

# ESRC Scottish Doctoral Training Centre Information Science Pathway Training day 13<sup>th</sup> February 2012



# **Analysis of data for organisational research**

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# Session content

- Data analysis as part of the research process
- Data, evidence and findings
- Role of coding data in data analysis
- Coding exercise

# Data analysis as a process

- Design methods → gather evidence → present case
- Move from **description** of elements, e.g. object, people, phenomena “observed” to **explanation**, i.e. **analysis**.
- Output is tied to purpose of the research and related research questions, with scope for extension
  - discover what the research is **really** about
  - new research questions may **emerge**
  - example: intranets and information sharing → power issues and knowledge management

# Refine & develop concepts – critical treatment

Research	Established “theory”	Contribution	(Action)
<b>Hall PhD</b>	Poor understanding of knowledge sharing with technologies	Knowledge sharing practice is local. Efforts to knowledge share is influenced by power bases	(Adopt communities approach to KM in case study organisation)
<b>Hall &amp; Davison blogs in the classroom</b>	Blogs promote reflective learning	Blogs do <i>not</i> promote reflective learning to the extent reported	(Pay attention to weekly blog hints to engineer reflection)

# Refine & develop concepts – critical treatment

Data analysis

Research	Established “theory”	Contribution	(Action)
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Data analysis

# Belief in your research results

- Research findings are expected
    - to be **grounded in evidence**
    - not to be based on speculation, nor on weak inference
  - Therefore decisions on data analysis are important
    - Example from TFPL research into job market for information professionals:  
**apparently** more opportunity in the public and voluntary than the corporate sector.  
However:
      - less obligation in corporate sector to advertise posts
      - public and voluntary sector organisations could be playing “catch up” with the corporate sector
- We **could not** be confident that this finding was grounded in evidence because our data collection was not extensive enough

# Inevitability of “too much” data

- Assume it's murder
  - safety net
- Not all data collected will be analysed - data collectively “emphasised”
  - to serve as evidence
  - to build a case
- Tension
  - present a set of understandable findings
  - yet acknowledge the complexities of the social world under investigation





# Inevitability of “too much” data

- Assume it's murder
  - safety net

You can't just say “this way of working is better than the old way”

- Not all data collected will be actively “emphasised”
  - to serve as evidence
  - to build a case
- Tension
  - present a set of understandable findings
  - yet acknowledge the complexities of the social world under investigation



# Data, evidence and findings

- Data + interpretation = evidence
- Evidence = social product/artefact of work completed
  - Evidence → findings
- Data cannot (normally) speak for itself, so
  - data ≠ evidence
  - evidence ≠ mere illustration
  - evidence is built from multiple data sets
    - research design should permit multiple collection of “same” data for triangulation purposes
  - obligation falls on the researcher to check alternative claims for the evidence collected

# Links between findings & research design

- Outcome of data analysis (findings) must be understood in the context of the methods adopted
  - Example from TFPL research into job market for information professionals: globalisation the strongest driver in the creation of new job roles in the corporate sector. However:
    - Research design determined sample selection focused on large, multinational companies

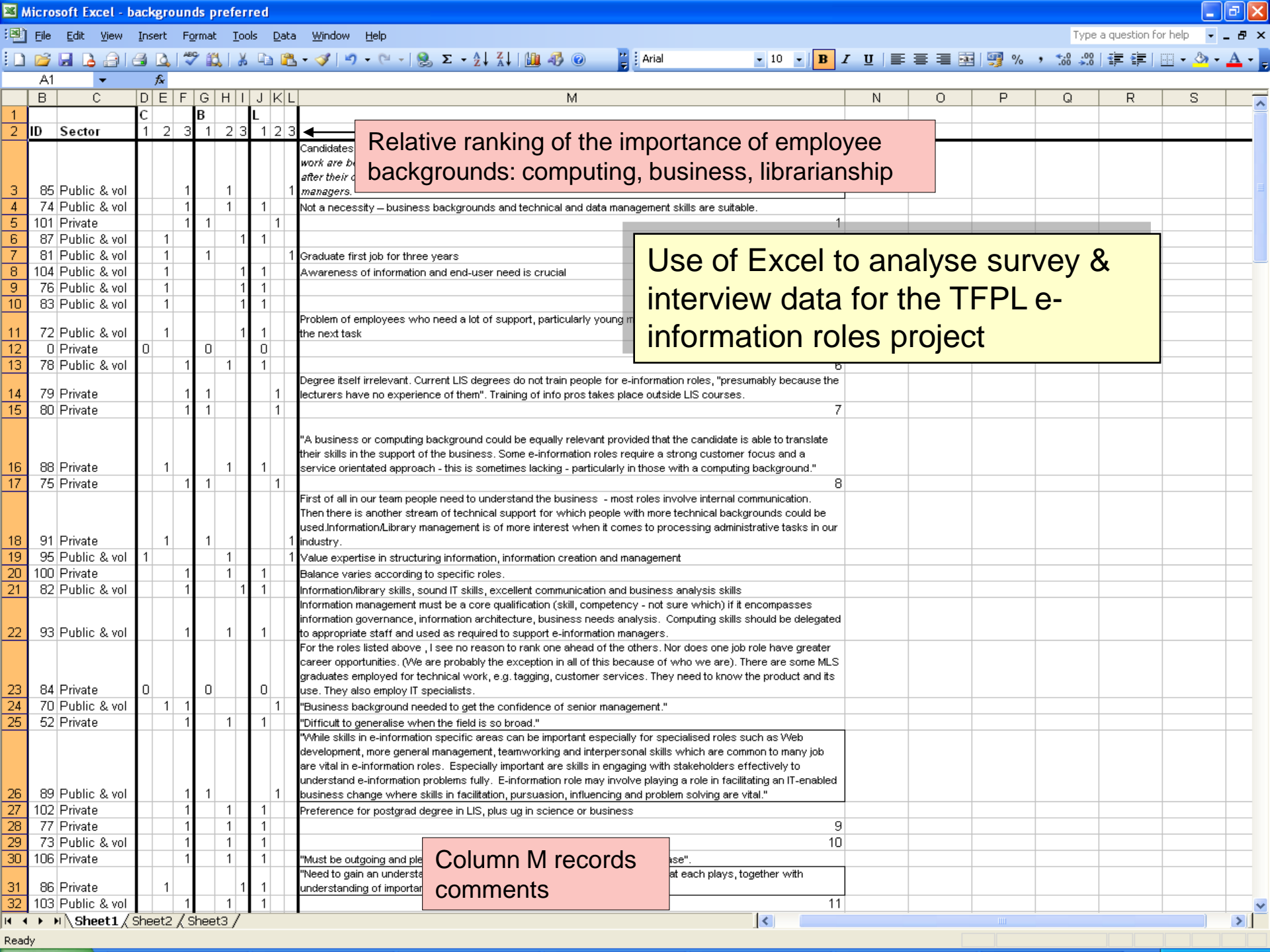
So we were confident that the finding was grounded in evidence, **within the context of our sample**
- Obligation to provide detailed and comprehensive account of both **findings and basis on which they were obtained**

# Data analysis: some examples

Research	Format of data	Coding & analysis
<b>Hall PhD</b>	Recorded interviews; interview notes; archive of company documents	Interviews transcribed; interview data coded using <i>Ethnograph</i> ; archive details organised into historical sequence & coded manually – “content analysis”
<b>Blogs in the classroom</b>	Students’ blog entries; survey	Content analysis of blog entries; survey results not incorporated
<b>TFPL e-information roles</b>	Focus group notes; job adverts; job descriptions; survey; telephone interview notes	Combined mind-mapping of focus group notes & job data; survey & telephone data analysed using Excel
<b>Outsourcing research &amp; information services</b>	Interview notes; provider web sites	Interview data coded & analysed manually – total of 11 data sets

# Data analysis options

- Analysis using software
  - Standard packages
    - Word
    - Excel
    - Access
  - Dedicated software
    - SPSS - <http://www.spss.com/>
    - Ethnograph - <http://www.qualisresearch.com/>
    - Nvivo 9 (NUD\*IST) - [http://www.qsrinternational.com/products/productoverview/NVivo\\_7.htm](http://www.qsrinternational.com/products/productoverview/NVivo_7.htm)
    - Atlas.ti - <http://www.atlasti.com/>
- Manual analysis



Relative ranking of the importance of employee backgrounds: computing, business, librarianship

Use of Excel to analyse survey & interview data for the TFPL e-information roles project

Column M records comments

	B	C	D	E	F	G	H	I	J	K	L
1			C			B			L		
2	ID	Sector	1	2	3	1	2	3	1	2	3
3	85	Public & vol			1		1				1
4	74	Public & vol			1		1		1		
5	101	Private			1	1					1
6	87	Public & vol		1				1	1		
7	81	Public & vol		1		1				1	
8	104	Public & vol		1				1	1		
9	76	Public & vol		1				1	1		
10	83	Public & vol		1				1	1		
11	72	Public & vol		1				1	1		
12	0	Private	0			0			0		
13	78	Public & vol			1		1			1	
14	79	Private			1	1				1	
15	80	Private			1	1				1	
16	88	Private			1		1			1	
17	75	Private			1	1				1	
18	91	Private		1		1				1	
19	95	Public & vol	1				1			1	
20	100	Private			1		1			1	
21	82	Public & vol			1			1		1	
22	93	Public & vol			1		1			1	
23	84	Private	0			0				0	
24	70	Public & vol		1	1					1	
25	52	Private			1		1			1	
26	89	Public & vol			1		1			1	
27	102	Private			1		1			1	
28	77	Private			1		1			1	
29	73	Public & vol			1		1			1	
30	106	Private			1		1			1	
31	86	Private		1				1		1	
32	103	Public & vol			1		1			1	

Candidates work are better after their managers.

Not a necessity – business backgrounds and technical and data management skills are suitable.

Graduate first job for three years

Awareness of information and end-user need is crucial

Problem of employees who need a lot of support, particularly young m the next task

Degree itself irrelevant. Current LIS degrees do not train people for e-information roles, "presumably because the lecturers have no experience of them". Training of info pros takes place outside LIS courses.

"A business or computing background could be equally relevant provided that the candidate is able to translate their skills in the support of the business. Some e-information roles require a strong customer focus and a service orientated approach - this is sometimes lacking - particularly in those with a computing background."

First of all in our team people need to understand the business - most roles involve internal communication. Then there is another stream of technical support for which people with more technical backgrounds could be used. Information/Library management is of more interest when it comes to processing administrative tasks in our industry.

Value expertise in structuring information, information creation and management

Balance varies according to specific roles.

Information/Library skills, sound IT skills, excellent communication and business analysis skills

Information management must be a core qualification (skill, competency - not sure which) if it encompasses information governance, information architecture, business needs analysis. Computing skills should be delegated to appropriate staff and used as required to support e-information managers.

For the roles listed above, I see no reason to rank one ahead of the others. Nor does one job role have greater career opportunities. (We are probably the exception in all of this because of who we are). There are some MLS graduates employed for technical work, e.g. tagging, customer services. They need to know the product and its use. They also employ IT specialists.

"Business background needed to get the confidence of senior management."

"Difficult to generalise when the field is so broad."

"While skills in e-information specific areas can be important especially for specialised roles such as Web development, more general management, teamworking and interpersonal skills which are common to many job are vital in e-information roles. Especially important are skills in engaging with stakeholders effectively to understand e-information problems fully. E-information role may involve playing a role in facilitating an IT-enabled business change where skills in facilitation, persuasion, influencing and problem solving are vital."

Preference for postgrad degree in LIS, plus ug in science or business

"Must be outgoing and ple

"Need to gain an understa

understanding of importa

1

6

7

8

9

10

11

## Use of Word to analyse document data for Hall PhD

Date	Data	Source
8 November 2001		
	<b>History – investment</b> Budget changes	
		Named meeting minutes

Date of activity/development

Activity/development

Source of information

H: Who controls 422  
the Intranet content, is it 423  
controlled by you in XX ... rather than 424  
from the centre, from the KM group ...? 425

#-CONTROL \$-RELS KMG

P: Well, in terms of what tools and what 427 -#-\$  
facilities are made available to us, 428 | |  
that's obviously controlled by the 429 | |  
central group. But in terms of the XX 430 |-\$  
content and the XX presence, that's 431 |  
entirely controlled by me ... simply 432 |  
because it wouldn't be relevant to go 433 |  
through a central group. 434 -#

H: Yeh, OK. You've told me about 436  
#-INT BUY-IN  
ownership. How ... it sounds as if 437 -#  
you've got really good buy-in from 438 |  
your own set of people ... 439 |  
|  
P: Absolutely. 441 -#

#-INT BUY-IN

H: What about the Intranet as a whole in 443 -#  
the UK? What are your perceptions of 444 |  
buy-in there? 445 |  
|

\$-KM SPONS

P: I think it varies. I mean, I'm very 447 -#-\$  
fortunate in that I report into the 448 |  
KM partner, who's also one of the 449 |  
senior partners ... 450 -\$

H: Which, who ...? 452

## Use of Ethnograph to analyse interview data for Hall PhD



# “Translating” data for analysis - coding

- Coding
  - records instances of occurrence
  - organises data into categories
  - comprises part of the analysis stage in qualitative research

# Attention to coding in research design

- Design of research tool has determined predefined codes

Indicate the best day of the week for team leader meetings:

- A. Monday
- B. Tuesday
- C. Wednesday
- D. Thursday
- E. Friday
- F. Don't know
- G. No preference
- H. Not applicable

# Attention to coding in research design

- Design of research tool has determined predefined codes

Indicate the best day of the week for team leader meetings:

- A. Monday
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Note also the importance of the last three options: there is a difference between not having a preference and not knowing; if this forms part of a survey of staff who have nothing to do with team leader meetings, there needs to be an option for their response. Attention to coding at the design stage can help with asking the “right” questions.

# Coding down

- Data is coded according to predefined categories
  - identified in range of work brought together in literature review
  - identified in a single piece of work
  - commonly deployed, e.g. age breakdowns used in national statistics

# Example coding down: blog posting data coding scheme

Dimension	Code	Interpretation	Evidence
<b>Reflection</b>	C	Content-free	Comment makes no reference to points in the original entry.
	U	Non-reflective (U='unreflective')	Comment makes reference to the original blog entry, the module content or the general context in order to state an opinion, emotion or a point of fact or theory.
	R	Reflective	Comment addresses points from the main blog entry and demonstrates a consideration of the validity of the content, the process or the underlying premise.
<b>Propositional stance</b>	A	Agree	Comment actively supports the point made in the original entry.
	I	Indifferent	Comment neither supports nor challenges original entry.
	D	Disagree	Comment takes up a contradictory position to the original entry.
<b>Affective</b>	P	Positive	Comment is encouraging, approving, accepting, etc.
	E	Even	Comment appears affectively neutral.
	N	Negative	Comment is hostile, discouraging, dismissive, etc.

Scheme based on Kember, D., Jones, A., Loke, A., McKay, J., Sinclair, K., Tse, H., Webb, C., Wong, F., Wong, M. & Yeung, E. (1999). Determining the level of reflective thinking from students' written journals using a coding scheme based on the work of Mezirow. *International Journal of Lifelong Education*, 18(1), 18–30.

# Coding up

Data is coded according to categories suggested by the data

- Revise codes as new insight is developed through the process of coding - further discovery of what the research is really about
- Example from Hall PhD: seven broad categories related the intranet under investigation
  - Content
  - Functionality
  - History
  - KWorld
  - Policy
  - Staffing
  - Uptake

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
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Relative ranking of the importance of employee backgrounds: computing, business, librarianship

Some data in this spreadsheet fits with predefined codes, i.e. in columns D-L. However comments need to be coded up.

Column M records comments

H: ← **Speaker** Who controls 422  
 the I is it 423  
 controlled by you in XX ... rather than 424  
 from the centre, from the KM group ...? 425

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#-INT BUY-IN ← **Code**  
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 you've got really good buy-in from 438 |  
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#-INT BUY-IN

H: What about the Intranet as a whole in 443 -#  
 the UK? What are your perceptions of 444 ← | **Line numbers**  
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 fortunate in that I report into the 448 |  
 KM partner, who's also one of the 449 | ← **Data coded**  
 senior partners ... 450 -

H: Which, who ...? 452

## Value of software packages for coding and generating reports for analysis



# Advice pointers

- Be **disciplined and systematic** when analysing data
  - especially important to keep records of what you do if you dip in and out of your research work
- Be prepared to **account for** what you have done in the report of your work
  - another reason to keep good records
- When designing data collection tools, **look forward to data analysis**
  - good decisions at this stage may save a lot of work at data analysis stage – as will be demonstrated in the class exercise!

**Section 3: Future of e-information roles**

We are particularly interested in your expert opinion on the quality of the e-information workforce, and the candidates wishing to join it. Your responses to these questions will help influence this research project's recommendations to the universities. (Please supply as many answers as possible, as appropriate to your knowledge and opinion.)

The definition of e-information roles is available to you by clicking the button next to each question below.

**3.1 Which skills would you consider to be most important in the recruitment of individuals to e-information roles in the future?**

1.  4.   
2.  5.   
3.  6.

**3.2 Please identify any skills gaps for e-information roles in the current new graduate workforce.**

1.  4.   
2.  5.   
3.  6.

**3.3 Please identify where there are the greatest career opportunities for those working in e-information roles (for example, by sector, by job role, by location).**

1.  4.   
2.  5.   
3.  6.

**3.4 Please rank the relative importance of the following backgrounds for candidates who would hope to work in e-information roles:**

- Computing, e.g. degree in computer science, software engineering, multimedia systems, computer networking
- Business, e.g. degree in business studies, e-commerce, e-business
- Library and information management, e.g. degree in librarianship, information management

Please add any further comments on the backgrounds of candidates who would hope to work in e-information roles:

The class exercise is based on the responses to questions 3.1, 3.2 and 3.3 in the TFPL e-information roles survey

Ability to align work activities to business strategy  
 Ability to connect with developments  
 Ability to cope with change  
 Ability to see the big picture  
 Ability to translate the needs of the business at all levels  
 Abstracting  
 Adaptability  
 Analytic mind  
 Business acumen  
 Business awareness  
 Business development  
 Business focus  
 Cataloguing  
 Change management  
 Classification  
 Collaboration – non-technical  
 Collaboration – technical  
 Commercial awareness  
 Communication  
 Computer literacy  
 Confidence  
 Contract/supplier management  
 Creativity  
 Diplomacy  
 E-learning facilitation  
 Empathy  
 Engaging audiences  
 Enterprise content management

Enthusiasm  
 Evaluation of information sources  
 Facilitation  
 Flexibility  
 Grammar  
 Imagination  
 Indexing  
 Influencing  
 Information analysis  
 Information delivery  
 Information governance  
 Information literacy  
 Information retrieval  
 Innovation  
 Integrity  
 Intellectual property knowledge  
 Intelligence  
 Interviewing  
 IT savvy  
 Knowledge harvesting  
 Knowledge of e-information arena, new technologies  
 Knowledge of government policy  
 Knowledge of information sources  
 Knowledge of law  
 Knowledge of public sector vocabulary  
 Languages  
 Leadership  
 Literacy

Management  
 Management of individuals  
 Management of teams  
 Marketing  
 Multi-tasking  
 Negotiation  
 Networking  
 Numeracy  
 Organisation  
 Outgoing personality  
 Political awareness  
 Presentation skills  
 Prince 2  
 Problem solving  
 Professionalism  
 Project management  
 Records management  
 Relationship building  
 Relationship management  
 Repackaging information  
 Research  
 Self-management  
 Small business knowledge  
 Social computing  
 Spelling  
 Stakeholder management  
 Strategic thinking  
 Synthesising information  
 Taxonomy development  
 Technical ability  
 Time management

Training  
 Understanding of technical tools  
 Validation of information sources  
 Web authoring  
 Web development  
 Web usability testing  
 Working under pressure  
 Writing

How would you group these responses for coding?

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