

**Title: Web-based Information skills tutorials for evidence based learning and practice**

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### **University of Edinburgh context**

Medicine and Veterinary Medicine have recently become two schools in the same College at the University of Edinburgh. Making an effort to reflect the organisation of the academic departments, the Library restructured the staff of the medical and veterinary libraries into one geographically distributed team. Although we did collaborate before joining together, this has been a welcome incentive to share expertise and ideas even more than before.

When the two schools joined together, it had been anticipated that pre-clinical veterinary and medical students would share basic sciences classes, to save resources. But this level of joint teaching has been put back, as it was thought the contexts for the two groups' learning were too widely different. Similarly, when the collaboration on information skills training started, it was found that the requirements for the two groups were different enough that the training modules did not suit direct transfer from medicine to veterinary medicine.

Both schools are changing the curricula to a problem-based, evidence-based learning pattern – medicine to a greater degree. As part of this change to the curricula, the Library had been invited to design and contribute courses on information skills. The importance given to information skills in medicine has been underscored by the recent incorporation of an exam on Medline for third year students, as part of a series of objective structured clinical examinations. We see this as a milestone, as it is the first time our library staff have been able to assess information skills competence in a formal manner.

### **Outline of tutorials**

The information skills training we have set out to deliver is staged, so that each successive section builds on skills previously covered (see appendix 1). As an example, veterinary students are first taught to search CAB using free-text searches. Once they have grasped the basics of what to expect from a bibliographic database and the search interface, they are introduced to searching with controlled thesaurus terms. Another example is the use of search filters as shown to medical students: in third year they are introduced to the relatively simple filters available at the CASP site<sup>1</sup> and now in fourth year they are being introduced to the more complex systematic reviews and controlled trials filters created by the Cochrane Collaboration.

The first year students cover the Library Hunt and the Basic literature searching sections. Subsequent sections are not all specifically targeted at particular groups, with the exceptions of the more advanced searching techniques, which are covered in a workshop session for third year medical students. One example of an adjustment we have made is the splitting up of the Medline tutorial into two sections in EEMeC – feedback we got from first year students indicated that we had packed too much information into the tutorial. We have intentionally not named the sections year 1 tutorial, for example, to avoid putting off older students who wish to review, or younger students who want to work ahead.

### **Development of the tutorials**

For three years, the Medical School has had a virtual learning environment (VLE) for the undergraduate medical students called EEMeC (Edinburgh Electronic Medical Curriculum)<sup>2</sup> and now an EEVeC is in development for the school of veterinary medicine. The Library took advantage of technical expertise available from the creators of the VLEs, the College's Learning Technology Section, to create online tutorials and quizzes for training on basic information skills, from identifying the type of reference in a reading list (e.g. journal article, book chapter, etc.) to knowing how to find the item in the Library, and further, knowing what to expect from a bibliographic database and how to perform basic searches.

Taking the Library Hunt as an example of how we were able to improve the training by using online tutorials, I will describe its development from a wholly face-to-face exercise to its current format. The literature searching tutorial has also had an evolution, but time permits only one example. The Library Hunt is aimed at first year medical students in the first week of their course. What we wanted as a result of the Library Hunt was for the new students to feel confident about knowing how to read a reference and find it using the online catalogue.

In the first year of running the Library Hunt, we had a cohort of approximately 200 students. We had them come to the library in groups of about 40, and we spent 30 minutes with each group. We gave a short demonstration of how to use the catalogue, and sent them off in threes to answer questions about the locations of three items. The students returned after 15 minutes for a question and answer session.

Not unexpectedly, we found several problems with this arrangement. The number of students made the breaking into groups a necessity, but even 40 students were too many: although they were working in groups, there were not enough computers in the area to use for locating the items on the list. We did see students working together both at computers and at the shelves, but there was also a fair amount of tripping over one another. The 15 minutes given to answer the references was insufficient for some students, many of whom had politely waited for a computer terminal for a good part of the period. During the question and answer session, it was obvious that some students were shy about asking questions in such a large group. The sessions were time-consuming and tiring for library staff, and we had an unsatisfied feeling that many students finished the session without being confident about how to use the catalogue and find items on the shelves.

Not long afterward, the then Faculty of Medicine's Learning Technology Section created EEMeC and called for course-work contributions. Having seen other basic information skills taught online (such as Netskills<sup>3</sup>), we saw an opportunity. However, still wanted the students to know that library staff are approachable human beings, so we did not want to lose all face-to-face contact.

In the second year, we expanded the learning outcomes of the Hunt to include being able to find electronic materials like e-journals and electronic reserve items, as well as the traditional printed materials. We also wanted students to be aware of the various library locations that would serve their subject needs, and of the fact that multiple copies of an item are often available for various loan periods at different locations.

The format we settled on, and have used three times now, combines three elements: an introductory lecture-format demonstration to the whole cohort, a printed course handbook that complements and backs up the online tutorials (it also contains details such as how to interpret and make references in the Vancouver Style), and the assignment to complete the online quiz. The introductory demonstration takes about 25 minutes, and follows a short lecture by the course leader for evidence-based medicine. The lecture on evidence-based medicine provides a context for the information skills training, but we are also careful to mention coursework like essays and case-based reports that the students will undertake in the coming weeks as an incentive to do the Library Hunt. The online tutorial contains all of the material in the demonstration including screen shots, and leads to a 10-question multiple-choice quiz.

## Library Hunt Tutorial

### (iv) Catalogue: Simple Search

By default, a Simple Search for title comes up, but you can use the Find In menu to change the record field to be searched.

The screenshot shows the 'Catalogue' interface for the Edinburgh University Library. The 'Database Name' is 'Edinburgh University Library'. The 'Simple Search' tab is active. The 'Find' field contains the text 'Macleods clinical examination'. The 'Quick Limit (Optional)' dropdown is set to 'None'. The 'Find In' dropdown menu is open, showing a list of search criteria: 'Title (Omit \*The\* & other leading articles)', 'Author Browse', 'Subject Browse', 'Shelfmark', 'Journal Title (Omit \*The\* etc.)', and 'Keyword Search with Relevance'. Below the search fields are buttons for 'Search', 'Reset', and 'Set Limits'. At the bottom, there are 'SEARCH TIPS' for 'Title Searches' and 'Browse Searches'.

Search tips for each type of search are toward the bottom the page - do scroll down to have a look when you use the catalogue yourself.

We've typed in the title already, so now we just click on the Search button.

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[Library Hunt Quiz](#)

Figure 1. One page from the Library Hunt tutorial, showing a title search in the online catalogue

This sample page (figure 1) from the Library Hunt tutorial gives an impression of the structure: the navigation menu on the right shows all of the sections in the tutorial, and allows skipping back and forth to relevant areas; it is also possible to navigate sequentially step to step by following the 'previous' and 'next' links at the base. We have tried to have as little text as possible – just enough to carry over essential points.

The quiz is perhaps the only truly interactive portion of the tutorial. Figure 2 shows one question with three possible answers. We have deliberately selected an incorrect answer to illustrate how the feedback mechanism works in the case of an incorrect selection. As you can see the question is asking the student to identify the type of reference shown.

**Library Hunt**

**Question 1**

Newton E. This bed my centre. In: Black N, editor. Health and disease: a reader. Milton Keynes: Open University Press; 1984. p.280-1

What type of material is cited here?

a: An article from a journal.

b: A chapter from a book.

c: A whole book.

Submit

To do this exercise, you will need to use the

[Library Catalogue](#), [Library Online](#), and [SALSER](#).

By clicking on each of those names in the previous sentence, a new browser window will open, allowing you to switch back and

Figure 2. The first question in the quiz, showing an answer that has been selected (intentionally incorrect!)

When the submit button is clicked, feedback lets the student know how they did (figure 3). In this case, they are told how they can tell the reference is not in fact to a journal article. They are not actually told at this point what the correct answer is, but they are made to try again – they cannot proceed to the next question until the correct answer is selected. When the correct answer is selected, they are also given feedback, reinforcing why the answer is the correct one – this to try and reach students who have just guessed.

**Library Hunt**

**Question 1**

Newton E. This bed my centre. In: Black N, editor. Health and disease: a reader. Milton Keynes: Open University Press; 1984. p.280-1

What type of material is cited here?

a: An article from a journal.

b: A chapter from a book.

c: A whole book.

Submit

You selected: a. An article from a journal. This is not a reference to a journal article. You can identify a journal article reference because it should have volume and (usually) issue numbers as well as year and page numbers. Also, journal article references **don't** have the place of publication or publisher. [Try again](#)

To do this exercise you will need to use the

[Library Catalogue](#), [Library Online](#), and [SALSER](#).

By clicking on each of those names in the previous sentence, a new browser window will open, allowing you to switch back and forth between this assignment and the other web pages. To switch between browser windows

Figure 3. The feedback given for the answer selection shown in figure two.

For other questions, the correct answers are found by using the online catalogue or library web pages – these can be linked to from the quiz, and a new browser window opens to allow the students to move between the quiz and the research tools.

The students are given a deadline of two weeks to complete the quiz, which eases the pressure on access to computers (though we have in fact many more computers available now). Students can revisit the

presentation while they are doing the quiz if they wish to review any point. The quiz ends with an invitation to send questions or comments.

| Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Comments                                                                                                                                                                                                                                                                       |
|----|----|----|----|----|----|----|----|----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| b  | c  | a  | a  | b  | a  | c  | a  | a  |     | Psychiatry Library<br>I have no real comments, except that the library hunt was well layed out and easy to follow. I do wonder however how you know who I am as I have not been asked to give identity before I submit this. Perhaps it will tell me more when I click submit! |
| b  | b  | a  | a  | c  | a  | a  | a  | a  |     | Easter Bush Vetinary Centre Library                                                                                                                                                                                                                                            |
| b  | b  | a  | a  | c  | a  | a  | a  | b  |     | Vetinary Library                                                                                                                                                                                                                                                               |
| b  | b  | a  | a  | b  | c  | a  | a  | a  |     | Edinburgh City Library                                                                                                                                                                                                                                                         |
| b  | a  | a  | a  | b  | a  | a  | a  | c  |     | Psychiatry Library Department of Psychiatry<br>I still have difficulty with journal finding but otherwise the library hunt was useful                                                                                                                                          |
| a  | b  | b  | a  | a  | a  | a  | a  | c  |     | moray house library                                                                                                                                                                                                                                                            |
| b  | b  | a  | b  | b  | a  | a  | a  | c  |     | Psychiatry Library<br>I found how to find the Brit J Gen Pract difficult since the journal catalogue didn't recognise this journal. How do i find this journal?                                                                                                                |
| b  | b  | a  | a  | b  | a  | a  | b  | a  |     | veterinary library                                                                                                                                                                                                                                                             |

Figure 4. Library Hunt quiz results

The first answer for each question and the feedback are collected into a table (figure 4) showing in columns the name and matriculation number for each student (not shown here), the answer they gave for each question, and any comments they submitted. The letters in the answer columns show which of the multiple choices was selected, with green showing correct and red showing incorrect answers. You can see that in this snapshot of the table, only one person got question 6 correct, and that question nine caused some problems, too. The students' marks on these quizzes do not go toward their degree mark.

The table allows us to view answer selections and further questions and comments in a very convenient way for analysis. Firstly, we are able to respond to questions easily (using email) and we have found that in general, questions are about the same few issues – so we can re-use our answers. Secondly, we can see trends in answers for questions simply by scanning the list. This allows us to see quite easily which questions were regularly answered incorrectly, and which incorrect options were chosen. We have used this information to adjust either the tutorial or the question itself, when it has become apparent that the question is badly worded. Other comments from the students, on the tutorials themselves, we also use for revision – for example, comments on the first version of the quiz following the literature searching tutorial pointed out that, unlike the Library Hunt quiz, the questions were solely derived from the text of the tutorial: none of them actually required the students to use the resources described to find the answers. For active learning, the latter is obviously much more effective, so some of the questions this coming year will be changed.

We do not have statistical evidence, but we have observed a dropping off of questions at the service desks that can be answered by a simple search in the catalogue, and for a couple of years now we have noticed that the more senior students who are part of the old curriculum have less of a tendency to use the catalogue in comparison to younger students in the new curriculum.

### Learning outcomes and skills 'schedule'

The outcomes are based on what we have proposed are the minimum skills required by students to use successfully the library resources (see Appendix 2). The outcomes are the tasks we want the students to be able to perform, and the skills are the more specific break-down of the outcomes into components. We have split the outcomes and skills into grades from basic to advanced so that we could plan the overall outline of tutorials more coherently. We found this grading subjective and found we could easily argue ourselves into various permutations. This is a compromise, but nevertheless it is very handy, and helps teaching committees to understand exactly what the library sessions are about.

### **Expectations fulfilled and surprises**

Our expectations of how the tutorials could improve our sessions were mostly based on how they solved logistical problems, as illustrated in the example of the Library Hunt, but we have also found several unexpected results as we have developed the training.

A fulfilled expectation was that the online tutorials have allowed us to cope more easily with the annual increase in class size – the university is being encouraged to take in larger and larger cohorts.

One major expectation, when looking at adapting the tutorials for the Veterinary Medicine students, was that much of the material could be directly copied transferred to the EEVeC VLE. After some discussions, however, we realised that the emphasis placed on evidence-based practice in the medical curriculum demanded more complex search techniques, partly to do with the large size of the Medline database, and partly to do with the detective work required by the case-based learning projects. Nevertheless, taking the Medline modules as an example, the same elements are used in both training outlines, but just at different points– so we are still able to avoid some duplication of effort.

I had also expected that the introduction to literature searching tutorial could, in the same way as the Library Hunt, become largely a task done in the medical students' own time. However, it was felt by the Medical Teaching Organisation that the time-tabled sessions in the large teaching computer lab were important to make sure the first year students attached importance to the task. We are, however, able to use fewer tutors to answer questions during the labs than previously.

The initial investment in time creating the material for tutorials and quizzes was greater than anticipated, but we see it as worthwhile, given the greater ease of training delivery and the fact that the students can revisit the tutorials whenever they want. This time-of-need support made more easily sustainable by the online tutorials was expected, but we had not anticipated a logical extension – we are now able to say to a student who is asking for basic literature searching help, 'Have you reviewed the tutorial? If not, review it, and if you are still uncertain, let's make an appointment to go over your specific questions.' Also, transfer students, who join the curriculum in year 3 are able, if necessary, to bring their information skills to the level of their colleagues'.

An unpleasant surprise has been the frequency with which we have had to update the images of the various search interfaces. It always seems that just as we have finished the annual revision of the tutorials, a new version of OVID becomes in use. We use remote hosts for many of our resources, so we do not have much control over when upgrades take place.

### **Current work and plans for the future**

One problem with the information skills tutorials being within EEMeC/EEVeC is that they are only available to students in those schools. Discussions were held with other University of Edinburgh Library colleagues on how the EEMeC tutorials could be adapted to generic or other discipline-oriented tutorials. A consensus was reached that only the basic skills levels could usefully be served by generic tutorials. Intermediate skills need to be discipline-oriented, because different disciplines can require widely differing resources and techniques. For advanced searches, it was thought that online tutorials are most likely not helpful – it is probably more efficient for the researcher to have a reference interview with an information professional who can discuss specific requirements and advise on the most appropriate combination of search tools and techniques, and assist in refining the search strategy if required.

Now that the technical expertise to create online tutorials is available within the Library there is work underway to adapt these tutorials to more generic use, as well as to adapt the more discipline-specific elements to other disciplines. These newer tutorials will be on the Library web pages, or available as modules to insert into other disciplines' VLEs. Also, the current work for the generic tutorials has used flash animation, so that users can click a button saying 'show me' if they want to see actions demonstrated, rather than just static images.

## **Acknowledgements**

We are immensely indebted to the Learning Technology Section<sup>2</sup>, particularly Rachel Ellaway, for the work to make the tutorials have the format they have. The tutorials would not be so effective if information skills training were not given the support they are by the curriculum designers, in particular the Medical Teaching Organisation, the EBM theme coordinators Drs Harry Campbell and Andrew McIntosh, and Dr Graham Pettigrew in the School of Veterinary Medicine.

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<sup>1</sup> CASPfew filters are available at <http://www.phru.org.uk/~casp/casfew/few/filters/index.htm>

<sup>2</sup> EEMeC is access controlled, but information is available at <http://www.eemec.med.ed.ac.uk/about/index.htm>

<sup>3</sup> Netskills internet training for higher education: <http://www.netskills.ac.uk/>

## Appendix 1: Outline of tutorials

| EEMec                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | EEVeC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <p><b>Library Hunt</b></p> <p><b>Basic literature searching</b></p> <p><b>Introduction to bibliographic databases</b></p> <ul style="list-style-type: none"> <li>• What are bibliographic databases?</li> <li>• Why use a database?</li> <li>• Beware!</li> <li>• How do you use a database?</li> <li>• Which database should you use?</li> <li>• BIOMED-Medline</li> <li>• The Cochrane Library</li> <li>• Embase</li> <li>• Web of Science</li> <li>• Self Assess</li> </ul> <p><b>Starting with a research question</b></p> <p><b>Combining with Boolean operators</b></p> <p><b>Cochrane Library Basics</b></p> <ul style="list-style-type: none"> <li>• Introduction to the Cochrane Library</li> <li>• Keyword search sample</li> </ul> <p><b>Medline introduction</b></p> <ul style="list-style-type: none"> <li>• Subject Heading searches</li> <li>• The Mapping Display</li> <li>• Subheading Display</li> <li>• Building the search history</li> <li>• Combining search sets</li> <li>• Using Limits</li> <li>• Looking at records</li> <li>• Downloading results</li> <li>• Quiz</li> </ul> <p><b>Beyond the basics of literature searching</b></p> <p><b>Medline – Ovid interface</b></p> <ul style="list-style-type: none"> <li>• The difference between Subject Heading and keyword searching</li> <li>• Keyword searches</li> <li>• Finding the best Subject Heading (Tree Display, Exploding, Scope Notes)</li> <li>• When to avoid Subheadings</li> <li>• Using ‘auto-alerts’</li> </ul> <p><b>Other databases</b></p> <ul style="list-style-type: none"> <li>• <i>When to use Web of Science</i></li> <li>• <i>When to use Embase</i></li> <li>• <i>When to use BIOSIS</i></li> <li>• <i>When to use PsycINFO (eeMec only)</i></li> </ul> <p><b>Wider internet</b></p> <ul style="list-style-type: none"> <li>• <i>Search engines versus Subject Gateways</i></li> <li>• <i>How to assess a website for quality of information</i></li> </ul> <p><b>More advanced literature searching techniques</b></p> <ul style="list-style-type: none"> <li>• <i>Structuring a search</i></li> <li>• <i>Why and how to use a search filter</i></li> <li>• <i>Web of Science – citation tracking</i></li> </ul> | <p><b>Library Hunt</b></p> <p><b>Basic literature searching</b></p> <p><b>Introduction to bibliographic databases</b></p> <ul style="list-style-type: none"> <li>• What are bibliographic databases?</li> <li>• Why use a database?</li> <li>• Beware!</li> <li>• How do you use a database?</li> <li>• Which database should you use?</li> <li>• <i>CAB</i></li> <li>• BIOMED-Medline</li> <li>• Web of Science</li> <li>• Self Assess</li> </ul> <p><b>Starting with a research question</b></p> <p><b>Combining with Boolean operators</b></p> <p><b>CAB introduction</b></p> <ul style="list-style-type: none"> <li>• <i>Logging on</i></li> <li>• <i>Keyword searches</i></li> <li>• <i>Building the search history</i></li> <li>• <i>Combining search sets</i></li> <li>• <i>Using Limits</i></li> <li>• <i>Looking at records</i></li> <li>• <i>Downloading results</i></li> <li>• <i>Quiz</i></li> </ul> <p><b>Beyond the basics of literature searching</b></p> <p><b>Medline introduction</b></p> <ul style="list-style-type: none"> <li>• Subject Heading searches</li> <li>• The Mapping Display</li> <li>• The difference between Subject Heading and keyword searching</li> <li>• Finding the best Subject Heading (Tree Display, Exploding, Scope Notes)</li> <li>• Subheading Display</li> <li>• When to avoid Subheadings</li> <li>• Building the search history</li> <li>• Combining search sets</li> <li>• Using Limits</li> <li>• Looking at records</li> <li>• Downloading results</li> <li>• Using ‘auto-alerts’</li> </ul> <p><b>Other databases</b></p> <ul style="list-style-type: none"> <li>• <i>When to use Web of Science</i></li> <li>• <i>When to use Embase</i></li> <li>• <i>When to use BIOSIS</i></li> </ul> <p><b>Wider internet</b></p> <ul style="list-style-type: none"> <li>• <i>Search engines versus Subject Gateways</i></li> <li>• <i>How to assess a website for quality of information</i></li> </ul> <p><b>More advanced literature searching techniques</b></p> <ul style="list-style-type: none"> <li>• <i>Structuring a search</i></li> <li>• <i>Why and how to use a search filter</i></li> <li>• <i>Web of Science – citation tracking</i></li> </ul> |

*Italics denote sections still in development.*



## Appendix 2: Learning outcomes and skills schedule

### Competencies

#### Basic

- be able to identify the type of material cited in a reference
- be able use the Library Catalogue and/or Library Online to find the locations of reading list items know what to expect from a bibliographic database
- know when it is appropriate to use a textbook or the literature in periodicals
- know when to use the Cochrane Library
- know when to use Medline
- be able to carry out a simple Medline search know about various databases other than Medline

#### Intermediate

- know what to look for to determine the quality of resource (e.g. currency, bias, conflict of interest, etc.)
- know how and when to use key databases other than Medline / CAB (e.g. WoS, Embase, PsycINFO, BIOSIS)
- know where to find high quality life-sciences information on the wider Internet

#### Advanced

- know what research type is appropriate for specific clinical queries (e.g. RCTs for therapeutic intervention)
- be able to create a structured search from a clinical situation (involves recognising a need for information)
- know the basic steps required to perform a systematic literature search

### Specific skills leading to competencies

#### Basic

- know what Boolean operators are and how to use them
- be able to choose search terms from a research question
- know where to find databases and information about them
- know how to build a search history
- know how to use limits (largely Ovid Medline?)
- know how to do a Subject Heading search (EEMeC)
- know how to do a free-text search
- know how to truncate words or use wildcards
- know how to save search histories (Ovid)
- know how to output search results

#### Intermediate

- know how to do a Subject Heading search (EEVeC)
- know when to use thesaurus terms versus free-text
- know to use Scope Notes to find most appropriate Subject Heading
- know how and when to 'explode' (Ovid interface specific?)
- know when to 'Focus' Subject Headings (Ovid specific)
- know when to use or avoid Subheadings (Ovid specific)
- know how to set up 'auto-alerts'

#### Intermediate/Advanced

- be able to make a focussed research question
- know how to use search filters (e.g. methodology filters)
- know how to do a cited reference search (WoS)
- know how and when to use Internet search engines and subject-specific gateways (e.g. BIOME , Google)