do not want to declare																				

Question 9 (Q9)	Please indicate the first letters of your postcode address in the UK:								
Answer format	Short free text								
Question 10 (Q10)	Please state if you have any of the following disabilities or conditions:								
Answer format	<table border="1"> <tr> <td>Yes</td> <td>No</td> </tr> </table>				Yes	No			
Yes	No								
Sub-question	No known disability								
Sub-question	I do not want to declare								
Sub-question	Two or more impairments and/or disabling medical conditions								
Sub-question	Specific learning difficulty such as dyslexia, dyspraxia and AD(H)DA								
Sub-question	Social/communication impairment such as Asperger's syndrome/other autistic spectrum disorder								
Sub-question	Long standing illness or health condition such as cancer, HIV, diabetes, chronic heart disease or epilepsy								
Sub-question	Mental health condition, such as depression, schizophrenia or anxiety disorder								
Sub-question	Physical impairment or mobility issues, such as difficulty using arms or using a wheelchair or crutches								
Sub-question	Deaf or a serious hearing impairment								
Sub-question	Blind or a serious visual impairment uncorrected by glasses								
Sub-question	A disability, impairment or medical condition that is not listed above								
Question 11 (Q11)	Please state your highest level of education:								
Answer format	<table border="1"> <tr> <td>Other</td> <td>Elementary education</td> <td>Secondary education</td> <td>Higher education - undergraduate</td> <td>Higher education - postgraduate</td> </tr> </table>				Other	Elementary education	Secondary education	Higher education - undergraduate	Higher education - postgraduate
Other	Elementary education	Secondary education	Higher education - undergraduate	Higher education - postgraduate					
Question 12 (Q12)	Please select your field of study or area of expertise:								
Answer format	<table border="1"> <tr> <td>Other</td> </tr> <tr> <td>Computer Science and Information Technology</td> </tr> <tr> <td>Engineering, Mathematics and Physical Sciences</td> </tr> <tr> <td>Arts and Humanities</td> </tr> </table>				Other	Computer Science and Information Technology	Engineering, Mathematics and Physical Sciences	Arts and Humanities	
Other									
Computer Science and Information Technology									
Engineering, Mathematics and Physical Sciences									
Arts and Humanities									

		Life and Environmental Sciences	
		Social Sciences	
		Medicine and Health	

Question 13 (Q13)	What is your current employment status?									
Answer format	<table><tr><td>Employed full-time</td><td>Employed part-time</td><td>Retired</td><td>Student</td><td>Unemployed/Not in paid work</td></tr></table>					Employed full-time	Employed part-time	Retired	Student	Unemployed/Not in paid work
Employed full-time	Employed part-time	Retired	Student	Unemployed/Not in paid work						
Question 14 (Q14)	Please indicate your job title.									
Answer format	Short free text									
Question 15 (Q15)	If you have any particular job or career in mind, can you tell us what is it?									
Answer format	Short free text									

Appendix B: Demonstrative example of the C3-IoC system

In the following, we present a demonstrative example of the proposed C3-IoC system in three steps when trying to target a Database Manager Profile.

Step I. Skill Evaluation

Let us suppose that the trial user responds to the first six questions of the input questionnaire (see Fig. 1 in the Appendix). Then, for didactic proposes, the confidence level selected is 4 (levels: NA, 1,2,3,4,5,6,7 such that the higher the value, the best is the confidence level of the user):

- (1) Attention to Detail. Being focused, attentive to details and thorough in completing tasks: **4**
- (2) Management. Getting members of a group to work together to accomplish tasks and determining how money will be spent to get the work done: **4**
- (3) Self-Control. Maintaining composure, keeping emotions in check and dealing effectively with high-stress situations: **4**
- (4) Mathematical Reasoning. Choosing the right mathematical methods or formulas to solve a problem: **4**
- (5) Training and Teaching. Identifying the educational needs of others, providing guidance and training to help others to improve their knowledge or skills: **4**
- (6) Mathematical Reasoning. Choosing the right mathematical methods or formulas to solve a problem: **4**

Fig. 1 Example of answering the *Attention to Detail* question in the input questionnaire.

*** Attention to Detail:** Being focused, attentive to details and thorough in completing tasks.

How confident are you in selective attention? For example, could you:

☒ N/A
 ☐ 1
 ☐ 2
 ☐ 3
 ☒ 4
 ☐ 5
 ☐ 6
 ☐ 7

Tune in a radio in a noisy truck
 Look for a golf ball in the rough
Identify camouflaged tanks from a high-speed airplane

Step 2. Skill Profile

Let us select skills related to the target profile (see Fig. 2 in the Appendix). These soft and technical skills complement the ones selected in Step 1. For example, some soft skills added manually are Interacting with computers, Processing Information, and Database Administration, whereas some technical skills are Relational Databases, SQL, and PostgreSQL.

Fig. 2 List of soft and technical skills selected according to the target Database Manager Profile.



Following with Skill Profile stage, in Fig 3, we can observe some of the technical skills grouped into four categories: Programming Language, Tools and Platforms, General Tech and Specific Training. Also, Fig 4 illustrates some soft skills categorised in Social, Thinking, Personal and Management. In this stage, the user can choose a confidence level for each skill, and the radar chart will be updated accordingly.

Fig. 3 Illustration of the technical skills selected for the target Database Manager Profile.

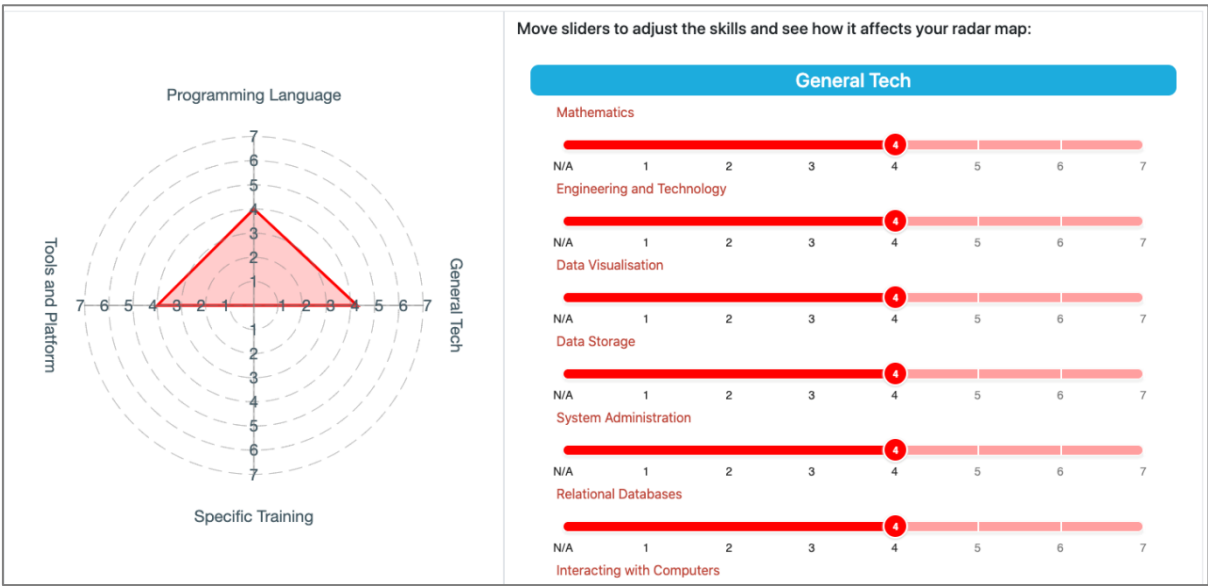
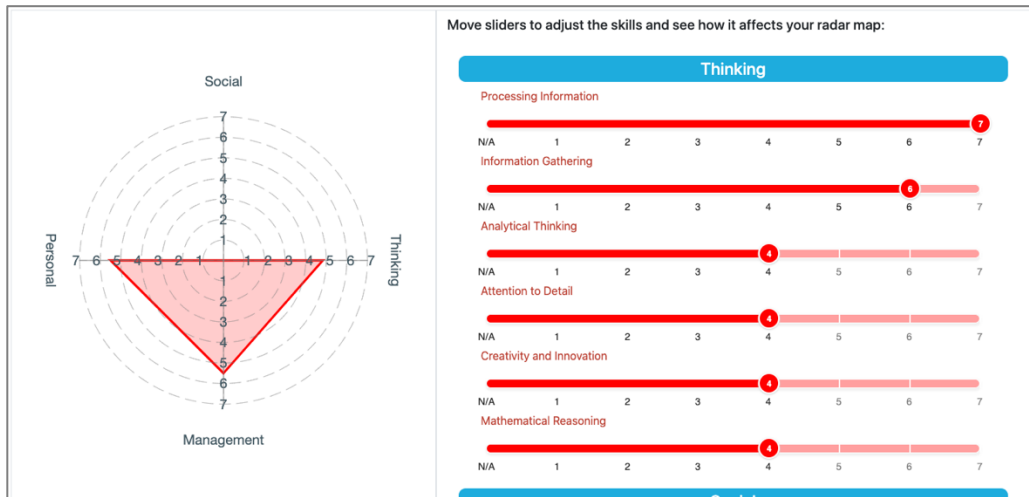


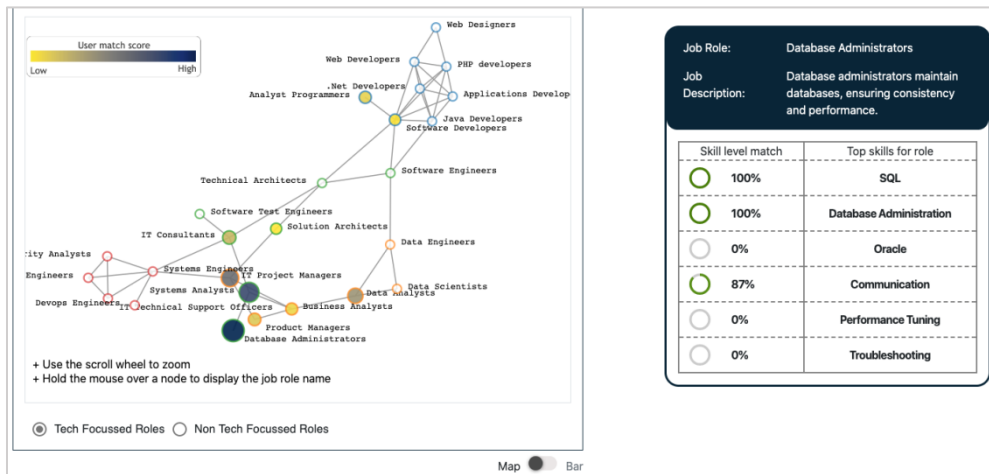
Fig. 4 Illustration of the soft skills selected for the target Database Manager Profile.

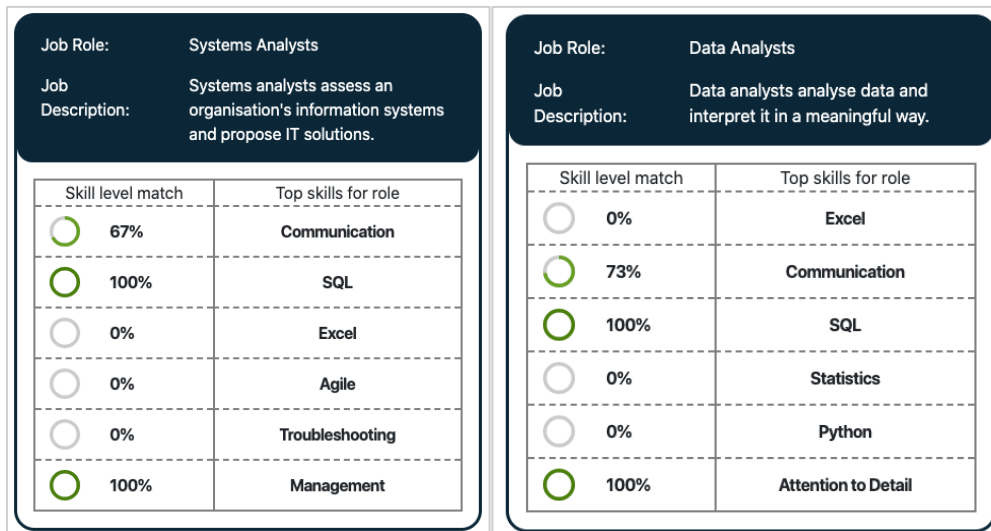


Step 3. Job Role Explorer

On the one hand, if we focus on the IT job role map in Fig. 5, it is evident that the job role obtained is “Database Administrator” and that there are other very similar roles such as “System Analysis” and “Data Analysis”. However, on the other hand, note that the user does not have other essential technical skills for this position.

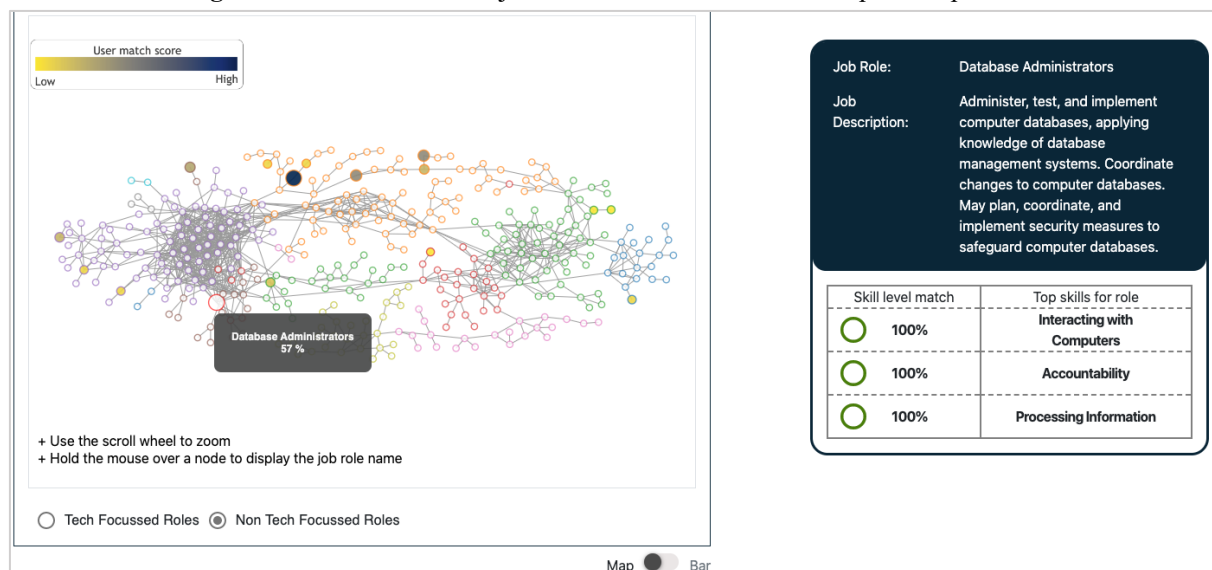
Fig. 5 Illustration of IT job roles obtained based on the input user profile.





Finally, when we look at the results obtained for O*NET job roles based on soft skills from Fig. 6, we observe that one of the recommended job roles is “Data Administrators” and that other similar job roles are “Computer Programmers”, “Survey Researchers”, and “Statistical Assistants”. Concerning the soft features, we can observe how a set of features are transversal to the mentioned job roles. In addition, the system indicates to the user the skills required for the different job roles.

Fig. 6 Illustration of O*NET job roles obtained based on the input user profile.



Job Role:

Computer Programmers

Job Description:

Create, modify, and test the code, forms, and script that allow computer applications to run. Work from specifications drawn up by software developers or other individuals. May assist software developers by analyzing user needs and designing software solutions. May develop and write computer programs to store, locate, and retrieve specific documents, data, and information.

Skill level match	Top skills for role
100%	Interacting with Computers
0%	Programming
100%	Accountability
100%	Processing Information

Job Role:

Survey Researchers

Job Description:

Plan, develop, or conduct surveys. May analyze and interpret the meaning of survey data, determine survey objectives, or suggest or test question wording. Includes social scientists who primarily design questionnaires or supervise survey teams.

Skill level match	Top skills for role
100%	Interacting with Computers
100%	Accountability
63%	Analytical Thinking
94%	Information Gathering
100%	Processing Information

Job Role:

Statistical Assistants

Job Description:

Compile and compute data according to statistical formulas for use in statistical studies. May perform actuarial computations and compile charts and graphs for use by actuaries. Includes actuarial clerks.

Skill level match	Top skills for role
100%	Interacting with Computers
65%	Mathematical Reasoning
97%	Information Gathering
0%	Dependability
68%	Analytical Thinking