Advanced Research Techniques ™

Knowledge-Based Certification

Certification Curriculum

Summary Certification Overview

1	Research aims	7	Critiquing papers
2	Knowing the search terms	8	Could the research be biased?
3	Which sources do I use?	9	Correlation and Causation
4	Too many or too few papers?	10	The science behind the headlines
5	Researching on a budget	11	Wikipedia BONUS MODULE
6	Reading a paper	12	Dos and Don'ts

Advanced Research Techniques

Unit	Content
1	Taking your career a step further
2	Skills Lab™: What is your goal
3	Introduction to research techniques
4	Skills Lab™: What´s your scientific question?
5	Understanding keywords and search terms
6	Skills Lab™: Identifying my search terms
7	Where do I conduct my search?
8	Researching with PubMed
9	Searching with ScienceDirect
10	Investigating with Google Scholar

Advanced Research Techniques

Unit	Content
11	Skills Lab™: Conducting a search
12	Refining search results
13	Skills Lab™: Narrowing down results
14	Accessing the full texts for free
15	Skills Lab™: How to access free papers
16	How to read a scientific paper
17	What does the abstract and introduction teach us?
18	Why know the experimental set up?
19	Examining epidemiological evidence
20	Seeing the data with an unbiased eye

Advanced Research Techniques

Unit	Content
21	Critiquing scientific papers
22	Taking a critical eye to the study design
23	Going direct to the results
24	Analysing the analysis
25	Skills Lab™: Critiquing a paper
26	Avoiding confirmation bias
27	Looking beyond the numbers
28	Debunking the Headlines
29	Cutting through the misinformation
30	Skills Lab™: Analysing a news article

Advanced Research Techniques

Unit	Content
31	The good and bad of Wikipedia
32	Skills Lab™: Auditing Wikipedia pages
33	Dos, don'ts, and must dos

0. Fundamentals

Unit	Here's what you'll learn	Extra support material
0.1 Taking your career a step further 0.2 Skills Lab™: What's your goal?	▪ An exciting scientific journey ahead ▪ Your specialised course ▪ Contradictions and harmful advice ▪ Trusting the news? ▪ The only acceptable source ▪ The scope of training ▪ From knowledge to practise ▪ More about your course materials ▪ Expert training	▪ My Personal Notes worksheet ▪ Skills Lab™: Personal Strategy Questionnaire (What's your goal?)

1. My research aims

Unit	Here's what you'll learn	Extra support material
1.1 Introduction to research techniques 1.2 Skills Lab™: What´s your scientific question?	▪ Why do your own research? ▪ What is a literature review? ▪ Why carry out a literature review? ▪ Hourglass research model ▪ More than 1 review? ▪ Not just for scientists ▪ The purpose of this research training ▪ The first step ▪ From general to specific ▪ What is my research question? ▪ Research question vs hypothesis ▪ What´s my question? ▪ New beginnings ▪ The 5 steps involved ▪ Your next steps ▪ What do you want to find out? ▪ Important factors to consider	▪ Research Question Generator™ ▪ Test Your Knowledge Exercises

1. My research aims

Unit	Here's what you'll learn	Extra support material
1.1 Introduction to research techniques 1.2 Skills Lab™: What´s your scientific question?	▪ Additional questions to answer ▪ An example research question ▪ Research Question Generator™ ▪ Step 1 done!	▪ Research Question Generator™ ▪ Test Your Knowledge Exercises

2. Knowing the search terms

Unit	Here's what you'll learn	Extra support material
2.1 Understanding keywords and search terms 2.2 Skills Lab™: Identifying my search terms	▪ Thinking about search terms ▪ Computer mind readers? ▪ Brainstorming with a dictionary ▪ UK vs US spellings ▪ Establishing your search terms ▪ To include? Or not to include? ▪ From research question to keywords ▪ Organising keywords ▪ Listing keywords to include ▪ Listing keywords to exclude ▪ Creating lists and checking it twice ▪ Truncations and wildcards ▪ Boolean connectors ▪ Using Boolean connections ▪ Same meaning as everyday speech ▪ Our example search ▪ Other inclusions and exclusions	▪ Test Your Knowledge Exercises

2. Knowing the search terms

Unit	Here's what you'll learn	Extra support material
2.1 Understanding keywords and search terms 2.2 Skills Lab™: Identifying my search terms	▪ What are your keywords? ▪ Brainstorming keywords ▪ Using Boolean connectors ▪ Keyword Brainstorming Board™ ▪ Time to get the papers?	▪ Keyword Brainstorming Board™ ▪ Test Your Knowledge Exercises

3. Which sources do I use?

Unit	Here's what you'll learn	Extra support material
3.1 Where do I conduct my search? 3.2 Researching with PubMed 3.3 Searching with ScienceDirect 3.4 Investigating with Google Scholar 3.5 Skills Lab™: Conducting a search	▪ Where do find scientific papers? ▪ Search engine vs database ▪ The databases behind the engines ▪ Not created equal ▪ Specific databases ▪ Choosing your database ▪ Free or paid? ▪ More than 1? ▪ Doing your own research ▪ Who is MEDLINE? ▪ Basic PubMed search ▪ Starting an advanced search ▪ Separating Booleans ▪ PubMed search result example ▪ Filtering your results ▪ Why look at the abstract? ▪ PubMed abstract example	▪ Searching in PubMed video tutorial ▪ Investigating with Google Scholar video tutorial ▪ Scientific Search Workbook™ ▪ Test Your Knowledge Exercises

3. Which sources do I use?

Unit	Here's what you'll learn	Extra support material
3.1 Where do I conduct my search? 3.2 Researching with PubMed 3.3 Searching with ScienceDirect 3.4 Investigating with Google Scholar 3.5 Skills Lab™: Conducting a search	▪ 2 more search engines to go… ▪ What is ScienceDirect? ▪ Integrating journals and books ▪ A quick, basic search ▪ Filtering by date ▪ Filtering by publication date ▪ Further filtering? ▪ Filtering results ▪ Finding something already in mind ▪ Advanced search ▪ Conducting an advanced search ▪ Full access? ▪ Two down! ▪ About Google Scholar ▪ Potential caveats ▪ A basic Google Scholar search ▪ Basic search results	▪ Searching in PubMed video tutorial ▪ Investigating with Google Scholar video tutorial ▪ Scientific Search Workbook™ ▪ Test Your Knowledge Exercises

3. Which sources do I use?

Unit	Here's what you'll learn	Extra support material
3.1 Where do I conduct my search? 3.2 Researching with PubMed 3.3 Searching with ScienceDirect 3.4 Investigating with Google Scholar 3.5 Skills Lab™: Conducting a search	▪ Most recent papers ▪ Need a more detailed search? ▪ Creating an advanced search ▪ Putting it into practice ▪ Your 2 search engines ▪ Tips for your search ▪ Scientific Search Workbook™ ▪ Continue practising ▪ Same or different?	▪ Searching in PubMed video tutorial ▪ Investigating with Google Scholar video tutorial ▪ Scientific Search Workbook™ ▪ Test Your Knowledge Exercises

4. Too many or too few papers?

Unit	Here's what you'll learn	Extra support material
4.1 Refining search results 4.2 Skills Lab™: Narrowing down results	▪ 10,000 results? ▪ Approaching that magic number ▪ The magic number: from 100 to 350 ▪ Fine-tuning your search ▪ Choosing relevant publications ▪ Finding the relevant texts ▪ Have access to the full text? ▪ The never-ending search ▪ Your key takeaways ▪ Time to refine your own search? ▪ Reaching the magic number ▪ Refining My Search Guide™ ▪ A crucially important skill?	▪ Refining search results video tutorial ▪ Refining My Search Guide™ ▪ Test Your Knowledge Exercises

5. Researching on a budget

Unit	Here's what you'll learn	Extra support material
5.1 Accessing the full texts for free 5.2 Skills Lab™: How to access free papers	▪ £40 per paper? ▪ Open access journals ▪ Increasing open access articles ▪ Free access journals? ▪ Don't we 'get what we pay for'? ▪ Culture shift ▪ Science for everyone ▪ What am I missing? ▪ This filter might help… ▪ Cutting just one corner ▪ Second best ▪ Use you own judgement ▪ Two birds with one stone ▪ How different will the answer be? ▪ Let's compensate ▪ What aren't they telling you? ▪ Can't find the free paper?	▪ Accessing Free Full Texts in PubMed video tutorial ▪ Finding Free Papers Guide™ ▪ Test Your Knowledge Exercises

5. Researching on a budget

Unit	Here's what you'll learn	Extra support material
5.1 Accessing the full texts for free 5.2 Skills Lab™: How to access free papers	▪ The perks of being a Pro ▪ Tools for life ▪ Let's take action! ▪ What's coming up? ▪ Finding and downloading ▪ Finding Free Papers Guide™ ▪ Online or download? ▪ Reading and critiquing?	▪ Accessing Free Full Texts in PubMed video tutorial ▪ Finding Free Papers Guide™ ▪ Test Your Knowledge Exercises

6. Reading a paper

Unit	Here's what you'll learn	Extra support material
6.1 How to read a scientific paper 6.2 What does the abstract and introduction teach us? 6.3 Why know the experimental set up? 6.4 Examining epidemiological evidence 6.5 Seeing the data with an unbiased eye	▪ I've got my research – now what? ▪ 3 key reasons to go the source ▪ Original research vs reviews ▪ The study of studies ▪ Levels of evidence ▪ Conducting your own reviews ▪ Let's focus on original research ▪ Jargon alert ▪ 6 main paper sections ▪ The start of a paper ▪ How it relates to a research trial ▪ Uncovering the parts of a paper ▪ First 2 paper parts ▪ Setting the scene ▪ The point of the abstract ▪ Did you know? ▪ How long is short?	▪ Reading a Scientific Paper video tutorial ▪ Test Your Knowledge Exercises

6. Reading a paper

Unit	Here's what you'll learn	Extra support material
6.1 How to read a scientific paper 6.2 What does the abstract and introduction teach us? 6.3 Why know the experimental set up? 6.4 Examining epidemiological evidence 6.5 Seeing the data with an unbiased eye	▪ Graphical abstract ▪ Graphical abstract examples ▪ The evolution of the abstract ▪ Keywords? ▪ Why read the full article? ▪ A screening tool ▪ Let's get down to business ▪ How do scientists know what to study? ▪ An extended introduction? ▪ A scientific controversy? ▪ Methods time! ▪ "Methodology": what to expect ▪ Did you know? ▪ An important distinction ▪ Experimental studies ▪ Analytic studies organisation ▪ Correlation vs causation	▪ Reading a Scientific Paper video tutorial ▪ Test Your Knowledge Exercises

6. Reading a paper

Unit	Here's what you'll learn	Extra support material
6.1 How to read a scientific paper 6.2 What does the abstract and introduction teach us? 6.3 Why know the experimental set up? 6.4 Examining epidemiological evidence 6.5 Seeing the data with an unbiased eye	▪ Observational vs experimental ▪ Cross-sectional studies ▪ Cross-sectional studies: pros and cons ▪ Cohort studies ▪ Prospective cohorts: pros and cons ▪ Prospective Cohort Studies ▪ Retrospective cohorts: pros and cons ▪ Retrospective Cohort Studies ▪ Case-control studies ▪ Case Control Studies ▪ Randomised controlled trials ▪ Blissfully unaware ▪ Randomised controlled: pros and cons ▪ Randomised Control Studies ▪ Other experimental studies ▪ Non-randomised Studies ▪ Why non-randomised	▪ Reading a Scientific Paper video tutorial ▪ Test Your Knowledge Exercises

6. Reading a paper

Unit	Here's what you'll learn	Extra support material
6.1 How to read a scientific paper 6.2 What does the abstract and introduction teach us? 6.3 Why know the experimental set up? 6.4 Examining epidemiological evidence 6.5 Seeing the data with an unbiased eye	▪ Uncontrolled Cohort Studies ▪ Why uncontrolled? ▪ Diving even deeper ▪ Nutrition-related scientific papers ▪ Epidemiological studies ▪ Is this the cause? ▪ Preventing Alzheimer's Disease? ▪ The 2 main types ▪ Case-control study ▪ Prospective cohort study ▪ Does red meat cause cancer? ▪ Association or link? ▪ Not to be skipped ▪ Results: what to expect ▪ A higher power ▪ What are "significant" findings? ▪ Significant or not?	▪ Reading a Scientific Paper video tutorial ▪ Test Your Knowledge Exercises

6. Reading a paper

Unit	Here's what you'll learn	Extra support material
6.1 How to read a scientific paper 6.2 What does the abstract and introduction teach us? 6.3 Why know the experimental set up? 6.4 Examining epidemiological evidence 6.5 Seeing the data with an unbiased eye	▪ Who provides the therapy? ▪ Bringing it all together ▪ What else might be discussed? ▪ Your key takeaways ▪ What's coming up?	▪ Reading a Scientific Paper video tutorial ▪ Test Your Knowledge Exercises

7. Critiquing papers

Unit	Here's what you'll learn	Extra support material
7.1 Critiquing scientific papers 7.2 Taking a critical eye to the study design 7.3 Going direct to the results 7.4 Analysing the analysis 7.5 Skills Lab™: Critiquing a paper	▪ Are all studies of the same quality? ▪ Separating the wheat from the chaff ▪ Who are you to say? ▪ Ranking by impact factor ▪ Don't lower your standards ▪ The impact factor formula ▪ Independent impact evaluation ▪ Put things into perspective ▪ Not all science is published ▪ One size doesn't fit all ▪ Ignorance is bliss ▪ Types of blinding ▪ Volunteers needed ▪ To recruit or not to recruit? ▪ Confounding factors ▪ Behind the scenes ▪ Can you control for confounders?	▪ Critiquing a Paper Workbook™ ▪ Test Your Knowledge Exercises

7. Critiquing papers

Unit	Here's what you'll learn	Extra support material
7.1 Critiquing scientific papers 7.2 Taking a critical eye to the study design 7.3 Going direct to the results 7.4 Analysing the analysis 7.5 Skills Lab™: Critiquing a paper	▪ Matching: an example ▪ Independent risk factors? ▪ Table of characteristics example ▪ Judging the strength of a study ▪ Data collection ▪ Study duration ▪ What's the risk? ▪ Absolute vs relative risk ▪ Let´s look at an example ▪ Halved and doubled ▪ Just in case scenario ▪ Too many drop outs? ▪ Could the author be biased? ▪ Competing interests ▪ A conflict of interest? ▪ Are there study limitations? ▪ Correlation doesn't equal causation	▪ Critiquing a Paper Workbook™ ▪ Test Your Knowledge Exercises

7. Critiquing papers

Unit	Here's what you'll learn	Extra support material
7.1 Critiquing scientific papers 7.2 Taking a critical eye to the study design 7.3 Going direct to the results 7.4 Analysing the analysis 7.5 Skills Lab™: Critiquing a paper	▪ We're all unique individuals ▪ We all wear different genes ▪ Question the reliability of research ▪ Critiquing a paper ▪ One page at a time ▪ Critiquing a Paper Workbook™ ▪ A strong foundation ▪ Looking at your own papers	▪ Critiquing a Paper Workbook™ ▪ Test Your Knowledge Exercises

8. Could the research be biased?

Unit	Here's what you'll learn	Extra support material
8.1 Avoiding confirmation bias	▪ The long version ▪ Your honour ▪ You're wrong and I'll prove it… ▪ Object of science ▪ According to this study, I'm impartial ▪ Asking the right question ▪ All in your head ▪ While we're here… ▪ Zeroing In ▪ Bias Remorse ▪ Ask yourself this ▪ A few good rules ▪ Checking for confirmation bias ▪ Confirmation Bias Check™ ▪ One last thing…	▪ Confirmation Bias Check™ ▪ Test Your Knowledge Exercises

9. Correlation and Causation

Unit	Here's what you'll learn	Extra support material
9.1 Looking beyond the numbers	▪ Daunting world of statistics ▪ Not just a number ▪ What are statistics? ▪ Dat latin plural ▪ Prove it ▪ Chilly weather ▪ Are YOU wearing a scarf? ▪ Trendy scarves ▪ Up or down ▪ Not so fast! ▪ But what if… ▪ The datum of the matter ▪ Controlled scarf studies ▪ Who cares about scarves? ▪ Correlation confirmation ▪ It's all connected ▪ We can't all be average	▪ Test Your Knowledge Exercises

9. Correlation and Causation

Unit	Here's what you'll learn	Extra support material
9.1 Looking beyond the numbers	▪ Don't smoke up, Johnny ▪ Connected by coincidence? ▪ Spurious correlations ▪ Say it with me… ▪ The hype behind the headlines	▪ Test Your Knowledge Exercises

10. The science behind the headlines

Unit	Here's what you'll learn	Extra support material
10.1 Debunking the Headlines 10.2 Cutting through the misinformation 10.3 Skills Lab™: Analysing a news article	▪ Read between the lines ▪ What's the problem? ▪ Why bad science is important ▪ News vs science ▪ Context is everything ▪ Whatever it takes ▪ "Where´s the research?" ▪ Over-generalisation ▪ "Have they over-generalised?" ▪ Anecdotal evidence ▪ A sample of one ▪ The power of suggestion ▪ Like apples and oranges ▪ Sharks vs cows ▪ False equivalence ▪ Risky business ▪ "Have they used the right risk?"	▪ Debunking News Workbook™ which includes the Article Checklist™ ▪ Test Your Knowledge Exercises

10. The science behind the headlines

Unit	Here's what you'll learn	Extra support material
10.1 Debunking the Headlines 10.2 Cutting through the misinformation 10.3 Skills Lab™: Analysing a news article	▪ Stretching the truth ▪ Correlation is not causation ▪ Bigger is better ▪ Small, under-powered trials ▪ Cherry-picking ▪ "Cherry-picked" data ▪ Is there any science there? ▪ Beyond your control ▪ Misleading headlines ▪ A day in the life of a reporter ▪ Let's write a headline… ▪ We don't eat single nutrients ▪ Seeing the bigger picture ▪ Food synergy ▪ What's the bigger picture? ▪ News checker guide ▪ Your key takeaways	▪ Debunking News Workbook™ which includes the Article Checklist™ ▪ Test Your Knowledge Exercises

10. The science behind the headlines

Unit	Here's what you'll learn	Extra support material
10.1 Debunking the Headlines 10.2 Cutting through the misinformation 10.3 Skills Lab™: Analysing a news article	▪ Putting your learning into action ▪ Separating fact from opinion ▪ 4-hands on parts ▪ Debunking News Workbook™ which includes the Article Checklist™ ▪ Ideally go to the scientific paper	▪ Debunking News Workbook™ which includes the Article Checklist™ ▪ Test Your Knowledge Exercises

BONUS MODULE

11. Wikipedia

Unit	Here's what you'll learn	Extra support material
11.1 The good and bad of Wikipedia 11.2 Skills Lab™: Auditing Wikipedia pages	▪ Not a real research tool? ▪ Can it be valuable? ▪ Then what is it? ▪ It's a big world after all ▪ All articles aren't created equal ▪ Fake science news? ▪ I get that reference! ▪ But don't take their word for it ▪ Check their working ▪ No substitute ▪ Turn, turn, turn ▪ Bigger is sometimes better ▪ On the agenda ▪ Ask yourself this… ▪ What is it good for? ▪ Wiki Research Pro ▪ Going to the source	▪ Test Your Knowledge Exercises

BONUS MODULE

11. Wikipedia

Unit	Here's what you'll learn	Extra support material
11.1 The good and bad of Wikipedia 11.2 Skills Lab™: Auditing Wikipedia pages	▪ Choosing the article ▪ Wikipedia Audit™ which includes the Wikipedia Checklist™ ▪ The tools are in your hands	▪ Wikipedia Audit™ which includes the Wikipedia Checklist™ ▪ Test Your Knowledge Exercises

12. Dos and Don'ts

Unit	Here's what you'll learn	Extra support material
12.1 Dos, don'ts, and must dos	▪ Understanding your role ▪ What you CAN and CAN'T do ▪ What you MUST do ▪ The importance of medical advice	▪ Test Your Knowledge Exercises

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