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Published in:
Education for Information

DOI:
10.3233/EFI-200448

Published: 01/09/2021

Document Version
Final published version

Education for Information 37 (2021) 287–313
DOI 10.3233/EFI-200448
IOS Press

Information-seeking behaviours of teacher students: A systematic review of qualitative methods literature

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Teachers are the key to an inclusive and quality education for all. Therefore, training teachers and teacher students and understanding how they learn, including information-seeking behaviours, is crucial. This systematic literature review explores the observed research gap regarding teacher students' affective information-seeking behaviours. Of specific interest is the research practice context. Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guided the review process. Searches were conducted in three key research databases and resulted in 1006 references. Abstracts and titles were screened and assessed using Rayyan software. After screening, 56 publications were chosen for the qualitative synthesis; 17 used qualitative methods and were thereby of interest for the review. The high number of publications resulted in a need to divide the review into two studies. The first part focused on quantitative and mixed methods studies. The results were then analysed through thematic analysis. The results revealed a research gap regarding qualitative methods studies of non-normative and qualitative features of teacher students' information-seeking behaviours, especially affective behaviours and in research practices. This is the first systematic review of teacher students' information-seeking behaviours using thematic analysis. Thus, a valuable contribution to information-seeking behaviour and information literacy research has been provided.

Keywords: Information-seeking behaviour, information-searching behaviour, information literacy, teacher students, teacher education, systematic literature review, thematic analysis

1. Introduction

1.1. Background and rationale

The United Nations Educational, Scientific and Cultural Organisation (UNESCO) (2015) and its member states recognise teachers as the key to achieving Sustainable Development Goal 4 of the 2030 Agenda: "Ensure inclusive and equitable quality education and promote lifelong opportunities for all". In this world's most ambitious agenda for sustainable development, teachers are acknowledged as fundamental for guaranteeing quality education. To accomplish that, the training of teachers and teacher students is considered crucial. Studying how teacher students learn and the behaviours related to and affecting the learning process appear in this light as important. This also applies to learning about information seeking. Knowledge of

information seeking and other information literacies and behaviours that affect the process is essential for contributing to a high-quality teacher education.

Unlike other university students, teacher students not only study and learn different subjects; they also study some subjects they are going to teach as future teachers as well as the didactics of the subjects. This double perspective is also valid regarding information seeking and other information literacies, that is, a person's ability to identify the need for, seek, critically evaluate, and use information for solving problems in different contexts (e.g. Limberg et al., 2012). The importance of teaching pupils information literacy is manifested in UNESCO's Media and Information Literacy Curriculum for Teachers (2014). Here, information literacy is considered as crucial knowledge in an increasingly complex information landscape characterised by alternative facts and truths, and information literacy learning outcomes are outlined. Teachers worldwide are responsible for implementing the curriculum and educating future citizens in accordance with these learning outcomes. Given this double perspective, learning information literacy appears to be especially interesting and complex regarding teacher students, even though the didactic future teaching information-seeking content is different than the characteristics of information seeking needed for successful academic studies and professional practice based on research and evidence.

In recent years, the teaching profession has been strongly influenced by the Evidence-Based Practice (EBP) movement, which originated in the field of medicine. The notion that empirical evidence should guide teaching practice is not new; however, the strong impact of the EBP movement and other related trends, such as large-scale international comparative studies like the Programme for International Student Assessment (PISA) is new. Also new is the emergence of organisations such as the What Works Clearinghouse (WWC) that collect, review, synthesise, and report on empirical educational intervention studies. Information seeking plays a vital role in EBP since finding the best available evidence is a cornerstone in all EBP models and processes (Emmons et al., 2009; Kvernbekk, 2017; van Ingen, 2013).

In view of the importance of preparing future highly qualified teachers, endowed with the necessary literacies, including information seeking, this review will explore the empirical evidence on teacher student behaviours in relation to information seeking: their information-seeking behaviours. Thus, researchers and practitioners are provided with a useful research overview as well as ideas and direction for further exploration. The review is specifically exploring affective information-seeking behaviours, based on the assumtion that affective phenomena, such as feelings and emotions, play a crucial role for students' learning of information literacies. In addition, the research practice context is particulary of interest, motivated by that knowledge about learning processes in research practices is vital, not only for teacher students' successful academic studies but also for future evidence-based practices.

Before addressing the aim and research questions guiding the review, key concepts are presented. These helped define and contextualise the behaviours and informed the search strategy of relevant search terms to use. In addition, the concepts guided the thematic analysis where codes and themes were deducted from the definitions and

context and provided the lens through which the results of the thematic analysis were finally discussed and explained. The systematic review process is then described. The final step, the results of the qualitative synthesis, describes the process of identifying themes across the publications and presents the publications in each theme with the help of thematic analysis. Finally, the results are discussed, and conclusive potential contributions and implications for researchers and practitioners are suggested together with limitations.

This is the second part of the review. The first (hereafter referred to as Review 1) focused on quantitative and mixed methods studies (Dahlqvist, 2021). In order to provide the proper context and review to work independently without only referring to Review 1, thereby helping the readership of this article, it was considered important to give the introduction and describe the method herein. In addition, the results are discussed and concluded in relation to Review 1, thus providing an overall picture of contemporary research on teacher students' information-seeking behaviours.

1.2. Key concepts

The research areas in LIS where people's behaviours when engaging with information are studied, are vast and complex. This is not the place to provide an exhaustive description of them. Relevant for this review, however, is the aspect where task-based information seeking and the behaviours related to this activity are studied, the information-seeking behaviours. The information-seeking behaviours studied in these areas of research are underpinned by different theoretical perspectives and epistemological traditions and the behaviours of interest have different focus. The key concepts used in this context, and their relations, are presented in this section.

Wilson's (1999) frequently cited nested model divides information-behaviour research into subfields. Information behaviour is the main field within which *information-seeking behaviour* constitutes the field that studies "the variety of methods people employ to discover and gain access to information sources" (p. 263). *Information-searching behaviour* is "a sub-set of information-seeking, particularly concerned with the interactions between information user [. . .] and computer-based information systems" (p. 263).

In another conceptual model or framework of information-behaviour research, Hepworth, Grunewald, and Walton (2014) summarise the epistemological and methodological theoretical approaches. From a Cartesian perspective, research is characterised as either assuming the Cartesian split between mind and body, or not. Three approaches are identified: *positivist* (Cartesian, analytical perspective), *post-positivist* (Cartesian, interpretivist e.g. social constructivist perspective), and *phenomenological* (Cartesian and non-Cartesian holistic perspective). The *positivist/analytical* approach is oriented towards obtaining knowledge of observable and pre-defined information behaviours and producing generalisable results through preferable quantitative data and statistical analysis. From the *post-positivist/interpretivist* approach, researchers

are interested in knowing how people, often in a specific context and through theoretical lenses, construct (e.g. constructivism) their information experiences. Results are achieved by gathering both quantitative and qualitative data. In the *phenomenological/holistic* approach, people's information experiences are not analysed through pre-defined theoretical frameworks. Researchers are more interested in people's information experiences from their perspectives and variations in experiencing phenomena (e.g. phenomenography). Data are exclusively collected through qualitative methods.

From Hepworth, Grunewald, and Walton's (2014) summary of the different epistemological approaches, it is reasonable to assume that information-seeking behaviour studies should include affective factors or behaviours. In affective science, which is the study of emotion or affect, there are several competing theoretical approaches to the affective phenomena, and there is no general definition of the concepts. In an attempt to provide some useful working definitions of the various phenomena, Davidson et al. (2004, xiii) observed that:

- *Emotion* refers to a relatively brief episode of coordinated brain, autonomic, and behavioural changes that facilitate a response to an external or internal event of significance for the organism.
- *Feelings* are the subjective representation of emotions. [...]
- *Mood* typically refers to a diffuse affective state that is often of lower intensity than emotion, but considerably longer in duration. [...]
- *Attitudes* are relatively enduring, affectively coloured beliefs, preferences, and predispositions toward objects or persons.
- *Affective style* refers to relatively stable dispositions that bias an individual toward perceiving and responding to people and objects with a particular emotional quality, emotional dimension, or mood.
- *Temperament* refers to particular affective styles that are apparent early in life, and thus may be determined by genetic factors.

Kuhlthau's (1993; 2004) ground-breaking information search process (ISP) model, first published 1993 and conceptually developed in the second revised edition (2004), is one of the first to provide a *constructivist* view of information seeking and learning. It integrates cognitive and affective factors, or *affective behaviours*, in the learning process. The affective phenomena are considered to have a fundamental impact in the process of constructing meaning from information (that is learning). The construction is unique for the individual and is a totality of experiences where actions, thoughts, and feelings are all part of, interplay, and contribute to the constructive process. Learning occur when new experiences or information are assimilated and accommodated; experiences are reshaping and changing existing constructs into new constructs. It is this process of construction that with different theoretical approaches have been developed by the three constructivist theorists. Kelly's (1963) theory of personal construct underpins the affective factors in Kuhlthau's model (2004, p. 82), which are described in relation to the six stages of the research process (initiation, selection, exploration, formulation, collection, presentation). In the ISP *Feelings* category, these

affective behaviours are uncertainty, optimism, confusion/frustration/doubt, clarity, sense of direction/confidence, and satisfaction or disappointment. In addition, the associated interdependent process steps of *Thoughts* (from vague during initiation and selection to focus during formulation, increased interest from formulation to presentation) and *Actions* (from seeking relevant information, exploring, to seeking pertinent information, documenting) are presented in the model.

Information seeking is also an essential part of *information literacy* research, and a significant body of literature studying students' information-seeking behaviours in relation to learning investigates information literacies (e.g. Lupton, 2008; Limberg et al., 2012). An established definition of information literacy is a person's ability to identify the need for, seek, critically evaluate, and use information for solving problems in different contexts (Limberg et al., 2012). Information literacy research can thus be viewed as focused on the enactment of information-seeking abilities and learning outcomes.

Enactment is a foundational element in Lloyd's (2017, p. 93) conceptual model of the information literacy landscape. Information literacy is enacted through "the modalities of information that reference the knowledge base" and "ways of knowing" in activities and use of "material objects and artefacts". The activities manifest themselves in the visible elements of information literacy and the related information competencies, activities, practices, and skills.

The information literacy landscape model (Lloyd, 2017) can be approached from two different spaces: the conceptual and the practical. In the *conceptual space*, performed by the *researcher*, information literacy researchers study information literacy from a qualitative and social perspective through the lens of socially influenced learning theories such as sociocultural theory and phenomenography. The traditions structuring the information environment and landscape are problematised and described. In the *practical space*, the *practitioner* explores information literacy through a quantitative and instrumental point of view and focuses on the literacies of information and outcomes of learning, for example, the quality of teaching and curriculum and standards development (e.g. Bent & Stubbings, 2011; Association of College and Research Libraries [ACRL], 2000; ACRL, 2016). Research within this space is interested in competencies, practices, attributes, and skills in particular contexts (e.g. schools, higher education) underpinned by learning theories reflecting the normative conditions of information literacy instruction.

The modalities (epistemic/instrumental, social, physical) of a specific information environment (e.g. educational information environment) in Lloyd's (2017) model represent the ways of knowing, unique for the information environment it is part of. Lloyd and other LIS researchers (e.g. Hanell, 2019; *Informationskompetenser: Om lärande i informationspraktiker och informationssökning i lärandepraktiker*, 2009; Limberg et al., 2012) conceptualise and theorise such context-dependent information environments as information practices, underpinned by learning theories like Säljö's (2010) sociocultural perspective, Vygotskij's (2012) social constructivism, and Wenger's (1998) communities of practice. Information-seeking behaviours and

literacies are viewed as enactments situated within context-specific social and information practices defined by the common collective knowledge of their members. This collective knowledge or ways of knowing affect and are affected by the behaviours and enactments of members, and, for example, a student can be part of several information practices. One such practice could be the information practice unique for the context of engaging in research activities and processes (e.g. Kuhlthau's in relation to the ISP model), the *research practice*.

1.3. Aim and research questions

This review aims to give LIS researchers and practitioners a valuable thematic overview of contemporary empirical research on teacher students' information-seeking behaviours. Identifying what research that has been conducted, might inform future studies and practices based on previous research as well as give direction to areas that need further exploration.

In light of the fundamental importance teachers play for guaranteeing quality education for all pupils and future citizens, the training of teachers and teacher students is considered crucial. Studying how teacher students learn and the behaviours related to and affecting the learning process appear therefore essential. This also applies to learning information literacies and information seeking.

One such behaviour is affective behaviours which is of specific interest in the review. Although publications on information-seeking behaviour and information literacy in higher education is vast (Case & Given, 2016), there are few studies studying affective phenomena. Information-seeking behaviour researchers (e.g. Krakowska, 2020; Lopatovska & Arapakis, 2011; Savolainen, 2015a; Savolainen, 2015b; Nahl & Bilal, 2007) have identified this critical gap. Howerver, some research has been conducted recently. In a thematic review from 2020, Krakowska (2020) provide some examples. Of these, a number of studies (e.g. Koh et al., 2019; Behzadi & Sanatjoo, 2019), studied the population of interest in this review, students.

The ambition of this systematic review is to further explore this research gap regarding teacher students. From a constructivist perspective on learning (Bruner, 1986; Kelly, 1963; Kuhlthau, 1993, affective behaviours' role in the process of construction meaning and learn is fundamental in the interplay with actions and cognitive behaviours (thoughts). Actions and affective and cognitive behaviours are all part of and contribute to the constructive process of learning; when new experiences or behaviours are assimilated and accommodated, reshaping and changing existing constructs into new constructs.

Additionally, through studies of teacher students' research practices, the review will investigate the context in which information seeking play a vital role. Understanding how students learn in this context is important not only for their successful academic studies. It is also crucial for a future evidence-based practice, increasingly given importance and highlighted through the growing EBP movement in the educational sciences.

Given the aim and specific focus, the research questions (RQ) guiding the review are:

RQ 1 – What themes are evident in contemporary empirical research on teacher students' information-seeking behaviours?

RQ 2 – To what degree is contemporary empirical research on teacher students' information-seeking behaviours studying affective behaviours?

RQ 3 – To what degree is empirical research on teacher students' information-seeking behaviours studying behaviours in research practices?

2. Method – Systematic review

Preferred Reporting Items in Systematic reviews and Meta-Analyses (PRISMA) (2009) defines a systematic review as a "review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research" (p. 264). This definition guided the review, providing the method for answering the research questions in the intended systematic and careful way, using explicit and transparant inclusion and exclusion criteria as well as search strategies. In addition, contributing to the systematic search process and motivating the label systematic review, the identification and selection of the literature where conducted in databases that enable systematic searches through structured bibliographic information and subject term lists (thesauri).

In recent years, the requirement of what systematic reviews should cover has undergone a shift from only including randomised controlled trials to a more generous interpretation including qualitative and mixed method studies (Grant & Booth, 2009). With that liberal interpretation, this review was finally considered to be a systematic review.

2.1. Search strategy and process

The search string consisted of two categories or blocks: *teacher students* and *information seeking*. References in each block were captured by applying synonyms and related concepts and were combined with the Boolean operator OR. The blocks were finally combined with the Boolean operator AND.

Three key databases were used to identify publications: one in library and information science, Library and Information Science and Technology Abstracts (LISTA); and two in the educational sciences, Education Resources Information Center (ERIC) and Education Research Complete (ERC). The searches were conducted using the interface offered by Ebsco.

In Tables 1–3, the complete search strings for each database are presented in detail with additional subject terms. Both free-text and equivalent subject terms were applied where available to minimise the risk of missing relevant references. The initial inclusion criteria are also available in the tables: publication dates covered and

Table 1
Search strategy in LISTA (Library and Information Science and Technology Abstracts)

Platform: Ebsco host Database: LISTA
Date: 20200803
(“teacher student*” OR “student teacher*” OR “teacher educat*” OR “teacher training” OR “teacher trainee*” OR “trainee teacher*” OR “teacher candidate*” OR “preservice *” OR "pre-service *") AND (“information literac*” OR “seek* behavio#r*” OR “information * behavio#r*” OR “search* behavio#r*” OR “information activit*” OR “information experience*” OR “information practice*” DE “LIBRARY orientation for students” OR DE “INFORMATION literacy” OR DE “ELECTRONIC information resource literacy” OR DE “INTERNET literacy” OR DE “INFORMATION literacy education” OR DE “INFORMATION literacy research”OR DE “INFORMATION literacy standards” OR DE “INFORMATION literacy digital resources” OR DE “INFORMATION-seeking behavior” OR DE “INFORMATION-seeking strategies” OR DE “BOOLEAN searching (Online information retrieval)” OR DE “ELECTRONIC information resource searching” OR DE “ASSISTED searching (Information retrieval)” OR DE “BOOLEAN searching (Online information retrieval)” OR DE “DATABASE searching” OR DE “INFORMATION-seeking strategies” OR DE “INTERNET searching” OR DE “KEYWORD searching” OR DE “ONLINE bibliographic searching” OR DE “SEARCH engines”)
Limitations: 2000–2020. English.
Number of hits: 156

Table 2
Search strategy in ERIC (Education Resources Information Center)

Platform: Ebsco host Database: ERIC
Date: 20200803
(“teacher student*” OR “student teacher*” OR ”teacher educat*” OR “teacher training” OR “teacher trainee*” OR “trainee teacher*” OR “teacher candidate*” OR “preservice *” OR “pre-service *” OR DE “Teacher Education” OR DE “Competency Based Teacher Education” OR DE “English Teacher Education” OR DE “Inservice Teacher Education” OR DE “Preservice Teacher Education” OR DE “Teacher Educator Education” DE “Preservice Teachers” OR DE “Student Teachers”) AND (“information literac*” OR “seek* behavio#r*” OR “information * behavio#r*” OR “search* behavio#r*” OR information activit* OR information experience* OR “information practice*” DE “Information Literacy” OR DE “Information Seeking” OR DE “Search Strategies”)
Limitations: 2000–2020. English.
Number of hits: 578

language. Additional information on search results and the date of the searches is also provided.

In Fig. 1, a detailed account of the steps with additional figures from each database is presented in a flow diagram adapted from the PRISMA statement (2009). Rayyan software was used in the screening process. References, including abstracts, were imported from EndNote after duplicates were removed. Each reference was assessed, including or excluding it with reasons. After the screening process, 214 publications remained, which were printed and eligible for full-text assessment. In the close-reading assessment stage, the inclusion criteria were narrowed, and additional exclusion criteria were applied.

Table 3
Search strategy in ERC (Education Research Complete)

Platform: Ebsco host Database: Education research complete
Date: 20200803
(“teacher student*” OR “student teacher*” OR ”teacher educat*” OR “teacher training” OR “teacher trainee*” OR “trainee teacher*” OR “teacher candidate*” OR “preservice *” OR "pre-service *”OR DE “TEACHER education” OR DE “ARTICLED teachers (Great Britain)” OR DE “COMPETENCY-based teacher education” OR DE “DANCE teacher education” OR DE “EDUCATION of adult educators” OR DE “EDUCATION of art teachers” OR DE “EDUCATION of bilingual teachers” OR DE “EDUCATION of business teachers” OR DE “EDUCATION of cooperating teachers” OR DE “EDUCATION of history teachers” OR DE “EDUCATION of kindergarten teachers” OR DE “EDUCATION of library media specialists” OR DE “EDUCATION of mathematics teachers” OR DE “EDUCATION of music teachers” OR DE “EDUCATION of preschool teachers” OR DE “EDUCATION of social science teachers” OR DE “EDUCATION of special education teachers” OR DE “EDUCATION of teachers of the deaf” OR DE “EDUCATION of teachers’ assistants” OR DE “EXTENDED teacher education programs” OR DE “METHODS courses (Teacher education)” OR DE “STUDENT teachers” OR DE “EDUCATION interns” OR DE “EDUCATION students” OR DE “PHYSICAL education students (Education students)” OR DE “TEACHERS college students” OR DE “TEACHER training” OR DE “CHRISTIAN education – Teacher training” OR DE “FOLLOW-up in teacher training” OR DE “MICROTEACHING” OR DE “OBSERVATION (Educational method)” OR DE “RELIGIOUS education – Teacher training” OR DE “STUDENT teaching” OR DE “TEACHER induction” OR DE “TEACHER orientation” OR DE “TEACHER training courses” OR DE “TEACHERS’ institutes” OR DE “TEACHERS’ workshops” OR DE “TELEVISION in teacher training” OR DE “TRAINING of adult educators” OR DE “TRAINING of art teachers” OR DE “TRAINING of business teachers” OR DE “TRAINING of early childhood teachers” OR DE “TRAINING of information science teachers” OR DE “TRAINING of language teachers” OR DE “TRAINING of library media specialists” OR DE “TRAINING of mathematics teachers” OR DE “TRAINING of music teachers” OR DE “TRAINING of physical education teachers” OR DE “TRAINING of social science teachers” OR DE “TRAINING of special education teachers” OR DE “TRAINING of student teachers” OR DE “TRAINING of teacher educators” OR DE “TRAINING of teachers of gifted children” OR DE “TRAINING of teachers’ assistants” OR DE “TRAINING of vocational teachers”) AND (“information literac*” OR “seek* behavio#r*” OR “information * behavio#r*” OR “search* behavio#r*” OR “information activit*” OR “information experience*” OR “information practice*” DE “INFORMATION literacy” OR DE “ELECTRONIC information resource literacy” OR DE “INTERNET literacy” OR DE “INFORMATION literacy education” OR DE “INFORMATION-seeking behavior” OR DE “ELECTRONIC information resource searching” OR DE “DATABASE searching” OR DE “INFORMATION-seeking strategies” OR DE “INTERNET searching”)
Limitations: 2000–2020. English.
Number of hits: 272

2.2. *Inclusion and exclusion criteria*

The publications included after screening and full-text assessment met the following selection criteria:

- Publications with any level of teacher students as the population of the study, from preschool to upper secondary school;
- Empirical publications;
- Publication types: journal articles, book chapters, conference papers, reports, and dissertations.

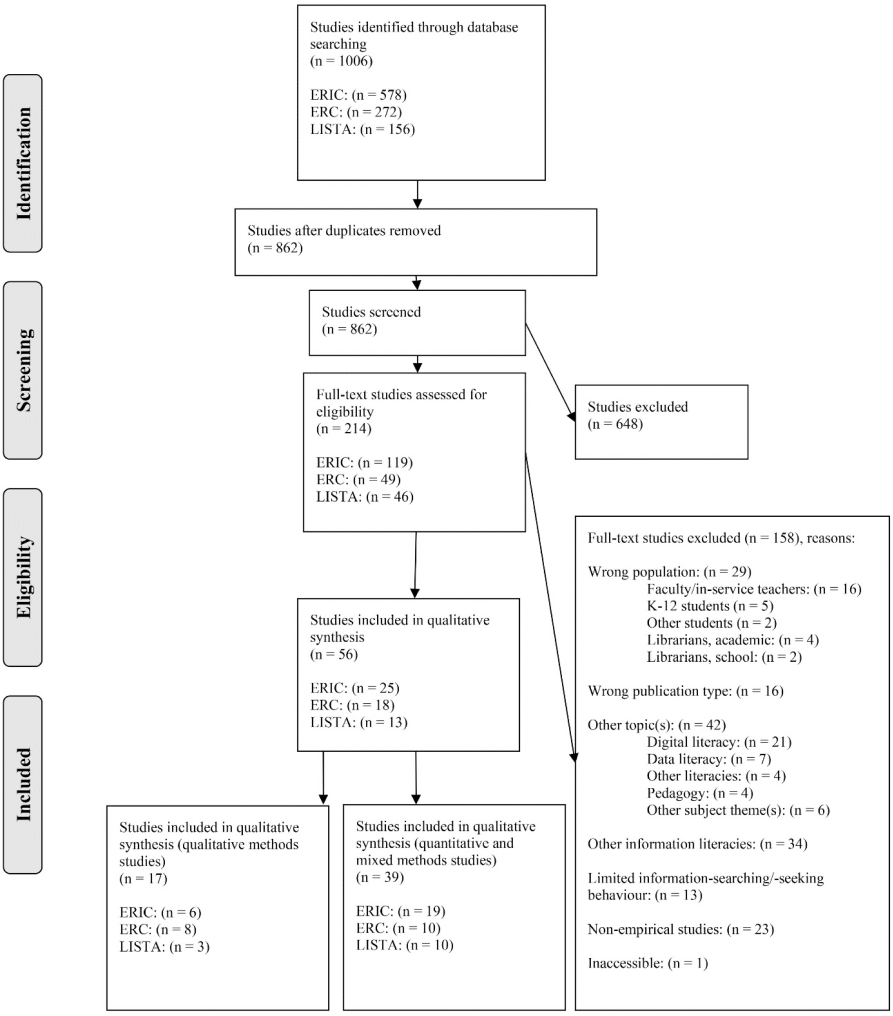

Fig. 1. Flow diagram adapted from the PRISMA statement describing the steps in the systematic review process.

Publications excluded after screening and full-text assessment were due to:

- Wrong population: faculty members, inservice teachers, K-12 students, other students, librarians (higher education, school, public), other population;
- Wrong publication type: short texts (abstracts, summaries, editorial notes, etc.), compilations (anthologies, literature reviews, compilation dissertations, proceedings, journals, etc.), non-empirical studies, other (manuals, guidelines, reviews, etc.);

- Oher topic: digital literacy, data literacy, oher literacies, pedagogy, other topics;
- Other information literacies than information-seeking/searching (studies focusing on information use such as referencing, anti-plagiarism, and source evaluation);
- Limited information-seeking/searching behaviour (publications mentioning information-seeking or searching, but not elaborating on how seeking/searching was conducted);
- Non-empirical studies;
- Inacessible studies.

After assessment, 56 publications qualified for qualitative synthesis and thematic analysis, of which 17 publications used qualitative methods. The high number of publications, resulted in a need to divide the review into two studies. This was done based on the methodological approaches of the publications. The first part (Dahlqvist, 2021) focused on quantitative and mixed methods studies. In this second part, the focus will be on qualitative studies.

3. Results – Thematic analysis

In order to give a thorough and transparent description of themes, in accordance with the PRISMA (2009, p. 264) definition of systematic reviews saying that these should use "systematic and explicit methods to [. . .] collect and analyse data from the studies that are included in the review", thematic analysis was used to synthesise the content of the texts. According to Braun and Clarke (2006, p. 82), a theme "captures something important about the data in relation to the research question and represents some level of patterned response or meaning within the data set", and thematic analysis is "identifying, analysing and reporting patterns (themes) within the data" (Braun & Clarke, 2006, p. 79).

The thematic analysis began with coding. In the initial stage, text extracts were identified and labelled, that is coded. Descriptive codes, which stay close to the data, were the most frequently applied type of code in the thematic analysis (Braun & Clarke, 2006). In the coding process, Nvivo software was used, to which the publications were imported as text-identified files, making it possible to code text extracts. All potentially relevant codes were applied during the reading process of the publications in the initial stage.

The next step was to sort the codes, find relationships between them, and group them into potential themes and subthemes. This was done through the lens of the key concepts presented in Section 2. The candidate themes with codes and text extracts were deducted, reviewed, and validated several times before the themes were finally named and defined. The final major themes and subthemes are presented, and the codes with additional representative text extract examples in each theme are described in the following analysis. The included publications were then analysed in accordance with the theme definitions.

The defintions of the identified themes did not explicitely capture all the aspects of interest in the review. The information-seeking behaviours studied in relation to the research process (e.g. Kuhlthau's research process in the ISP model) in research practices were specifically sought within each theme. For this purpose, a research practice code was necessary. In the analysis, research practices are viewed as information practices, information environments that are unique with their own collective context-specific knowledge and ways of knowing. Information-seeking behaviours and literacies are situated within these information practices which affect and are affected by the members' behaviours and enactments (Hanell, 2019; Lloyd, 2017; Limberg et al., 2012). The following definition guided the analysis:

> *Research practices* are information practices in which teacher students' information-seeking behaviours are situated. The information practice in which teacher students conduct research is unique, with its own collective knowledge that affects information-seeking behaviours.

The code representing this definition was labelled *research practice*, and the text extracts coded reflected activities where the teacher students conducted research in different ways.

Code	Text extract example
Research practice	Both Class A ($n = 28$) and Class B ($n = 24$) completed a major, semester-long portfolio, called the Education Research Project, in which preservice teachers engaged in a scaffolded process of linking research to practice. [...] students were asked to: [...] 5. Set up a search plan (including search terms) prior to searching databases for journal articles. 6. Locate scholarly research articles that addressed the research question (van Ingen & Ariew, 2015).

The methodological approaches of information-seeking behaviours were also of interest and analysed within the themes. These were deducted from the commonly accepted classification (e.g. Bryman, 2016) with definitions of social science research methodological approaches: quantitative, qualitative, or a combination of them, mixed methods. Hepworth, Grunewald, and Walton's (2014) and Lloyd's (2017) descriptions of methodological approaches to information-seeking research also contributed to the definitions that guided the analysis:

- *Quantitative approach* – researchers systematically gather empirical and predefined quantifiable data. The data can be ranked, measured and categorised through statistical summary and analysis. Tools for gathering the data are, for example, surveys or questionnaires (often with scales), and experiments.
- *Qualitative approach* – researchers systematically gather empirical data about peoples' own experiences and their experienced meaning of these. The data help researchers to better understand complex human phenomena. Tools for data collection are, for example, interviews, focus groups, observations, and reflective writings.

– *Mixed methods approach* – researchers combine the two approaches and use a combination of tools to collect data.

One code was applied to capture the qualitative approach identified across the publications.

Code	Text extract example
Qualitative approach	Individual interviews were the primary data collection method. [. . .] A semi-structured interview guide [. . .] was used [. . .] The researcher attended a single training lesson for each trainee and observed what information resources the trainee presented to the class (Tanni, 2012).

3.1. Information-seeking behaviours

Informed by Wilson's (1999) definition, this major theme covered studies that explicitly describe information-seeking behaviours as the activities in which students use a variety of methods to discover and gain access to information. Hepworth, Grunewald, and Walton's (2014) information-behaviour framework and Kuhlthau's (2004) ISP model also helped define the behaviours, offering a holistic view of information-seeking where affective and cognitive experiences, in addition to activities, are objects of study. The behaviours included in the theme are not limited to computer-based search tools and sources. The following definition guided the analysis:

> *Information-seeking behaviours* are the variety of activities and methods, with associated affective and cognitive experiences, people engage in to discover and gain access to information.

This major theme was divided into four sub themes, deducted from Lloyd's (2017) and Hepworth, Grunewald, and Walton's (2014) conceptualisations of information-seeking research approaches. Three themes were discovered through the lens of Lloyd's practical/practitioner approach to information literacy research, and Hepworth, Grunewald, and Walton's positivist/analytical approach to information-behaviour research gave direction. Lloyd's conceptual model of the information literacy landscape provided the analysis with concepts to define and label the behaviours and clarify their relations.

Information-seeking behaviours are enacted through its visible elements, literacies, and manifested in competencies, activities, practices, and skills. These literacies of information are often explored as outcomes of learning, underpinned by learning theories reflecting the normative conditions of information literacy learning and teaching and enacted through modalities of information that reference the knowledge base. The three sub themes were named and defined as:

– *Information-seeking skills* are literacies that are enacted as observable information-seeking behaviours, and measurable normative outcomes of learning.

- *Information-seeking activities* are literacies that are enacted as observable information-seeking behaviours, and not necessarily measurable normative outcomes of learning.
- *Information-seeking skills pedagogy knowledge* is the base from which learning activities are enacted, and measurable normative outcomes of learning. These learning activities are about information-seeking skills and the pedagogical aspects of teaching them, rather than information-seeking skills in themselves.

The fourth sub theme, *Information-seeking skills learning experiences* was derived from Lloyd's (2017) conceptual/researcher space, in which the researcher describes and explains the information environment and landscape and is interested in qualitative ways of knowing (for example, experiences). In addition, Hepworth, Grunewald, and Walton's (2014) identified post-positivist/interpretivist and phenomenological/holistic approaches, in which people's construction of their information experiences are studied, provided guidance, giving the following definition of the theme:

> *Information-seeking skills learning experiences* are constructed as non-enacted, non-visible and qualitative ways of knowing and learning. The experiences are not pre-defined and measurable normative outcomes of learning but inductively interpreted from people's construction of learning. Thus, they offer a holistic understanding of people's variation of experiences learning information-seeking skills.

Ten publications were included in this major theme.

3.1.1. Information-seeking skills

Three publications were included in the theme. The text extracts coded should reflect the seeking skills aspect, and one code was applied.

Code	Text extract example
Seeking skills	Do you use the ERIC thesaurus to find better subject headings? [. . .] Do you ask librarians or library assistants for help? Do you use any other library strategies to find better words to search on? [. . .] if the students' attention could be turned to the language learning aspect of using library databases, they [. . .] could learn to find information more effectively [. . .] (Bordonaro, 2010).

In a case study (Baba Hamid et al., 2015), individual interviews and document analysis were conducted in order to explore teacher students' information-seeking skills in relation to the research process in their final project papers. The results were intended to inform the development of national learning outcomes curriculum.

In an article, non-native English-speaking teacher students' choices of keywords in the initial stage in the search process and other library strategies were investigated as well as whether these contributed to learning English. Data was collected through semi-structured interviews and written answers (Bordonaro, 2010).

Research competencies and experiences, including "finding and using" information were investigated in two cohorts of teacher students in a capstone course (Lehner-Quam & Pitts, 2019). The ACRL framework was used to study their research and skills growth in learning information literacy, of which one frame was "Searching as strategic exploration". Within the frame categories of information-seeking, experiences were explored through reflective e-portfolio writings, observations, and questions.

3.1.2. Information-seeking activities

Two publications were included in this theme, and one label was used to code. The text extracts should capture the information-seeking activity as well as the non-normative aspect.

Code	Text extract example
Seeking activities	Table 2 summarises six modes of the trainees' information acquisition. The modes are organised to illustrate a continuum beginning with the most goal-oriented and ending up with the most serendipitous mode of information acquisition. [...] Seeking known-items [...] Seeking with direction (Tanni, 2012).

In two studies (Tanni, 2012; Tanni et al., 2008) in an article-based dissertation thesis (Tanni, 2013), teacher students were individually interviewed to identify information-seeking activities in relation to lesson-planning assignments but not in research practices. In the pilot study (Tanni et al., 2008), information-seeking patterns, use of information sources, selection criteria, and perceived learning outcomes were explored. In the main study (Tanni, 2012), where some observations were also conducted, students' use of information channels and sources was studied as well as information-seeking activities, called modes of information acquisition, stressing the non-active and non-conscious ways of acquiring information.

3.1.3. Information-seeking skills pedagogy knowledge

Three publications focusing not only on teacher students' own information-seeking skills, but mostly as a skill teacher students are going to teach as future teachers, were included in this theme. The code applied captured extracts in the text where the pedagogical aspect of information-seeking skills was evident.

Code	Text extract example
Seeking kills pedagogy knowledge	Media and information Literacy (MIL), can help address the challenges of new media and information that students encounter online [...] This study aimed at i) understanding how preservice teachers' views about teaching MIL in their future classroom manifested themselves in practice, and ii) observing how these reflective practices impacted their intention to teach MIL in their future classroom (Gretter, 2018).

Embedded within a methods course and part of the information literacy project, pre- and post-reflective writings in relation to a lesson-planning assignment were

assessed in an article (Asselin & Lee, 2002). Teacher students' knowledge of school library programmes, the role of teacher-school librarian collaboration and how to integrate information-seeking skills in the curriculum, as well as teaching the skills, were investigated.

In another study (Branch, 2003), open-ended questionnaires before and after a learning activity intervention measured teacher students' understanding of information-seeking skills and other information literacy learning outcomes in a course on research-based learning. Besides learning how to conduct research and develop their own information-seeking skills, the students were required to develop a lesson plan integrating information literacy learning outcomes.

Teacher students' attitudes and intentions to teach information-seeking skills as part of media and information literacy (MIL), were explored in a study (Gretter, 2018) in the context of an educational technology course that intended to increase students' MIL skills. Based on these intentions, norms and perceived behavioural control attitudes were analysed in reflective exercises.

3.1.4. Information-seeking skills learning experiences

Two studies were included in this theme. Text extracts coded should reflect the non-normative learning experience aspect as well as the object of learning: information-seeking skills.

Code	Text extract example
Seeking skills learning experiences	The questions included: [. . .] 2. Can you describe a time during this project/assignment when you found and used information effectively? Why was it effective? [. . .] Category 1: Finding information [. . .] Trial and error – experimenting with different sources, keywords, tools [. . .] Interacting with other people – seeking assistance, observing (Diehm & Lupton, 2012).

Based on semi-structured interviews and open-ended questions, out of context and not as part of a research practice or a course, a phenomenographic study (Diehm & Lupton, 2012) explored teacher students' approaches to and strategies of learning information literacy. The approaches were studied within earlier discovered descriptive variations or categories of learning information literacy.

In another article (Locke, 2005), individual interviews were conducted to discover variations, called categories, in teacher students' learning experiences when finding and using information in a research-based practical assignment.

3.2. Information-searching behaviours

The theme was defined in the same way as *Information-seeking behaviours* but informed by Wilson's (1999) definition of information-searching behaviour as the more specified type of behaviour that occurs in the interaction between user and computer-based systems. Publications studying such information-seeking behaviours, occurring in web environments with the help of digital tools, were included in this major theme. These behaviours were defined as:

> *Information-searching behaviours* are the variety of activities (in web environments with the help of digital tools), with associated affective and cognitive experiences, people engage in to discover and gain access to information.

The theme was divided into two sub themes. *Information-searching skills* was derived from Lloyd's (2017) practical/practitioner and Hepworth, Grunewald, and Walton's (2014) positivist/analytical identified epistemological approaches in the same way as *Information-seeking skills*, resulting in the definition:

> *Information-searching skills* are literacies that are enacted as observable information-seeking behaviours, and measurable normative outcomes of learning.

The *Information-searching emotions* theme was derived from Lloyd's (2017) conceptual/researcher space, in which qualitative ways of knowing (for example, emotions) are of interest. In addition, Hepworth, Grunewald, and Walton's (2014) identified post-positivist/interpretivist and phenomenological/holistic approaches, where people's construction of their information experiences is studied, provided guidance. Emotions seemed the proper term to use, since Davidson et al.'s (2004, xiii) definitions of affective phenomena describe emotions as objects, rather than feelings which are "the subjective representation of emotions", resulting in the definition:

> *Information-searching emotions* are non-enacted and non-visible "relatively brief episodes of coordinated brain, autonomic, and behavioural changes that facilitate a response to an external or internal event of significance for the organism" (p. xiii). These information-searching emotions are not measurable normative outcomes of learning in themselves but can be indicators of such outcomes.

In addition, Kuhlthau's (2004) rich descriptions of emotions, although referred to as feelings, offered examples of different kinds of emotions.

Seven publications were included in this second major theme.

3.2.1. Information-searching skills

The sub theme covered six publications. The text extracts coded should reflect the information-searching skills aspect, and one code was applied.

Code	Text extract example
Searching skills	Do librarians succeed in teaching students how to search for information in the library's databases? Do students as a result of this training start using the library's resources to find information for their assignments? [. . .] Most of the students in this study had attended more than one literature search class at the library during their study period, and consequently increased their searching skills (Boger et al., 2016).

In a follow-up study (Boger et al., 2016), semi-structured interviews and observations with nursing and teacher students were employed to assess the impact of a learning activity intervention. Academic maturity, including information-searching

skills in library databases, was measured, out of context not embedded within a course or a research assignment.

Teacher students' online information-searching skills for gathering knowledge and how these related to views about the concept of selective learning were investigated in a case study (Ersoy, 2019). Not embedded within a course or a research practice, search behaviours were identified through observations. Based on these, the participants were placed in groups, for example, "Searching for information". Search behaviours and skills were then further explored within the groups through interviews.

Not part of a course or research practice, teacher students' experiences of search engines were explored through content analysis of writings describing experiences using metaphors (Şahın et al., 2010). These were then analysed in relation to study length and computer experiences.

An article investigated teacher students' process used to search for and use resources for the integration of Internet knowledge and use in the curriculum as future teachers (Land & Greene, 2000). As part of a project-based technology education course, think-aloud and video observations were conducted and revealed two types of information-searching strategies: data-driven and goal-driven. Written documentation was used to explore students' approaches to the project's goals and rationales, and surveys were employed where their meta-cognitive learning and systems knowledge was measured through self-assessment.

Teacher students' online research comprehension insights and experiences were investigated in a study (Yamaç & Öztürk, 2019) embedded within a research assignment. Through semi-structured interviews information-searching strategies were explored.

Embedded within a methods course, aiming to develop teacher students' knowledge of research related to mathematics teaching, written portfolios were analysed (van Ingen & Ariew, 2015). With the explicit intention to link research to practice, a faculty member and librarian collaborated in a learning activity in an intervention and control group.

3.2.2. Information-searching emotions

This sub theme covered one publication studying information-searching emotions. The text extract should capture both the information-searching and emotion aspect, and one code was used.

Code	Text extract example
Searching emotions	What really differentiated novices from experts was how they dealt with search anxiety. Experts made significantly more positive statements [. . .] about themselves and everything whereas novices or intermediates expressed their frustration (Tabatabai & Shore, 2005).

Teacher students, identified as novice web searchers, were compared with intermediates (master's students) and experts (librarians and information managers) in a study (Tabatabai & Shore, 2005), not taking place in a course or a research practice,

Table 4
Overview of publications in each theme

Theme	Publication(s)
Information-seeking behaviour	
Information-seeking skills	Baba Hamid, Nadzar, & Wan Dollah (2015); Bordonaro (2010); Lehner-Quam & Pitts (2019)
Information-seeking activities	Tanni (2012); Tanni, Sormunen, & Syvänen (2008)
Information-seeking skills pedagogy knowledge	Asselin & Lee (2002) Branch (2003) Gretter (2018)
Information-seeking skills learning experiences	Diehm & Lupton (2012) Locke (2005)
Information-searching behaviour	
Information-searching skills	Boger, Dybvik, Eng, & Norheim (2016) Ersoy (2019) Land & Greene (2000) Şahın, Çermik, & Doğan (2010) van Ingen & Ariew (2015) Yamaç & Öztürk (2019)
Information-searching emotions	Tabatabai & Shore (2005)

using both thinking-aloud observations and follow-up interviews. Web-searching experiences and information-searching strategy skills, of which one was affective emotions, as well as associated attributes, were the focus of investigation.

4. Discussion

Before discussing the outcomes of the thematic analysis in relation to the key concepts, the results are briefly presented by answering research questions (RQ) 2 and 3. RQ 1 has been answered in the thematic analysis and in the overview provided in Table 4.

RQ 2 – To what degree is contemporary empirical research on teacher students' information-seeking behaviours studying affective behaviours?

One publication studied teacher students' affective information-seeking behaviours using qualitative methods. In Review 1, three publications investigated affective behaviours.

RQ 3 – To what degree is contemporary empirical research on teacher students' information-seeking behaviours studying behaviours in research practices?

Seven qualitative methods publications studied information-seeking behaviours in research practices. Eleven publications studied research practices in Review 1.

Perhaps the most significant finding in the review, although not surprising given the learning context in which the studies were conducted, is that all but four (in Review 1 all but one) were oriented towards obtaining knowledge of normative skills, knowledge, and emotions. Even though the publications in this review were

qualitative studies and discovered information-seeking behaviours through writings, observations, and interviews, they were interpreted and evaluated as normative skills, knowledge, and emotions. Thereby, the approaches reflect Lloyd's (2017) information literacy research practical space, where research is conducted from a practitioner's perspective. In addition, it mirrors the positivist/analytical approach to information behaviour research conceptualised by Hepworth, Grunewald, and Walton (2014).

Another way of describing the positivist/analytical versus post-positivist/interpretivist research approach is, as Case and Given (2016, pp. 178–197), to label the dichotomy objectivist versus interpretivist. The level of objectivity determine in which end of the spectra research is positioned and the differences are manifested in levels of objectivity. Objectivists argue that being objective is the main goal conducting research which is also the strength with this approach or meta-theoretical position and also the strength with these studies in the reviews.

Through lenses of agreed upon and normative frameworks and guidelines, skills, knowledge and emotions were investigated, in most cases in terms of information literacies. Thus, making it possible for, to different degrees, objective measurements and comparisons of the results. For example, to compare different student populations and results of pedagogical interventions and collaborations using pre- and post-tests. Hence, valuable tools for developing and evaluating information literacy instruction and ways of integrating information literacy in courses and assignments are provided.

In order to balance research on teacher students' information-seeking behaviours, the lack of research from a post-positivist/interpretivist position suggests that more qualitative research, and research overall, from a post-positivist/interpretivist and phenomenological/holistic (Hepworth et al., 2014) and conceptual/researcher (Lloyd, 2017) perspective is needed. Studies from this perspective would, together with studies from a positivist/analytical (Hepworth et al., 2014) and practical/practitioner (Lloyd, 2017) perspective, contribute to a deeper and broader exploration and discovery of qualitative aspects and variations of behaviours and experiences, providing a more holistic picture. From a constructivist (e.g. Kelly, 1963; Kuhlthau, 2004) point of view, such holistic understanding is necessary. Learning, the construction of meaning, emanates from a totality of learners' prior and present experiences and behaviours, and a holistic understanding of teacher students' information-seeking experiences and behaviours is crucial for developing information-seeking learning and teaching.

4.1. Themes

4.1.1. Information-seeking and searching skills

Information-seeking and searching skills were the predominant information-seeking behaviour in the review. In nine studies, skills were investigated in different ways. Four were studies in research practices, two in the sub theme *Information-seeking skills* and two in *Information-searching skills*. The predominance of information-seeking and searching skills is logical, given the educational contexts

in which they were studied, with a focus on enacted and observable learning outcomes frequently influenced by skills-based guidelines and frameworks (e.g. Bent & Stubbings, 2011; ACRL, 2000, 2016).

Although the publications were qualitative studies, providing a nuanced picture inductively identified through writings, observations, and sayings, they mirrored Lloyd's (2017) practical/practitioner conceptualisation of information literacy research and Hepworth, Grunewald, and Walton's (2014) positivist/analytical characterisation of information-behaviour research. Information-seeking and searching skills were valued and interpreted against pre-defined and normative levels of learning outcomes and competencies.

4.1.2. Information-seeking skills pedagogy knowledge

Three publications studied the didactic aspect of information-seeking skills rather than teacher students' information-seeking skills. One investigated research practices, and all of them were integrated in courses (of which two were lesson-planning assignments). Teacher students' observable and enacted knowledge of the necessary information-seeking skills (e.g. UNESCO, 2016; AASL, 2018) they will teach as future teachers was studied as well as their understanding of the school library/librarian as a pedagogical resource. The qualitative approach allowed teacher students to express variations of not pre-defined knowledge of and attitudes towards teaching information-seeking skills. However, these were, as in Review 1, enacted activities for learning the knowledge base and normative outcomes of information-seeking skills pedagogy knowledge. In that sense, the publications in this theme also reflected Lloyd's (2017) practical/practitioner and Hepworth, Grunewald, and Walton's (2014) positivist/analytical approach.

4.1.3. Information-seeking activities

Two publications investigated information-seeking activities in this theme. Both were investigated in relation to lesson-planning assignments, but not part of research practices. Data was collected by interviewing and observing the teacher students. These were not valued against pre-defined and normative notions of proper ways of seeking. In contrast to the one publication in this theme in Review 1, information-seeking activities derived from the students' expressed and demonstrated activities, called modes of information acquisition, stressing the non-active and non-conscious ways of acquiring information. Information-seeking patterns and strategies, use of information sources and channels, selection criteria, and perceived learning outcomes were discovered. Although studying observable enacted activities, the exploration of non-normative information-seeking activities, the post-positivist/interpretivist (Hepworth et al., 2014) and conceptual/researcher (Lloyd, 2017) information-seeking research approaches were evident.

4.1.4. Information-seeking skills learning experiences

This is the only theme unique for this review, compared with Review 1. One of the studies was part of a research practice. In two publications, teacher students' experiences of learning, or non-observable ways of knowing, information-seeking skills, and information literacies were studied. Experiences were discovered from written and verbal interviews from which themes emerged. The discovery of themes and variations inductively, from teacher students' descriptions through interviews, rather than through the lens of pre-defined theoretical frameworks, reflect Hepworth, Grunewald, and Walton's (2014) phenomenological/holistic approach to the study of information behaviours.

Phenomenography, a methodology developed in the educational sciences (e.g. Marton & Booth, 1997) and applied in information literacy research (e.g. Bruce, 1997), is one type of methodology in the phenomenological/holistic approach. One study explicitly applied this methodology. However, both studies were phenomenographic since, through interviews, they were interested in describing non-normative variations in descriptive categories and focusing on the relationship between people's experiences and phenomena.

4.1.5. Information-seeking affective behaviours

One publication studied affective behaviours in relation to information-seeking behaviour; this constituted the *Information-searching emotions* theme. It examined online information-searching affective behaviours and was not part of a course or a research practice.

The emotions studied did not provide any deeper insights into students' information-seeking emotions. They were considered a search strategy and showed to correlate with normative cognitive strategies and level of success when searching the web. The main differences between teacher students (novices) and experts (librarians and information managers) were how they coped with search anxiety. Novices showed a higher level of anxiety, feeling disoriented and frustrated. The emotions of disorientation and frustration in the studies are equivalent to the feelings described in the third stage of Kuhlthau's (1993; 2004) ISP model: confusion/frustration/doubt, or the state of feeling anxious, or the emotion of anxiety. These feelings are the affective symptoms of uncertainty. Uncertainty is found in the first step of the *feelings* category of the ISP model and was the concept around which Kuhlthau's famous principle of uncertainty was developed.

Experts' level of anxiety was not that evident in the publication. Their successful searches were associated with positive emotions, "confidence, joy, and positive attitude". These were not easy to identify since they were not clearly defined and elaborated on in more detail. Confidence is found in the fifth stage in the ISP model: sense of direction/confidence. However, it is questionable whether confidence is an emotion. Perhaps it is more compatible with how Davidson et al. (2004, xiii) define the affective phenomena mood: "*Mood* typically refers to a diffuse affective state that is often of lower intensity than emotion, but considerably longer in duration". Joy,

an obvious emotion, may be related to the second stage, optimism, in the ISP model. Positive attitude could also be interpreted as optimism. However, *attitude* is a different type of affective phenomena than emotions, identified by Davidson et al. (2004, xiii) as "relatively enduring, affectively coloured beliefs, preferences, and predispositions toward objects or persons".

Although the study, as in Review 1, investigated emotions, indicating a holistic-constructivist approach interested in non-normative and non-enacted behaviours, the study had an obvious positivist/analytical (Hepworth et al., 2014) and practical/practitioner (Lloyd, 2017) approach where pre-defined normative searching behaviours were in focus. The affective behaviours were indicators of or associated with normative notions of what are considered the proper ways of searching. The lack of qualitative and overall research regarding teacher students' information-seeking emotions confirms information-seeking behaviour researchers (e.g. Krakowska, 2020; Lopatovska, & Arapakis, 2011; Savolainen, 2015a; Savolainen, 2015b; Nahl & Bilal, 2007) findings that minimal LIS research attention has been given to affective information-seeking behaviours. This is especially true since none of the studies in the reviews offered any post-positivist/qualitative (Hepworth et al., 2014) and conceptual/researcher (Lloyd, 2017) exploration. From a constructivist perspective (Kuhlthau, 1993; Kelly, 1963), understanding the role of affective behaviours is crucial for learning. All behaviours and experiences, visible and non-visible, are considered to have a fundamental impact in the process of constructing meaning from information (that is learning).

4.2. Information-seeking behaviours in research practices

Across the themes, six publications studied information-seeking behaviours situated within practices where the students conducted research. None of the publications studied affective information-seeking behaviours.

Few publications studied research practices and information practices in this review (four more publications studied information-seeking behaviour integrated into assignments or part of a course) and in Review 1 (11 in research practices and one part of a course). Studies of information-seeking affective behaviours in these were absent, which warrants a need for further research. This de-contextualised approach to the study of information-seeking behaviours was rather surprising. This view of behaviours and learning is in contrast with contemporary information practice research. From an information practice perspective (e.g. Hanell, 2019; *Informationskompetenser: Om lärande i informationspraktiker och informationssökning i lärandepraktiker*; 2009; Limberg et al., 2012; Lloyd, 2017), the behaviours and literacies situated within the specific contexts are unique and need to be understood. This is not only to better understand the information-seeking behaviours themselves but also due to their importance and impact on learning and teaching information seeking in relation to the specific context.

4.3. Limitations

Since the intention was to provide an overview on a thematic level, this review does not provide any deeper analysis or discussion of the literature. Such exploration might be of interest for other LIS researchers and practitioners.

As with all systematic reviews that aim to cover almost all relevant research, there is always a risk of missing relevant literature. In this review, more databases could have been used, especially Library and Information Science Abstracts (LISA), which, unfortunately, was not accessible for the review. However, since LISTA, the largest LIS database, and two of the three largest within the educational sciences were systematically searched, the review has covered the vast majority of important publications. Moreover, manual searches of key journals and chain searches from the publications found may have been conducted. To avoid the risk of bias towards certain researchers and national research, these additional sources were left out.

Furthermore, only publications issued within the last 20 years and written in English were included. More years could have been covered, and publications in other large languages such as Spanish and German could have been included. However, only contemporary research was of interest, and language barriers prevented the researcher from selecting publications in other languages.

5. Conclusion

This review, together with Review 1, has provided an overall thematic picture research literature of information-seeking behaviours of teacher students and, hopefully, given information behaviour and information literacy researchers ideas and inspiration for further and deeper exploration, particularly, researchers studying higher-education students. Practising instruction academic librarians and others teaching information literacy can also benefit from the review, informing their teaching practices with contemporary research evidence.

The reviews have confirmed the research gap identified by information-seeking behaviour researchers' (e.g. Krakowska, 2020; Lopatovska & Arapakis, 2011; Savolainen, 2015a; Savolainen, 2015b; Nahl & Bilal, 2007) findings that minimal LIS research attention has been given to affective information-seeking behaviours. It has also showed that few studies are investigating behaviours in research practice, of which none studied affective information-seeking behaviours. In addition, the reviews have revealed a gap regarding research from a post-positivist/qualitative (Hepworth et al., 2014) and conceptual/researcher (Lloyd, 2017) perspective. Altogheter, the gaps suggest that more research on teacher students' information-seeking behaviours is needed.

Finally, previous studies reviewing the literature on teacher students' information-seeking behaviours and information literacies, one meta-synthesis (Duke & Ward, 2009) and one annotated bibliography (Johnson & O'English, 2003), are more than

ten years old. Hence, the review provides an up-to-date overview, hopefully filling an important gap. Additionally it is the first systematic review using thematic analysis for discovering themes. The thorough review process described perhaps can inspire similar studies of teacher students' information-seeking behaviours.

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