# Systematic reviews and the consequences – the implementation of a research supporting course program in medicine at the University and State Library Saxony-Anhalt: a case report

## Systematic Reviews und die Folgen – der Aufbau eines forschungsunterstützenden Kursprogramms für die Medizin an der Universitäts- und Landesbibliothek Sachsen-Anhalt: ein Case Report

## Abstract

In 2021, the University and State Library Saxony-Anhalt, Halle (Saale), launched a course on systematic reviews in medicine. Since then, this course has been repeatedly offered, and led to the organization of other courses concerning literature search in medicine, including seminars within the curriculum of medical studies in Halle. The systematic review course became the nucleus of the library's training activities in supporting research in medicine. It bundled up the library's efforts in teaching skills in literature searching in medicine and culminated in a modular, at the same time open course program addressing patrons in different stages of their scientific career.

**Keywords:** systematic review, literature search, literature searching, curriculum of medical studies in Germany, scientific/bibliographic database, library courses

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## Zusammenfassung

Im Jahr 2021 startete die Universitäts- und Landesbibliothek Sachsen-Anhalt, Halle (Saale), einen Kurs zu Systematic Reviews in der Medizin. Seitdem wurde diese Veranstaltung mehrfach angeboten und zog die Organisation weiterer Kurse zur Recherche in der Medizin nach sich, darunter Veranstaltungen, die in das Curriculum des Medizinstudiums in Halle integriert wurden. Der Kurs entwickelte sich zum Nukleus der in Hinsicht auf die Medizin lancierten forschungsnahen Dienste. Er sorgte dafür, dass die Bestrebungen der Bibliothek zur Vermittlung von Kompetenzen im Bereich Literaturrecherche gebündelt wurden und in einem modular aufgebauten, zugleich offenen Kursprogramm gipfelten, mit dem Interessierte auf unterschiedlichen Stufen ihrer wissenschaftlichen Karriere angesprochen werden.

**Schlüsselwörter:** Systematic Review, Literaturrecherche, Literatursuche, medizinisches Curriculum in Deutschland, wissenschaftliche/ bibliographische Datenbank, Bibliothekskurse

# Background

Supporting research activities is the core task university and scientific libraries face. University and scientific libraries address the patrons' needs, among others, by offering training and consultancy in terms of (systematic) reviews and searching ([1], p. 7). In medicine, conducting complex (systematic) reviews has become a pillar of research activities with an ever increasing attention on it [2]. Systematic literature search and critical appraisal of the results is an integral part of evidence-based research and practice [3].

Systematic reviews ought to be considered by libraries as an important field. In this case report, we describe (the consequences of) a course on systematic reviews we launched at Martin Luther University Halle-Wittenberg in 2021. The first course led to a broad spectrum of training activities that support medical research in Halle in general by focusing on literature search.

As an area of interest, systematic reviews already seem to play a certain role in (research) libraries in Germany [4]. However, case reports or debates on this topic from a local perspective are scarce, compared to the widespread professional discourse in other regions of the world [5]. With the insight into our work, we therefore intend to fill this gap and to participate in the professional discourse by formulating impulses for other librarians involved in (the planning of) courses to support research in medicine.

# Case presentation

## The beginning: systematic reviews – an introduction

In 2021, we launched a course on systematic reviews in medicine, inviting scientific faculty staff as well as students at Martin Luther University Halle-Wittenberg interested in it. Our goal was to give an overview about systematic reviews. The initiative evolved from requests that had reached the library in terms of possible consulting and support in conducting systematic reviews. We decided to prepare a course as the basis and as a point of reference we could build on as well as canalize and assemble enquiries.

The first aspect we covered was the definition of systematic reviews (in demarcation to other forms of reviews), followed by information in terms of pre-searches and pre-registration (protocol). We then introduced the participants to the identification of suitable databases, and, as one of the major standards in systematic reviews, to the PICO scheme. The core of our efforts was the review process itself, including – among others – the development and the evaluation of a suitable search syntax, and the observance of documentation standards such as the PRISMA standard [6], [7].

We integrated an exercise part into the course: Participants were asked to discuss appropriate terms to be included into a search syntax. In this respect, we developed an exemplary research question. This example, as well as the other examples we integrated into the course for the sake of illustration, was taken from a medical context – to enhance the motivation of the participants.

To sum it up, the course was focused on search strategies and on basics such as Boolean operators and documentation (Table 1). Different from another similar initiative in Germany [5], we excluded statistical questions (meta-analyses) from the course. The overall well-disposed resonance encouraged us to steady our efforts and to implement the course as a recurring offer in the general training program of the library.

## Systematic literature search

We realized that some participants of the initial systematic reviews course were interested in advanced strategies in searching literature in general, but not specifically in systematic reviews as the most elaborative form of reviewing, or – as O'Dwyer and Wafford state – as "top-level evidence" [8]. Nonetheless, we decided to hold on to our course on systematic reviews seeing the importance to convey the high standards systematic reviews are characterized by. From the background of a widely observed lack of adherence to those standards [8], this seems to be a sensible measure to ensure a certain skill level. In the next round of our systematic reviews course, we reacted on the feedback we received by emphasizing the specificity and the high standards of systematic reviews. However, we decided to launch a course on systematic literature search to meet the expectations some of the patrons articulated.

This course, implemented in 2022, circles around databases in medicine, search strategies, as well as around different helpful tools and platforms such as the *RefHunter* portal (https://refhunter.org/). We talked about the PICO scheme and Boolean operators while not covering aspects like pre-registration and documentation (in detail). The course was intended to enable participants to structure and conduct elaborated literature searches (Table 1). It was widely accepted and therefore offered another time.

## Introduction to systematic literature search – part of the curriculum

The course on systematic reviews we launched did not only lead to a more broadly designed literature search course but also, upon request from the medical faculty, to an integration of certain content into the curriculum of medical studies taught in Halle. Acquiring skills in literature searching and critical appraisal of studies have not been deeply anchored in the curricula of medical studies in Germany, yet, even if so-called *Modellstudiengänge* (revised curricula) exist placing weight on it. Medical

**Table 1: Overview of the courses**

| Course | Length of each course (in minutes) | Number of participants (sum) | Number of participants (average per each course, rounded up) | Frequency/ amount of courses | Topics covered | Challenges |
|---|---|---|---|---|---|---|
| Systematic reviews – an introduction | 120 | 99 | 20 | 5 | definition and pillars of systematic review, pre-search/first steps, data-bases, PICO, structure of searchings, search process (Boolean operators, truncation, key words), documentation/ reporting (PRISMA) | different expectations/definitions concerning systematic reviews, questions in terms of meta-analyses and critical appraisal of studies, how to consider specific projects of the participants properly |
| Systematic literature search | 120 | 31 | 16 | 2 | overview of databases (selection of suitable databases), basics of systematic literature search (PICO, Boolean operators, wildcards), reference management software, search strategies in general, accessing papers/articles (print and online) | how to integrate suitable activating sessions/parts |
| Introduction to systematic literature search (Q1) | 90 | 260 | 22 | 12 | systematic literature search vs. random literature search, overview of databases in medicine, PICO, MEDLINE via PubMed® | tasks/exercises too specific/too rich in prerequisites, too much input, partly rudimentary interest in evidence-based medicine/scientific approaches among the audience underestimated |
| Databases and scientific journals in medicine | 120 | 10 | 10 | 1 | databases in medicine, introduction to basic features of (bibliographic) data-bases, Boolean operators, truncation, wildcards, presentation of the databases MEDLINE via PubMed®, Web of Science™, and Cochrane Library, journals in medicine, metrics, accessing journals (print and online) | how to improve the integration of suitable activating sessions/parts |
| Workshop for doctoral candidates | 120 | 43 | 43 | 1 | role of literature search in terms of doctoral theses in medicine, PICO, IMRAD, overview of search strategies, three stations (exercises) | more instructors needed, introductory part probably too short and demanding/ too rich in prerequisites |

studies in Germany are subject to wider reform plans in this direction [9]. In Halle, medical studies are committed to the traditional approach. Basic elements of the initial course found entrance in the so-called Q1 module, which is an integral and mandatory part of the fifth study semester. After having absolved the so-called *Physikum*, i.e. the theoretical part of the studies, students of the fifth study semester go on to the clinical and practical part of their studies in medicine. The Q1 module is centered at epidemiology, medical biometrics and medical informatics (Querschnittsbereich 1: Epidemiologie, medizinische Biometrie und medizinische Informatik) [10].

In 2022, we started with our course on literature search in medicine becoming part of the team teaching the Q1 module. After consultations with the person in charge for the module, we prepared a training unit for each of the twelve student groups. Topics we covered were: (bibliographic) databases in medicine, PICO scheme (formulating research questions in a structured way), using a scientific database (MEDLINE via PubMed®) to search for literature, including, at least in some of the units, exercises on the latter (Table 1).

The feedback we received encourages us to reduce the content in favor of more exercises in searching. We noticed that topics like evidence-based medicine as well as research and scientific methods in general have not been in the focus of students of the fifth semester, so we need to better take this into consideration in the future. Accordingly, our course in the previous form may have been too rich in prerequisites. In future courses, we plan to analyze an exemplary study/paper in terms of research processes that are involved so that the students will have a *smoother* introduction into the topic than with the short talk given by us as the teaching team.

Two questions we formulated were integrated into the final test of the module underlining the significance of the course. The course format will be continued in the winter term 2023/2024.

## Databases and scientific journals in medicine

Our courses on systematic reviews and systematic literature search deal with the basics and the structure of literature searching in medicine. In another course, we focused on accessing databases and scientific journals to deepen aspects of the initial courses and to cover aspects which would have overloaded the two other formats.

In the database and journal course, we skipped the topic of systematic literature search as well as the PICO scheme section. We had instead a closer look on some relevant databases (especially MEDLINE via PubMed®, Web of Science™, and Cochrane Library), including exercises on these databases to activate the participants. We also talked about metrics concerning journals, open access journals, and ways to identify and access content (Table 1).

So, in this course we focused on working with scientific/bibliographic databases and journals and identifying studies that suit the research question. The number of participants and the feedback we received encouraged us to steady this course format, too.

## Workshop for doctoral candidates

In Germany, starting to write a doctoral thesis in medicine is often part of the studies itself, meaning that a lot of advanced students in medicine are active in this area. Making students acquainted with researching and reviewing techniques within the fifth semester, as done with our course, is in our view a good step to improve the students' skills not at least concerning their possible future scientific efforts. However, we estimated that student doctoral candidates in medicine need a separate basic training concerning methods in searching literature. This led us to offer a workshop based on our course on systematic literature search.

We gave an introduction into some pillars of systematic literature search, the PICO scheme and then talked about the IMRAD (Introduction, Methods, Results, and Discussion) scheme taking the relevance of writing/production skills into consideration. The introductory part of the course was very short, since the focus of this workshop was on exercise tasks given to the participants. The workshop was based on material we created: We generated three templates participants were asked to fill in. The first template requested the participants to work with MEDLINE via PubMed® concerning the specific topics of their theses. The second contained a blank PICO scheme, students ought to complete by developing suitable search terms and tags, whereas the last template was a blank IMRAD scheme, added with a column on the searches that have to be done concerning each point of the scheme. Students were asked to fill in the gaps according to their own research question (Table 1).

This course came out to be the most successful in our general teaching program in terms of the number of participants (the general teaching program does not include library introductions with even more participants) and we are planning to offer it again. Emphasizing practical aspects and using worksheets has proved to be a vivid format. Thus, we noticed that the workshop format requires a higher number of instructors. Furthermore, giving more detailed input might help participants in getting an overview first. As a quite spontaneous reaction, the course was therefore supplemented by a talk about covering these topics (helpful tools and approaches in literature searching) some weeks later.

# Discussion

The course about systematic reviews has become the basis of our activities in supporting literature search in medicine. Focusing on training rather than on consultation allows us to react openly to enquiries in a general perspective, and it led to a reliable, fixed service level addressing patrons in different stages of their scientific education and career (Figure 1).
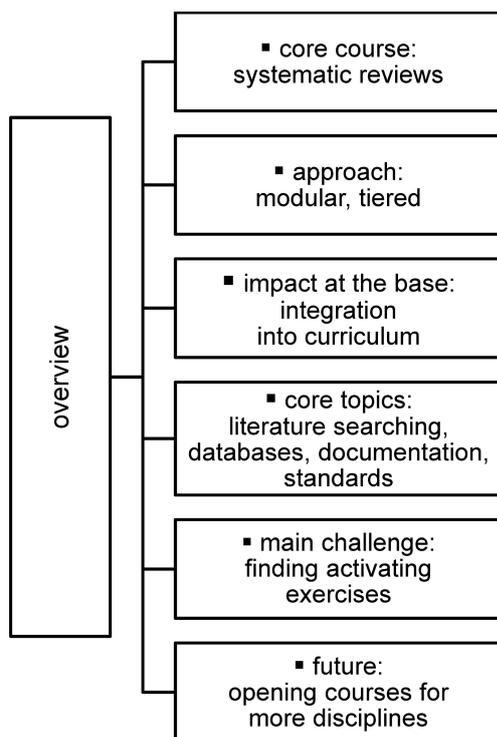


**Figure 1: Conceptual overview**

At the same time, it limits us (as well as our patrons) because it does not necessarily address specific research projects at first side. In comparison to other initiatives [2], [5], [8], we are not involved in or assisting in the reviewing process of several projects, but supporting the scientific efforts on a more general level. A compromise might be – as another step – to provide structured and formalized material for our patrons, material which can be applied to a wide range of research questions. The templates we created for the workshop for doctoral candidates proved to be a simple, albeit helpful tool for the participants as well as for us as the instructors, so it would make sense to create such material in terms of the other courses we are offering, too.

In Table 1, we give a detailed evaluation of the courses. As the overview shows, the outline of some courses was too overloaded, and therefore the parts in which participants just listened to us were probably too long. Structuring the course program in a modular way helps to address these challenges as it allows to outsource content to other courses. Another finding is that exercise sessions should be extended throughout all of the courses to focus on training skills rather than teaching knowledge.

The diversification of the courses reflects our experiences. We adjusted the program continuously to the patrons' needs. Still, interesting parts we still would like to integrate into the course are, among others: The possible role of AI (Artificial Intelligence) tools in supporting certain steps of the reviewing process, and questions of meta-analyses which we have excluded until now from our course on systematic reviews. Furthermore, we are seeking to be more open when it comes to other disciplines than medicine. By taking the *open* PICO scheme [11] into consideration and by covering examples from other disciplines than medicine, we took the first steps into this direction in our systematic literature search course.

The course program evolved from an initiative of the two authors (subject librarians) of this case report. In developing and extending the activities, we especially benefitted from the constant feedback that we received by the participants and colleagues. With regard to the modularization of the course program and its strategic anchoring, which was particularly pushed and structured by us, building up a team that goes beyond the two of us, and training our colleagues in this field might lead to the distribution of the workload over more people and therefore to a more decentralized structure.

Our case report shows that launching a high-level course can become the starting point of a net of courses linked to it and continuously referring back to it. Further courses benefit from a strong basis. Libraries seeking to foster research activities in medicine might check our (modular) approach defining systematic reviews as the core point as well as the challenges we stated (Figure 1) – above all the implementation of suitable exercises and activating parts.

# Notes

## Competing interests

The authors declare that they have no competing interests.

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