Media Studies Research in the Data-Driven Age: How Research Questions Evolve

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The introduction of new technologies and access to new information channels continue to change the way media studies researchers work and the questions they seek to answer. We investigate the current practices of media studies researchers and how these practices affect their research questions. Through the analysis of 27 interviews about the research practices of media studies researchers during a research project we developed a model of the activities in their research cycle. We find that information gathering and analysis activities are dominating the research cycle. These activities influence the research outcomes as they determine how research questions asked by media studies researchers evolve. Specifically, we show how research questions are related to the availability and accessibility of data as well as new information sources for contextualization of the research topic. Our contribution is a comprehensive account of the overall research cycle of media studies researchers as well as specific aspects of the research cycle, i.e., information sources, information seeking challenges, and the development of research questions. This work confirms findings of previous work in this area using a previously unstudied group of researchers, as well as providing new details about how research questions evolve.

Introduction

The ease with which today's technology enables digitization, storage, and retrieval of information has led to an unprecedented amount of digital material that is now available across archives, libraries, and on the web (Gantz & Reinsel, 2011). The introduction of new technology and information sources, however, changes the way researchers work and the questions they seek to answer, for example, in the humanities (Borgman, 2009; Collins & Michael, 2012; Michel et al., 2011; Toms & O'Brien, 2008) and the social sciences (Berg & Lune, 2012). Unsworth (2003) advocated building a toolkit that supports the *scholarly primitives* of humanities researchers. A 2009 call to action invited more behavioral research in the humanities as the discipline was evolving rapidly (Borgman, 2009). Meanwhile, regarding the social sciences, Meho and Tibbo (2003) suggested adding more activities to Ellis' model of the information-seeking behavior of social scientists. Palmer, Teffeau, and Pirmann (2009) proposed an extended set of scholarly primitives for both the humanities and social sciences.

If we are to build tools that support research in the humanities and social sciences, then a detailed understanding of the relation between data sources, tools, and activities in the research cycle as well as how this interaction affects the research questions is essential. Previous work on the research cycle of researchers in these disciplines, however, has lacked detail about when and how often researchers transition between research activities and factors that affect these transitions in the research cycle. In this paper we take a detailed look at the research cycle of a field that increasingly relies on large volumes of digital information, publishing technologies, access tools, and representation formats for its research: media studies.

The field of media studies can be situated both within the humanities and social sciences and is difficult to delineate. It has its roots in areas such as literature, sociology, psychology, economics, history, and journalism. Characteristic of media studies is that the media are the object of analysis, either in a centralized or decentralized way (Couldry, 2005). The media are present in many forms, through various channels, and have given rise to subareas such as film studies, technology studies, advertising, and marketing, as well as more practical subjects such as video production, radio production, printing, and journalism (Newbold, Boydt-Barrett, & Van den Bulck, 2002). Media studies researchers use a variety of data: textual data such as newspapers, Twitter feeds and magazines, and audiovisual data such as films, radio, games, and television programs.

By studying the research practices of media researchers and their use of archives, we get insight into the interaction between data, tools, and research questions. Hence, we reveal the needs and challenges of archives and digital tools for media research, which may also be of interest to other humanities and social science disciplines that are making the digital transition. In our investigation we use data from interviews about the research projects of 27 media studies researchers, which are analyzed to (a) identify sequences of activities in research projects of media studies researchers and compare the resulting model to other models of the humanities research cycle; (b) investigate whether and how research questions of media studies researchers change during research projects, and identify factors that influence this change; and (c) identify which information sources and information-gathering challenges media studies researchers face during research projects.

The remainder of this paper is organized as follows. The next section introduces background on the research cycle in the humanities and social sciences; then the methods used for interviewing and analysis are provided. The results of our analysis are followed by a discussion, and last, there is a conclusion.

Background

We first discuss how the field of media studies is situated within the humanities and social science disciplines. Then we analyze the prototypical research cycle as presented in textbooks of the respective disciplines, ending with a discussion on information-seeking behavior, which is one of the major activities within the research cycles we discuss.

Media Studies Within Humanities and Social Sciences

Media studies is a heterogeneous field of study. A common thread is the study of media according to one or more of the following three aspects: *production*, *texts*, and *reception* (Newbold et al., 2002). Production concerns the production of media, the industry, or the institutional context, for example, a study of journalists or the Hollywood film industry (D'Acci, 2004, p. 431). Text concerns the content of media and includes oral, print, still, moving image, and computer-generated communications (Newbold et al., 2002, p. 11). Reception concerns the "effect" of media on audience beliefs, attitudes, and behavior, on one hand, and the use and interpretation of media by audiences on the other (Newbold et al., 2002, p. 15). However, the rise of digital communication channels has diluted the analytical boundaries between the production, text, and reception aspects, as audiences have become both the producers and receivers of media (Thumim, 2012, p. 13).

To study production, text, and reception, various methods are applied, derived from the humanities and social sciences. Therefore, the research cycle of media studies may be instantiated according to either of the dominant paradigms in these disciplines. The humanities and social sciences are often referred to as two distinct academic domains; however, they are not as easily delineated. Subdisciplines in the humanities, such as history and linguistics, are often associated with the social sciences, and likewise, subdisciplines in the social sciences, for example, anthropology, are associated with the humanities.

One way to make a distinction between the two domains is to look at the dominant paradigms within each. For example, social science researchers studying generalizable patterns of behavior within large-scale data sets such as click logs or social networks take a functionalist perspective, that is, they seek patterns understood objectively in terms of their components (Bhattacherjee, 2012). This type of study tends to be most suited for quantitative methods. In contrast, the humanities follow the humanistic paradigm, more concerned with studying idiosyncratic (historical) events, objects, and phenomena through human (re)interpretation and reflection, in order to further our understanding of expression and appreciation of human culture (Bernard, 2011; Dilthey, 1911; Gold, 2012; Schreibman, Siemens, & Unsworth, 2008; von Wright, 1979). Qualitative methods tend to be better suited for the humanistic stance in the humanities (Chatham Carpenter, Pruin DeFrancisco, Hall, Martin, & Palczewski, 2014; Creswell, 2013; Marshall & Rossman, 2010). We note, however, that both interpretative (qualitative) and functionalist (quantitative) approaches are used in both domains.

To be able to analyze the research cycle of an interdisciplinary field such as media studies, we outline the prototypical research cycles within the humanities and the social sciences below.

Models of the Social Science Research Cycle

The research cycle of social scientists is often presented as progressing in a linear fashion. For example, Kendall (2012) describes the research cycle of social science research as consisting of six activities: *formulate research question*, *review existing literature*, *select research method*,
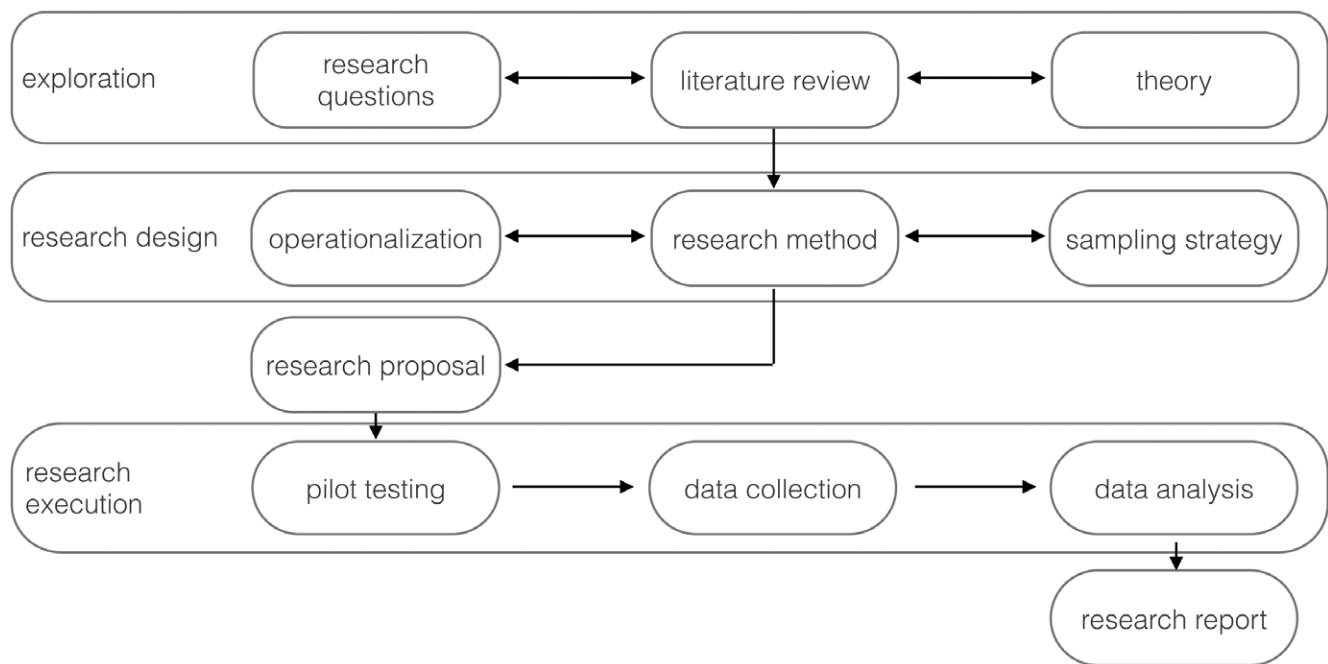
FIG. 1. The three stages in the social science research cycle according to Bhattacherjee (2012) and the associated activities.

collect data, *analyze data*, and *publish results*. Bhattacherjee (2012) suggests three stages in social science research, that is, exploration, research design, and research execution, during which various activities occur (Figure 1). The exploration stage consists of exploring existing literature to arrive at an overview of existing knowledge, formulating research questions, and identifying theories helpful in addressing the research questions. The research design stage involves operationalizing constructs as well as choosing an appropriate research method and sampling strategy. Once the research design is complete, a research proposal may be drafted that documents all decisions made up to this point in the research. Next, the research execution stage consists of pilot testing the selected methods and collecting and analyzing data. Finally, the findings of the research are documented in a publication. Note, however, that there is no evidence that the research cycle in the social sciences is indeed linear in practice.

Models of the Humanities Research Cycle

The process of inquiry in the humanities is not presented as a linear sequence of activities. The reflective and interpretative nature of the research creates a dynamic in which the researcher and the research are constantly changing (Figure 2). In the humanities research cycle, researchers alternate between theory, practice, research questions, and personal experience (Marshall & Rossman, 2010). A research project may start at any point, whereas the initial idea that led to a particular (research) question is shaped by

interacting with the literature, forumulating hypotheses, operationalizing definitions for a setting and sample, and so on (Marshall & Rossman, 2010).

The open-ended and dynamic nature of the research paradigm in the humanities has given rise to a number of studies into the specific instantiation of the research cycle within subdisciplines of the humanities.

Work in the 1970s identified three stages in the research cycle of economists: (a) the problem stage, in which an idea is developed and hypotheses are formulated; (b) the methodology stage, in which first the technique for collecting data is determined and then the data are gathered; and (c) the presentation stage, in which the data are analyzed, interpreted, and disseminated (White, 1975). Subjects in the study became more purposeful in their search in the second stage. This observation is consistent with earlier findings that researchers become better at formulating their information need and determining relevance at later stages of their research (Harmon, 1970). In the 1980s Stone (1982) suggested five steps that scholars go through during humanities research: (1) thinking and talking to people about the topic, (2) reading what has already been written, (3) studying original sources of information and making observations and notes, (4) drafting a document on what is found, and (5) revising the draft into a final document.

Other studies concern historians (e.g., Case, 1991; Duff & Johnson, 2002). Uva (1977) identified five stages in the research cycle: problem selection, detailed planning of data collection, data collection, analysis and interpretation,
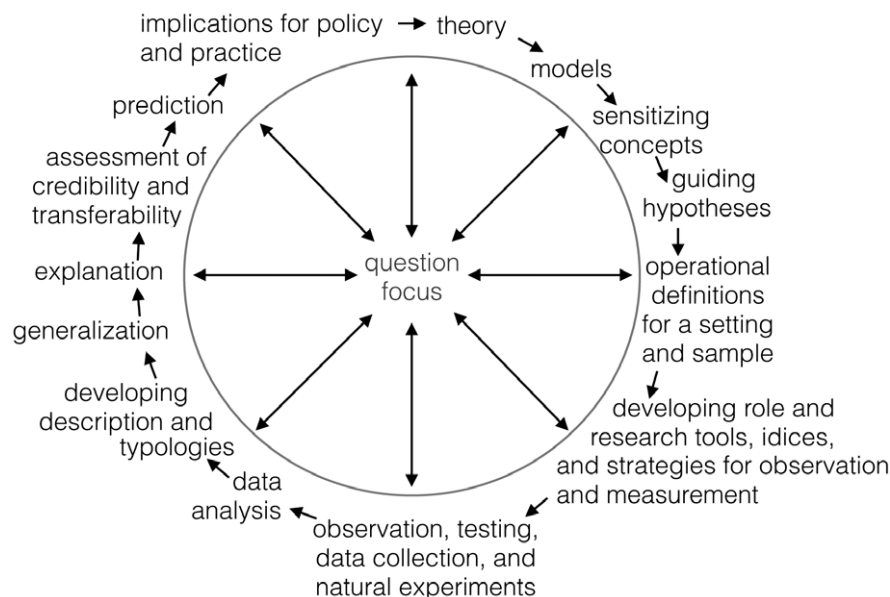
FIG. 2.   Overview of the cycle of inquiry and its influence on the research questions (Marshall & Rossman, 2010).

TABLE 1.   Overview of the stages in the research cycle of various disciplines.

	Economists (White, 1975)	Humanities (Stone, 1982)	Historians (Uva, 1977)	Literary critics (Chu, 1999)	Music scholars (Brown, 2002)	Media studies (Lunn, 2009)
1	Problem	Thinking; talking	Problem selection	Idea generation	Idea generation	Overview broadcasts
2	Methodology	Reading literature	Planning collection	Preparation	Background work	Data selection for analysis
3	Presentation	Study material; notetaking	Data collection	Elaboration	Preparing; organizing	Identify exemplars
4		Drafting	Analysis; interpretation	Analysis; writing	Analyzing	Verification of facts
5		Revising	Writing; rewriting	Dissemination	Writing; revision	
6				Writing; dissemination	Dissemination	

writing-rewriting. In the data collection stage historians expressed the importance of obtaining primary source materials.

Chu (1999) investigated another humanities discipline, that is, literary criticism, and introduced a model of the research cycle with six stages: idea, preparation, elaboration, analysis and writing, dissemination, and further writing and dissemination. She described several variants of the model with three, four, and five stages to accommodate the various behaviors exhibited by individual critics. A model of the research cycle of music scholars identified similar stages (Brown, 2002). The model contained an additional stage to categorize activities related to preparation and organization of controlled experiments and interviews.

A study that comes closest to research in media studies is the one by Lunn (2009). He studied the information needs of users of an audiovisual archive. Lunn identified four phases in the information needs of one group of users, that is, media studies researchers: (a) getting an overview of broadcasts, (b) selection of specific broadcasts for analysis; (c) identification of borderline exemplars, and (d) verification of facts.

However, the focus of his work was the information needs and not the relation between these phases and the overall research cycle.

Table 1 shows the various stages in the research cycle of humanities researchers. Although some of these stages appear to be a single activity, each stage is associated with several activities, for example, the idea generation stage of Brown (2002) consists of activities such as studying previous work, reading (music) literature, and discussions with colleagues. The specific activities that occur during these stages depend on the discipline, for example, listening to music is particular to the research cycle of music scholars.

Models of Information-Seeking Behavior

Common to the instantiations of the research cycle of the various subdisciplines discussed previously is that researchers engage in activities of searching for, organizing, and processing information. Studies of information behavior provide insight into why a certain information need arises or search strategy is employed and how information is used

during these particular activities in the research cycle (Byström & Hansen, 2005; Järvelin & Ingwersen, 2004; Li, 2009).

Older work on information behavior has focused on identifying requirements for the development of tools and perceived users as passive receivers of objective information independent of a search environment (Crawford, 1978). An alternative view was proposed by Dervin and Nilan (1986), who investigated how users' cognitive states are affected by interaction with information. Originating from within this tradition, a general model of information behavior introduced two new notions: (a) it identified as distinct factors the user, their information need, the information sources or services interacted with, and use of information; and (b) it regarded the interaction between these factors as an iterative process (Wilson, 1981, 1999). Here the concept *information need* is defined as the desire to locate and obtain information to satisfy a conscious or unconscious need (Taylor, 1962). In later views these behaviors are suggested to be part of a larger behavioral process in which a user explores an unknown information space and applies various search behaviors influenced by the information encountered, for example, "berry picking" (Bates, 1989) and "information foraging" (Pirolli & Card, 1999). This type of model considers several factors related to users' interactions with information, for example, using, producing, and searching for information.

Other studies focused on *information seeking*, that is, the process in which users engage starting from a situation in which an information need arises to the point at which the information need is resolved (Wilson, 1999). Ellis and Haugan (1997) found a set of typical behaviors that social science researchers engage in to resolve an information need, that is, starting, chaining, browsing, differentiating, monitoring, extracting, verifying, and ending. Kuhlthau (1991) identified stages in the *information search process* (ISP) of library users. Vakkari (2001) extended this work and observed fine-grained activities in the information-seeking process of students writing a proposal. Both Kuhlthau and Vakkari observed how the research questions of participants became more focused as they progressed in their search for information.

Method

In this section we describe the method used to conduct the interviews, the characteristics of the media studies researchers in our sample, and the method used for analysis of the interviews.

Interviews

Interviews were conducted using the same approach as described by Chu (1999) and Brown (2002) in their investigation of the research cycle of literary critics and music scholars. The method is a combination of the "time-line interview" (Dervin & Clark, 1987) and the structured personal account (Brown & Sime, 1981). In the account interview participants are asked to describe a previously experienced event from a personal point of view. The time-line method reconstructs each step taken in a specific situation with a focus on information gaps experienced and how these were resolved.

The style of the interview was semistructured and consisted of three parts: (a) identification of a recent research project, (b) open questions about research activities and research questions during the project (Table 2), and (c) an interactive part in which participants wrote down the research activities on index cards and ordered them chronologically.

During the first part, the interviewer started by explaining the goal behind the interview, that is, to investigate the research practices of media studies researchers. The first question served to identify a research project to discuss during the interview. This served two purposes: (a) it allowed the interviewer to determine whether the project was a suitable research project, for example, involved data collection and/or analysis as opposed to a literature review or preparation for a lecture; and (b) it allowed participants to talk freely about their own research, which contributed to a relaxed atmosphere.

In the second part, the interviewer covered questions Q1–Q10 shown in Table 2. For each question in Table 2 the interviewer allowed the participant to talk freely without enforcing any time limits. During the interviewee's answers the interviewer would ask for examples or elaboration when relevant. With this style of interviewing, some questions may already be answered during an answer to

TABLE 2. Topic list used during open questions part of the interview.

Part I
Q0 Do you have a recent research project in mind that we can discuss in which you were responsible for the entire research process?

Part II
Q1 Do you remember how the research project started?
Q2 What were your research questions?
Q3 Did you often search in media archives?
Q4 Which archives did you use?
Q5 What did you expect to find in these archives?
Q6 What problems did you encounter?
Q7 Next to media items, what other information did you search for?
Q8 What additional information did you need that you did not manage to obtain?
Q9 What tools did you use, e.g., search engines, websites, or analytical software?
Q10 Did your research questions change during the research project?

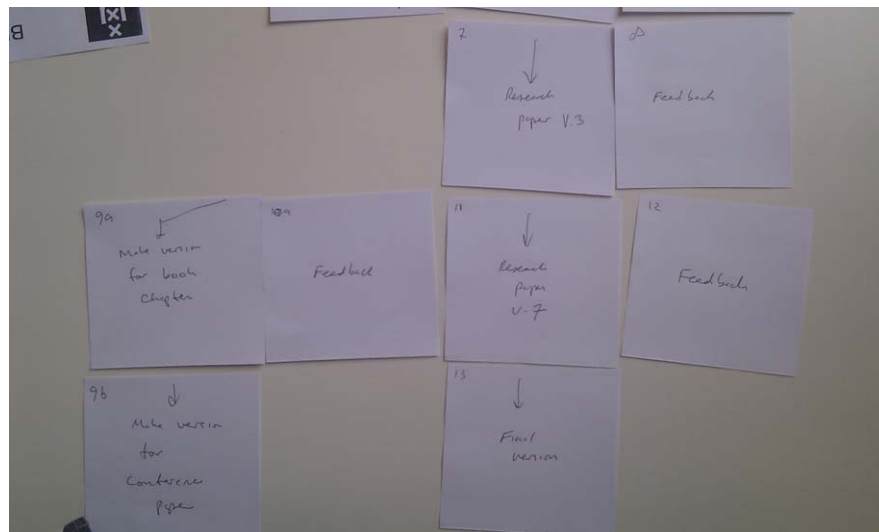| Part III |
| --- |
| Q11 If you would divide your research project into stages which would you identify? |
| Q12 Could you write down each of the stages you just mentioned on an index card and order them chronologically? |

FIG. 3. Picture of a part of one participant's card-ordering task. It represents the stages identified within a research project discussed during the interview. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

previous questions. The list of questions Q1 to Q10 served as guidance to ensure that each of the topics was covered.

In the final part of the interview the participant was first asked to identify stages in his/her research project. The purpose was to allow the participant to consider stages in her/his research project without imposing any division. In the final question the interviewee was asked to write down the stages mentioned in the previous questions on index cards and to order these chronologically. During this process the interviewee was asked to think aloud. Next the interviewee was asked to review the cards and to confirm the order and completeness. The interviewee was allowed to reorder the cards and add any additional cards if necessary. An example of the result of the card ordering task is shown in Figure 3.

Interviews lasted between 30 and 45 minutes, were audiorecorded, and later transcribed. The chronologically ordered cards representing the research cycle were numbered and photographed before being collected at the end of the interview. Interviews were conducted in Dutch or English, depending on the nationality of the interviewee.[1]

The interviews were conducted by two interviewers: a media studies researcher and a computer scientist. The first seven interviews were conducted jointly. Later interviews were conducted separately as the interviewers gained a shared understanding of the domain and interview style. A limitation of the interview method is that it is an account of how the researcher remembers a research project. It does not necessarily accurately describe how the project was carried out, as parts may have been omitted or received extra attention depending on the impact events made on the individual. A benefit of the method is that it concerns real projects. This also implies that the time frames of the projects differed. In some projects, the data collection happened before material had been digitized to such a large extent. However, the affect of these limitations on our sample appears to be limited (see below).

Sample

The participants were recruited based on availability. The investigators contacted colleagues to obtain an initial set of interview participants. Some of the participants suggested additional candidates who were contacted and invited to participate according to the snowball method (Jensen, 2002). Finally, the investigators recruited several participants by contacting researchers during research visits. In total, researchers from seven different universities participated, four in the Netherlands, the others in Belgium, Israel, and Denmark. To be able to characterize our participants we asked also about other demographic variables, shown in Table 3. As discussed previously, media studies is a broad field, with influences from many other disciplines. To characterize these varying influences, we included different fields and subfields in our sample of participants: discipline (social sciences, humanities, and science and technology), department (communication sciences, cultural studies, media studies), position (PhD student, postdoc, assistant, associate and full professor), media focus (TV, newspaper, games, music, radio, film, documentary, new media), research focus (production, text, reception), and preferred scientific research method (quantitative, qualitative, both). Some of the information has been anonymized to protect the identity of the interview participants. For identification purposes participants (P; column 1 in Table 3) are assigned a number, that is,

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[1]Quotes extracted from Dutch interviews have been translated to English. Note that when using quotes, square brackets [. . .] indicate modifications to the original quote to improve understanding or to protect the anonymity of the participant.

TABLE 3. Participants' characteristics.

P	I	Discipline	Department	Position	Media focus	Research focus	Method
01	I1	Soc SCS	Com SCS	PhD St	TV	Reception	Qual
02	I1	Soc SCS	Com SCS	PhD St	Newspaper	Production; text	Both
03	I1	Soc SCS	Com SCS	Post doc	TV	Production; text	Qual
04	I1	Soc SCS	Com SCS	Assistant PR	TV	Production; text; reception	Qual
05	I1	Soc SCS	Com SCS	Assistant PR	TV; newspaper	Text	Both
06	I1	Soc SCS	Com SCS	Assistant PR	Games; music	Reception	Both
07	I1	Soc SCS	Com SCS	Professor	TV; newspaper; radio	Production; text; reception	Both
08	I2	Hum	Cult Std	PhD st	New media	Text	Both
09	I2	Hum	Cult Std	Post doc	Radio	Text	Qual
10	I2	Hum	Cult Std	Assistant PR	Radio	Text	Both
11	I3	Hum	Cult Std	MST St	TV; new media	Production; text; reception	Qual
12	I3	Hum	Med Std	PhD St	TV; film	Text	Qual
13	I3	Hum	Med Std	PhD St	Documentary	Production	Both
14	I3	Hum	Med Std	Post doc	TV	Text	Qual
15	I3	Soc SCS	Med Std	Post doc	TV	Reception	Qual
16	I3	Hum	Med Std	Assistant PR	TV; newspaper	Text; reception	Qual
17	I3	Hum	Med Std	Assistant PR	TV; newspaper; radio	Production; text	Qual
18	I3	Hum	Med Std	Associate PR	TV	Text	Qual
19	I3	Hum	Med Std	Professor	TV	Production; text	Qual
20	I4	Hum	Med Std	Assistant PR	TV	Production; text	Qual
21	I5	Hum	Med Std	Professor	TV	Production; text; reception	Qual
22	I6	Soc SCS	Com SCS	PhD St	TV; newspaper	Text	Quan
23	I6	Hum	Med Std	PhD St	TV	Production; text; reception	Qual
24	I6	Hum	Med Std	Assistant PR	Newspaper; new media	Production; text; reception	Qual
25	I6	Hum	Med Std	Assistant PR	TV; new media	Text	Qual
26	I6	Sc & Tch	Med Std	Professor	New media	Text	Both
27	I7	Soc SCS	Med Std	Associate PR	Radio; TV; newspaper	Production; text; reception	Qual

Note. Institute = I; social sciences = Soc SCS; humanities = Hum; science and technology = Sc & Tch; communication sciences = Com SCS; cultural studies = Cult Std; media studies = Med Std; master student = MST st; PhD student = PhD st; professor = PR; qualitative = Qual; quantitative = Quan.

P01 to P27. Similarly, for institutions (I; column 2) we use I1 to I7.

Regarding the research discipline and department, our sample provides a good insight into the complexity of the field in terms of its interdisciplinary status as humanities and social sciences. Half of the participants (16 of 27) worked at institutes in which media studies is part of a larger research unit in the humanities. The media studies departments of 10 participants were part of a larger research unit in social sciences, and one participant conducted his media research within science and technology studies. The disciplinary traditions of the institutes are reflected in the names of the departments: humanities-based media researchers are either part of media studies departments (12 of 16), or cultural studies departments (4 of 16); social science-based media researchers are either part of communication science departments (8 of 10) or media studies departments (2 of 10); and the science and technology scholar is part of a media studies department as well (1 of 27).

Analysis Method

We start our analysis with Part III of the interview. The card-sorting task and associated questions and responses explicitly summarize the research activities that interviewees mention during earlier phases of the interview. This is followed by an analysis of Part II of the interview (Q1 to Q10) to provide explanations for the patterns in research practices that emerge from the analysis of Part III. The analyses were conducted using the Dedoose coding tool.[2]

Analysis of Part III. First, cards with activities that exactly match were used to align the research activity sequences of each of the participants. Next, we adopted an open-coding strategy (Strauss & Corbin, 1990) and grouped cards with similar descriptions in the interview, either mentioned during the description of the stages (Q11) or during the creation of the index cards. Activities that did not match were placed in a separate category. During a number of iterations categories were renamed and merged until a final set of codes emerged from the transcripts (see the codes listed in Table 4). The result after coding was an assignment of every activity mentioned by a participant on one of the index cards to one of the codes.

To test the reliability of the coding scheme the descriptions of the activities were coded by an additional investigator. Digital excerpts were created from the activities mentioned on the index cards in Dedoose and the coding scheme was explained. Dedoose has a convenient functionality to allow another investigator to code the data. In test mode it presents the excerpts that have been identified and coded one-by-one without the associated code. The user is

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[2]http://www.dedoose.com

TABLE 4. Overview of the codes used to annotate the activities in the research cycle mentioned during the interviews.

Code (abbreviation)	Description
Initial idea (ii)	An idea, observation, or proposal that starts a project.
Background study (bg)	Identify literature and background material for a topic.
Initial research questions (ir)	Identify research questions or instruments, e.g., sampling.
Initial data gathering (ig)	Initial search, exploration, or collection of data.
Revised research questions (rr)	Revision of research questions and instruments.
Targeted data gathering (tg)	Collect, search, or select data following guidelines.
Analysis (an)	Inspect, read, code, compare, or organize data.
Write (wr)	Write, select examples, drawing of conclusions.
Report (rp)	Integrate findings into articles, chapter, or presentation.

TABLE 5. Cohen's kappa coefficient indicating inter-annotator agreement for individual codes and pooled kappa.

Code	κ	Code	κ
Initial idea	0.49	Background study	0.75
Initial research questions	0.54	Initial data collection	0.17
Revised research questions	0.46	Targeted data collection	0.34
Analysis	0.64	Write	0.56
Report	0.75	Pooled kappa	0.53

then able to select one of the predefined codes to assign to the excerpt. The excerpts are shown in random order and without context from the interview.

The results are presented in Table 5. Cohen's kappa is a measure for interannotator agreement and generally the following rule of thumb is used for interpretation: <.20 is poor agreement, .21–.4 is fair agreement, .41–.6 is moderate agreement, .61–.8 is good agreement, and .81–1.0 is very good agreement (Landis & Koch, 1977). The pooled kappa (De Vries, Elliott, Kanouse, & Teleki, 2008) of the agreement between the two annotators over all individual codes is .53, indicating moderate agreement.

Closer inspection of the agreement on individual codes reveals that the initial data collection and targeted data collection codes have low agreement. The main difficulty turned out to be determining whether a data collection activity was initial or targeted without the context of the interview or other index cards. To resolve this issue, the two annotators discussed all excerpts where a disagreement existed using the interview and index cards as context to arrive at a 100% agreement on the code assignment.

Analysis of Part II. The variety and richness in the open answers that participants provided to interview questions Q1

to Q10 are less structured and more elaborate than those in the card-sorting task. This makes a quantitative coding approach less appropriate. Instead, we focused on two aspects: (a) changes in research questions and the reasons why and (b) information needs and challenges in satisfying those needs. The interviews were divided among two investigators who created an excerpt of each piece of text that related to one or more of these aspects.

Excerpts related to participants' research questions were divided into two categories, that is, whether participants mentioned that there was a change in their research questions or not. In case there was a change, excerpts were further categorized in terms of whether the questions became more specific, more questions were added, or completely changed perspective. This categorization emerged from the excerpts and the paraphrased excerpts are presented in Table 8.

Excerpts with respect to information needs and challenges were not further coded but are presented below. Where appropriate, we counted how many times items were mentioned.

Results

In this section we first analyze the answers related to research activities and their sequences in the research cycle, that is, Q11 and Q12 in the third part of the interview. Then, we analyze the answers related to changes in the research questions (Q2 and Q10). Finally, we discuss answers related to information sources used and data gathering challenges (Q3 to Q9). Although the following sections address different questions and illustrate different points, some of the participants' answers are relevant to multiple interview questions. In such cases a quote may be repeated.

Research Cycle

Table 6 shows the sequences of the research activities described on the index cards and mentioned in answer to Q11 and Q12 during the interviews for each of the participants. The first column lists the abbreviation of the codes assigned to each of the actions (Table 4). Columns 2 until 28 represent participant IDs and column 29 shows the number of participants that mentioned a particular action. Each row represents an activity. A asterisk indicates that a certain activity was identified for a participant.

We use the phrase *iteration within the research cycle* to refer to a sequence of research activities without repetition. A research project may consist of a single iteration in which activities, such as idea generation, data gathering, analysis, and reporting, follow each other in a linear fashion. However, during Part III of the interview many of the interviewees described how certain activities were repeated before the project was completed and created multiple cards with the same label. To visualize these repeating activities, each block, identified by horizontal lines, represents a sequence of nonrepeating activities. The sequences have

TABLE 6. Overview of the research activities.

Activity	05	12	23	26	09	07	16	21	15	03	11	24	25	06	18	22	01	20	19	27	17	14	08	10	13	02	04	Count
Initial idea	*				*	*	*	*			*					*							*		*			9
Background study	*	*				*					*		*	*	*					*		*	*	*	*	*		**12**
Initial rq	*	*	*	*	*		*	*	*							*	*								*	*		**12**
Initial inf gathering			*							*					*			*	*		*	*		*			*	9
Revised rq		*		*		*									*											*		5
Targeted inf gathering													*					*		*		*				*		5
Analysis						*							*		*			*	*	*		*	*			*	*	**10**
Write																*							*			*		3
Report																*							*			*		3
Initial idea													*															1
Background study	*	*	*				*	*	*		*		*			*		*	*			*	*	*				**14**
Initial rq									*	*																		2
Initial inf gathering				*		*							*				*											4
Revised rq	*					*						*						*	*									5
Targeted inf gathering						*	*	*	*	*	*			*	*		*	*	*		*							**12**
Analysis			*	*	*	*	*	*			*		*		*	*	*	*			*	*		*				**15**
Write													*		*			*	*	*	*	*	*					8
Report		*	*	*			*	*					*			*	*	*	*									9
Background study						*		*		*			*															4
Initial inf gathering	*	*								*																		3
Revised rq					*					*																		2
Targeted inf gathering			*							*		*	*	*														5
Analysis		*			*	*				*	*	*																6
Write						*				*	*																	5
Report		*		*			*	*	*																			5
Background study	*																											1
Revised rq	*		*																									2
Targeted inf gathering	*	*		*																								3
Analysis	*	*			*																							3
Write		*		*	*																							3
Report				*																								1
Background study	*																											1
Targeted inf gathering		*	*																									2
Write	*																											1

Note. See Table 4 for activity definitions.

been ordered with, on the left, the research projects with the most iterations, and on the right those with with the smallest number of iterations.

Initial exploration of a topic. In the first iteration, initial idea, background study, developing the initial research questions, and initial information gathering are the four top most frequently identified activities. Nine participants explicitly indicated that a research project starts with an initial idea or observation that sets the direction for the research topic. For example, participant P21 stated: "The first phase is the conceptual phase, in which you start thinking about your research question. Why is your topic interesting? And the development of a concept, or a research plan how you could study that." According to P11: "The first phase was to pick a phenomenon to write a paper about and not something else. Then identifying what literature relates to it."

Others indicated that research starts with studying the literature (P12, P25, P06, P18, P02, P27, P14) or an initial look at the data (P03, P17, P20, P19, P10, P04). Participants P17 and P20 indicated that initial information gathering comes first: "the first phase was to see what was there" (P17) and "start with the written archives to get the more general picture" (P20). Alternatively, participants P01 and P02 stated that literature is the starting point: "It happened exactly according to the scientific research process. So, first the question, then the literature review . . ." (P01), and "I spent most of the first year reading and defining the theme" (P02).

In general, the comments regarding the activities in the first iteration of the research cycle suggest the need for exploration in order to gain an overview of the data, topic, and literature. Participant P22 remarked: "first you must have a subject and know that it is interesting and has not been done before. But I never start by thoroughly figuring out a theoretical framework, which is actually the official procedure, [. . .] pretty quickly I go and see if the material is available." Another stated: "Always first explorative. A little bit of browsing, everywhere. Then, scoping not really. Because you will keep your eyes open for things you may discover. Just do not limit yourself in the beginning" (P19). Additionally, some interviewees noted that the goal is to arrive at an

initial research question through these interactions with data and literature. One researcher (P16) noted: "for me it starts with developing the research questions and data collection. This happens in parallel, so the question changes by the material you see" and another (P07) noted: "the data influences the research question, because the data is not available or because you start to see, oh this is so naïve."

Three participants' research cycles end without repeating any research activities (P02, P04, and P13). These researchers may have left out some of details of their research activities. As P04 noted: "the thing with qualitative research is that these phases are not so easily broken up into parts." Importantly, there does not appear to be a relation between the disciplinary background of the participants and their research cycle, indicating that social sciences and humanities methods are indeed blurring. We investigate this further below.

Targeted information gathering and analysis. In the second iteration, we observe that again the background study activity is frequently identified (by 14 participants). Seven researchers explicitly mentioned studying background material a second time during their research. As interviewee P27 noted: "Literature starts before everything and it comes again at the time of writing."

The emphasis in this iteration, however, is on targeted information gathering and analysis. Researchers engage in these activities based on experiences from earlier explorations: "If you have consulted more sources, then you always get more focus. You get more of a story line. Otherwise, it is anecdotal: this program says that, and that program says this. No, it should mean something together. You only realize that in second instance. Only when you have seen material, you get an idea of what goes together, like this may well be related to that. And that is what you will investigate further" (P19). This iteration ends the research cycle for 10 additional researchers.

Fourteen researchers engaged in one or more additional iterations of the research cycle. Eight researchers (P03, P05, P06, P07, P12, P23, P24, P25) mentioned the need for additional data collection and provided various reasons for repeating this step: getting a representative sample (P03: "so that [first analysis] was followed by collecting new data, using the methods identified in the literature and guided by insights from the earlier analysis"), being overwhelmed by the amount of information (P23: "So here I had the most stress, I got lost in it. Then I made my research question more specific. And defined case studies. So making choices in systematically searching the archive"), and lack of suitable material (P07: "and then you return again to the data and sometimes the literature, while part of the data has already been collected, because you feel that something is there but it does not come out"). The other six participants instead focused on studying additional literature, analyzing data, and writing.

After the third iteration eight researchers did not engage in additional activities and worked with the material they

have: "by organizing [the material] you create the story, I chose to use a chronological ordering, if I had organized my archive differently I would have written a different story. I could have organized it in supporters and opponents" (P16). In this case a researcher chose a certain view of the data and organized them accordingly. Although multiple lines of inquiry were possible, only one is explored. Another noted: "Otherwise, you can not [find] those sources when you are in an archive and your time is precious, you can not sit there for five months. No you go there for two weeks and then again two weeks and then you should know exactly what you are looking for. You also have to interpret the material on the spot and be able to say this is important and that is less important" (P21). In this case, time was a limiting factor in the research cycle and prevented the collection of new material. To limit the amount of time it takes to collect data some researchers reuse data, P02: "However, interestingly, if you continue to use the same data then you do not lose a lot of time with collecting" or ask others for help in getting access to data, as P21 described: "Because the archive service did not seem to cooperate. So then you ask journalists who have easier access to that archive. [. . .] It is a big hassle, and not just fun. [. . .] I have spent a lot of time on it and achieved few results." These quotes illustrate one possible reason for researchers not to continue with additional information gathering and analysis activities in the fourth and fifth iteration, that is, the time and effort involved in data collection and analysis.

Writing and reporting. When one or more iterations of data collection and analysis activities have finished, researchers engaged in writing and reporting activities. During writing, the results of the analysis are interpreted, suitable examples are found, and conclusions are drawn. This is a creative process that requires integrating original data, the results of analysis, literature, and background material. For example, a researcher (P05) noted: "Then write out the data analysis, followed by the conclusions. But again there are a lot of things in between . . . Yes, here you go again back to the literature, certainly after the data analysis and during that analysis. Actually those [cards] should also be put somewhat on top of each other because these things often overlap." Another described writing as: "And then the third phase is analysis and linking: you link all kinds of information together and base your analysis on that until the point that you can make some interesting observations. This connecting of all kinds of material is important. And then you describe your view on it" (P19).

Seven researchers mentioned that reporting occurred during and not at the end of the project. Giving presentations about preliminary work is a common practice in humanities to obtain feedback from peers (Brown, 2002; Chu, 1999); for example, as P18 mentioned: "Explore themes, formulate research questions, then—which in my case structured my thinking—writing a paper and presenting. By doing so, you find out if it is worth it and you can also find people who share that idea. Is it worth thinking about that theme. Then the collection of resources . . ."

TABLE 7. The Pearson correlation coefficient (and *p* value) between the demographics variables discipline, position, and method from Table 3 and the number of activities (#activities) and number of iterations (#iterations) for each participant as presented in Table 6.

	Department	Position	#Iterations	Method	#Activities	Discipline
Department		.23 (.25)	.07 (.74)	**−.47** (.01)	.06 (.78)	**.67** (.00)
Position	.23 (.25)		.07 (.72)	−.02 (.93)	.07 (.71)	−.08 (.70)
#Iterations	.07 (.74	.07 (.72)		−.05 (.82)	**.76** (.00)	.01 (.96)
Methods	**−.47** (.01)	−.02 (.93)	−.05 (.82)		-.02 (.91)	−.37 (.06)
#Activities	.06 (.78)	.07 (.71)	**.76** (.00)	−.02 (.91)		−.02 (.92)
Discipline	**.67** (.00)	−.08 (.70)	.01 (.96)	−.37 (.06)	−.02 (.92)	

Some of the research cycles do not end with writing or reporting activities (P06, P07, P10, P12, P23, P24, P25). Although care was taken to pick a project that was finished, some researchers did not have such a project, or described a project that was part of a larger project where the results served as input to another investigation.

Summary of the research cycle: exploration, contextualization and presentation. In this summary we first discuss the association between research activities and characteristics of participants. This is followed by an analysis of the research activities as an aggregation over all participants.

Table 7 shows the Pearson correlation matrix between some of the demographic variables from Table 3 and the number of activities and number of iterations for each participant as presented in Table 6. In this analysis the nominal variables in Table 3 have been dummy coded in the following way: (a) for the department variable, communication sciences is assigned 0, cultural studies 1, and media studies 2; (b) for the discipline variable, humanities is assigned 1 and social sciences 0; (c) for the method variable, qualitative is assigned 0 methods with a quantitative element 1; (d) finally for the position variable, the values from master student to professor are assigned values in the range 0 to 5. The number of activities (#activities) performed by a participant correspond to the number of "*" in his/her column in Table 6, whereas the number of iterations (#iterations) is the number of iterations for that participant in the same table.

We observe that there is a significant correlation (as indicated in bold) between the number of iterations and the number of activities. This should be expected, as more activities lead to more repetitions of activities and to more iterations. Further, there is a moderate (although not significant) negative correlation between the preferred method by the participant and her/his disciplinary background. This negative correlation suggests that humanities researchers (coded 1) use qualitative methods (coded 0), whereas social science researchers use quantitative methods. There is a significant negative correlation between department and methods, suggesting that communication sciences and cultural studies departments are associated with research using quantitative methods and media studies departments are associated with qualitative methods. We did not observe further associations between preferred method or position and the number of activities or iterations in the research cycle, which would

suggest these variables as an alternative explanation of our observation of the activities of media researchers in the research cycle. This indicates that although there is an association between methods used and department/discipline, we do not find evidence that these methods are related to the number of iterations or number of activities described by the researchers during interviews. That is, the method used by researchers is less of a factor than the personal variation in research style in determining the course of the research cycle.

The previous discussion focused on actions of individual participants. To investigate any patterns that emerge in the aggregate of the sequences of actions we create a one-step transition graph. Figure 4 shows the number of times participants mentioned transitioning from one activity to another. For example, in Table 6 we observe that the transition from background study (bg) to initial research questions (ir) occurs six times, that is, five times in the first iteration, and once in the second iteration. This is indicated by an arc from the node labeled *bg* to the node labeled *ir*. The thickness of the arc is determined by the total number of times a particular transition occurred during the research projects described by our participants.

The figure was generated using the graphviz tool *dot*[3] which generates an automatic layout based on an input of nodes and arcs with transition weights. We observe that at the start of a research project media studies researchers transition between studying background material, developing initial research questions, and initial information gathering. We identify this as the *exploration phase* in which the initial idea becomes more focused as media studies researchers become more familiar with the topic and the material. The goal of this phase is to get an overview of the topic and to formulate an initial research question.

In the next phase a more focused data collection starts. Initially gathered material is supplemented with material to place it into context or a theoretically motivated data selection is made. We define this as the *contextualization phase*. Three paths lead from the exploration phase to activities in the contextualization phase. The first path leads from initial information gathering, studying background material, or initial research questions to revised research questions. The
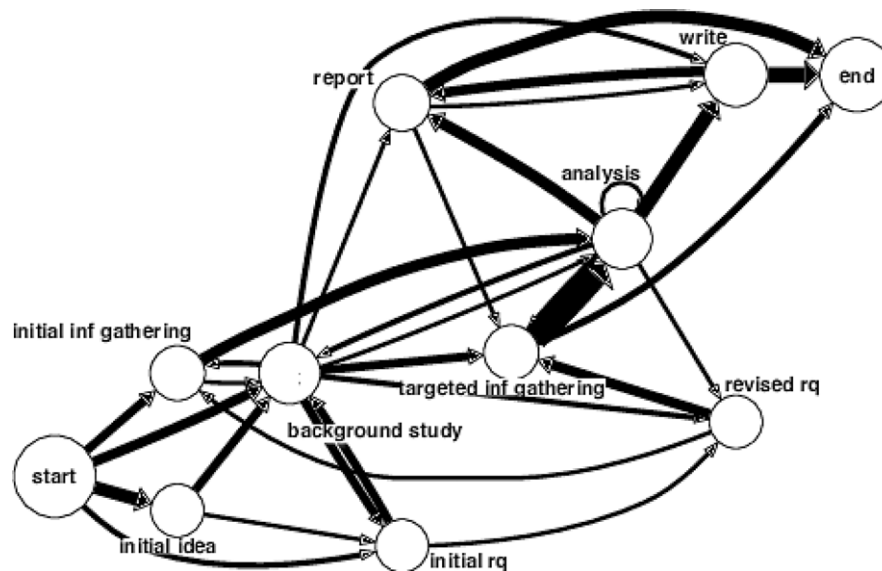
_____

[3]http://www.graphviz.org

FIG. 4.   Transitions between activities in the media studies research cycle. Edge thickness indicates frequency. Transitions occurring once or twice have been removed for clarity.

second path leads directly to analysis activities and the third path leads from studying background activities to targeted information gathering. In most cases targeted information gathering leads (18/20) to analysis of the material.

After the analysis we observed some additional transitions to information gathering (4/32) and studying background material (4/32) activities. However, at some point the data are fixed and the next phase starts. At this point a relevant sample of the data has been collected and these data are interpreted in the context of focused research questions. This phase consists of interpreting and writing. The media studies researcher builds up a case to support the research questions by organizing the data and selecting appropriate qualitative evidence. We refer to this phase as the *presentation phase*.

In this summary of the research cycle of media studies researchers we have seen that research questions change as research progresses and researchers gain a better understanding of their research topic as well as an overview of the material. However, we have not been able to observe associations between disciplinary background, preferred method, or position of participants and the number of activities in the research cycle. Further, it is not clear which factors lead to changes in research questions or the type of changes these questions undergo. Next, we use the model of the research cycle developed above to investigate when research questions change and analyze the interviews to discover how the research questions change.

Changes in Participants' Research Questions

In this section we discuss how the research questions of media studies researchers change during the research process. Table 8 shows for each participant (P) whether: (a) their research question changed (ch) indicated by yes (Y) or no (N); (b) how it changed (how), that is, became more specific (S), additional question added (A), or perspective changed (CP); (c) during which activity it changed (when), that is, during analysis (ana) or an information gathering activity (gat); and (d) why it changed (why). Five participants indicated that they did not change their research question during their research project. Participant P04, for instance, started with a specific question and did not change it because s/he was able to collect all the television series he wanted. P06 and P17 said they did not change their research questions, but added that they "slightly refined" (P06) or "focused a little bit maybe" (P17). P17 explains that "the programme guides and manuscripts provided everything [I] wanted."

The other 22 participants did change their research question. Our interview data shows that the research question changed in three ways: (a) by moving from broad to specific, (b) by adding other research questions, and (c) by changing the perspective of the research question. For 20 participants the research question only changed in one of these three ways. For two participants, P21 and P26, the research question changed in two ways.

More specific research questions.   The research question turned more specific (i.e., became more focussed) during the projects of 11 participants. In all cases the research question was refined during analysis of the material and/or during the data collection activity. Seven participants got a more focused research question during the analysis of material. P19 explains it as follows: "You are going to focus, to sharpen your research question if you know more about the programmes and more about the context. The more material you have analysed, the more focus you get." A participant (P02) who made his research question more specific

TABLE 8. Changes in research questions, for abbreviations see Changes in Participants' Research Questions.

P	ch	How	When	Why
01	N			
04	N			
06	N			RQ in essence the same, slightly refined
12	N			
17	N			A bit more focused
02	Y	S	Ana	RQ became more specific, since s/he discovered themes in the material
07	Y	S	Gat	RQ changed due to availability and type of material
09	Y	S	Gat	became more realistic: it was too much, narrowed down the time period
10	Y	S	Ana; Gat	RQ became more specific since s/he wanted a better focus and realized not all the material is available
15	Y	S	Gat	Limited data collection for pragmatic reasons
16	Y	S	Ana	Watched material and got a more specific idea
19	Y	S	Ana	RQ became more specific, since s/he had seen more documents
22	Y	S	Gat	RQ changed since s/he did not have access to all material
23	Y	S	Ana	RQ became multilayered, two RQs derived from the initial one
03	Y	A	Ana	Additional RQ about production and start new data collection
05	Y	A	Ana	Found that s/he could not properly answer the RQ and had to search again for specific material and enlarge his/her corpus of programmes.
08	Y	A	Ana	Studied additional literature and added a theoretical RQ
13	Y	A	Ana	Discovered that s/he should analyse a larger variety of cases
18	Y	A	Ana	Discovered shows lack of popularity in some countries, investigated why
25	Y	A	Ana	Found another aspect s/he could focus on
27	Y	A	Ana	Initial research turned out to be too limited
11	Y	C	Ana	Noticed that technology is an important factor
14	Y	C	Gat	RQ changed since s/he could not access to the programmes s/he wanted
20	Y	C	Ana	RQ was based on an assumption and should be rethought completely
24	Y	C	Ana	Noticed that some people use multiple languages, investigated why
21	Y	S; C	Ana	Discovered during analysis that his/her initial RQ could not be answered
26	Y	S; A	Ana	Exploratory research, some RQs are dropped others made more focused

during analysis of material, also referred to the literature study activity. He focused on four themes in the newspapers because s/he "found that there were re-occurring themes in the literature. And in the journalistic debates [in the newspapers]." He adds: "In fact, the research questions got more focused along the way, but of course it is also an interactive process [between analysis and literature study]. I started out very broad." During data collection, the research question of six participants got more specific. P22, for instance, had to change the focus of the research question as it turned out material was not available: "I had to change the research questions, [. . .] because I could not obtain enough material of [type A] broadcasters, and therefore could not compare [type A] and [type B] broadcasters."

Additional research questions. In eight cases participants decided to add additional research questions. During analysis some participants discovered additional aspects of their research topic and added a research question to account for this. For example, P25 noted: "It is related to my original research question, but it is in a different direction, because I can see while analyzing material, ah, there is another aspect," while another participant answered: "Yes, in the beginning I was interested in how [object of study] imagines its audience. And towards the way, I found that there were things that were interesting that are not related to this. For instance, location" (P27).

Other participants added additional questions as their original research question turned out to be too limited and did not cover the trends discovered in the data sample. As P18 mentioned: "Then you discover that it is a format that is also produced elsewhere, and that might be popular over there. It appeared that there is a big difference between northern and southern countries," P05 stated: "at one time I decided to add a qualitative part because I found that on the basis of the broadcasts that I had analyzed that I did not have all [. . .] That I was not yet able to fully answer the research question." Some participants mentioned that the patterns they expected to find in the material were not present: "I expected [medium A] to be more involved with [medium B]. Because [medium A] was the mass medium, the leading medium in the [. . .]s. I thought, in [medium A], they probably intensively discussed [medium B], but that was not the case" (P21).

Research questions with changed perspective. Five participants changed the perspective of their research question. According to P11: "when I was doing [analysis] it became clear that the availability of the shows depends on the technology. The paper ended up talking more about the technology. Because of the way [medium] criticism has moved in the way it works"; and P20: "it was when I started having interviews that I realized that it is not so black and white and that is when the direction of my research changed

completely." Similarly, P14 had to change the perspective of his/her research question from "[perspective A]" to "[perspective B]" because s/he did not get access to the archives: "So, I investigated what I could get access to."

In summary, the analysis of Q2 and Q10 suggests that research questions often change during the media studies research cycle, that is, questions become more specific, additional questions are added, or the perspective of questions changes. Changes are related to activities of information gathering and analysis. During these activities participants learn about new aspects related to their research topic and gain insight in the availability and trends in the material covering their topic. Responses indicate that several iterations of information gathering and analysis activities alternate before the final research questions take shape.

Information Sources and Challenges

In this section we describe which information sources and information gathering challenges media studies researchers encountered during their research projects. First, we focus on the primary source materials that were the focus of the research projects and what kind of additional information media studies researchers gathered. Then we elaborate on the challenges of gathering this initial and additional material.

Information sources. In the exploration phase, media studies researchers started with broad collections to select interesting cases. They gathered the primary source material in multiple and often combined ways. Eleven participants went to physical archives. Nine participants collected material by buying newspapers, magazines, DVDs, or games, or gathering online material such as websites and blogs. Two participants recorded television programs when they were broadcast. Five interviewees combined archival material with online material and/or recordings.

Several types of information were gathered. A large proportion of the participants (13) started by collecting audiovisual material: television programs, commercials, and documentaries. Others started with audio material, that is, radio broadcasts (4). Six participants collected print material such as program guides, institutional material, and newspapers. Three did this in conjunction with collection of television broadcasts. The other three had print material as their main collection. Five participants focused on new media collections such as Twitter feeds, websites, blogs, and games. Two of five collected new media in conjunction with television broadcasts. Three participants also indicated that they conducted interviews as part of the initial data collection (i.e., next to collection of audiovisual, printed, and/or new media material).

In contrast to data collected in the exploration phase, the additional data collected in the contextualization phase is more specific, that is, ratings/data on popularity (2), critical reviews (6), debates (3), blogs (4), online fora (2), letters of viewers (1), and biographies (4). The first five types of material are all collected to add a reception study on how television programs, radio broadcasts, or films are received in the press and by the audience. The last category, biographies, is collected to dig into the background of producers, journalists, cast members, and people mentioned in newspapers and news broadcasts. Last, interviews with producers are also often mentioned: nine participants indicated that they conducted interviews.[4] P03 explains why interviews are an important source of information: "For the production context in general, one depends on information on the internet, or the website of the production company or broadcaster. In general it remains very superficial. Therefore, we had to do interviews."

The information gathered in the contextualization phase is literally referred to as "contextual information" by eight participants. P21 describes contextual information as "essential" and explains it as "metadata in the language of archivists." Participants often named the collections they used in an attempt to find information ("program schedules in program guides," "interviews in newspapers," "reviews in newspapers," "biographies on wikipedia"). On one hand, they find it online, that is, on wikipedia, websites of broadcasters, and online newspapers. On the other hand, they look in paper archives for newspapers, magazines, and program guides. P13, for instance, studied international newspapers for reflections on the audiovisual material s/he studied: "Yes, I also used newspaper articles, namely [newspaper 1] and [newspaper 2], [. . .] to search for a reflection on what happened with [main subject]."

Newspapers are not only valuable in that they provide reviews, reflections, and production information but also to contextualize per se. Five participants used newspapers to get a better understanding of the political and social context of the media they studied. For instance, P24 mentioned that s/he "looked for international newspaper articles about [media subject] to contextualize it." (Historical) books are also mentioned in five interviews as useful contextual information. P14 explains the use value as follows: "journalists and directors do not come up themselves with ideas. They often get inspired by what happens in society. This is something you can find in historical books."

Challenges. Participants reported a variety of challenges that they encountered during the initial and targeted data collection activities. They did not mention a specific activity during this interview question; hence, we discuss the general challenges in information gathering here. The majority of problems relate to the physical and digital archives; some also to the web in general. Participants mention up to three problems each. These can be divided into five categories: (a) availability of material, (b) archival search system, (c) archival cataloging/metadata, (d) technological challenges not related to archives; and (e) institutional challenges.

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[4]Note that researchers collected multiple types of material and the number of types exceeds the number of participants.

A lack of availability of research material was mentioned 18 times. In 11 cases (of 18) the lack of availability referred to material that was not preserved. Six participants indicated that the television programs, radio broadcasts, and commercials that they needed were not preserved. P04 explains how it affected his research: "I got access to a lot of material that was not publicly available, [. . .] but still there was some material that was not preserved and, therefore, not available for my research." Five participants said that it was difficult to find production information, as this material is not preserved by archives. P01 considers "especially financial and budgetary information of television programs is difficult to obtain, but nevertheless important for research." S/he also suggests that "producers are not very likely to share this sensitive information with you." In four cases (of 18), it was regarded as a problem that material was not digitized. P21 for instance accounted for a situation in [country]: "Only a little is digitized. You often have to pay for viewing material. So, it costs a lot. This makes it very difficult to study audiovisual material in [country]". In the other three cases (of 18), the needed material was available but in bad condition. For instance, P10 really had to rely on the recordings, as s/he had to hear what was being said: "Quality various quite a lot [. . .] Especially, those really bad recordings of the 19[. . .]s." P20 gives as example that "it often happened that the film broke during my viewing [of audiovisual material]."

A second category of problem is related to the search system of the archives, a problem that was identified six times. Three participants mentioned that they were not allowed to use the search system themselves, and had to work with an archivist. For instance, P20 mentioned that "initially I did not have access to search myself, so I would tell them a big keyword or a specific title of a program, a long-running program for instance and then they would give me pages with the reference number of the programs without description and then I had to do my research based on that." Others noted that the search system was "not good" (P04, P13) or "non-existing" (P17).

Third, a bad archival cataloging system was mentioned as a problem by three researchers. According to participant P16, "the programs were not well described in the archive and difficult to retrieve." P16 also said that "there were missing metadata fields of radio programs." P24 "missed information on the page numbers of newspapers [in the online search system]." Fourth, the participants who did not obtain their research material (solely) from an archive, also reported technological problems, such as that "it was difficult to scrape all the tweets" (P25) or "difficult to record multiple programs at the same time" (P03, P05).

Last, institutional challenges, relating to the parent institute of the archive or the legal rights copyright owners and broadcasting companies, were mentioned nine times. Five participants could not get permission to access the archive. One participant was denied permission from web platforms to access the data. Three participants said that it was too expensive to obtain material from the broadcasters and film production companies and, therefore, they decided to collect

audiovisual material by recording them while on television. Two other researchers had to deal with geographically dispersed archives. P17, for instance, said that s/he had to go both to the central archive and to all regional archives in every state to obtain all material, "which costs time, effort, and money." According to two researchers, archives were also slow in releasing material. P09, for instance, says that "it took seven months to obtain all the material."

In summary, we found that gathering primary and contextual material requires search across various sources, that is, newspaper services, traditional as well as digital archives, and the web, and that each provides its own challenges in terms of accessibility and discoverability of the material. Specifically, we found that there is an urgent need for better and different types of information systems to search in archives that deal with various sources and collections. Finally, we found that next to traditional objects of study such as monographs, media studies researchers are turning towards new sources provided by the web, for example, online discussion forums, for primary source material as well as contextual material.

Discussion

In this section we discuss our answers for each of the three research questions raised in the first section and relate our findings to previous work.

Characterizing the Research Cycle of Media Studies Researchers

In our first research question we sought to identify sequences of activities in the research projects of media studies researchers and to compare the resulting model of the media studies research cycle to other models of the humanities and social science research cycle and information-seeking behavior. Note that other work on the research cycle often refers to stages instead of activities. We refer to stages as activities and a particular recurring pattern of activities as a phase. We identified several activities within the media studies research cycle, as detailed previously, and found that it is an iterative process, where activities such as literature study, data collection, and refinement of the research question alternate. A model with three phases emerged, that is, the exploration phase, the contextualization phase, and the presentation phase, as during a research project media studies researchers transition from one set of activities to the next. We first describe how our model relates to general models of information behavior and then zoom in on specific models of the research cycle of humanities researchers.

Models of information behavior. The phases identified in our model of the media studies research cycle are consistent with the stages of models of information-seeking behavior that have previously been published. Kuhlthau's (1991)'s ISP model describes the following six stages that occur
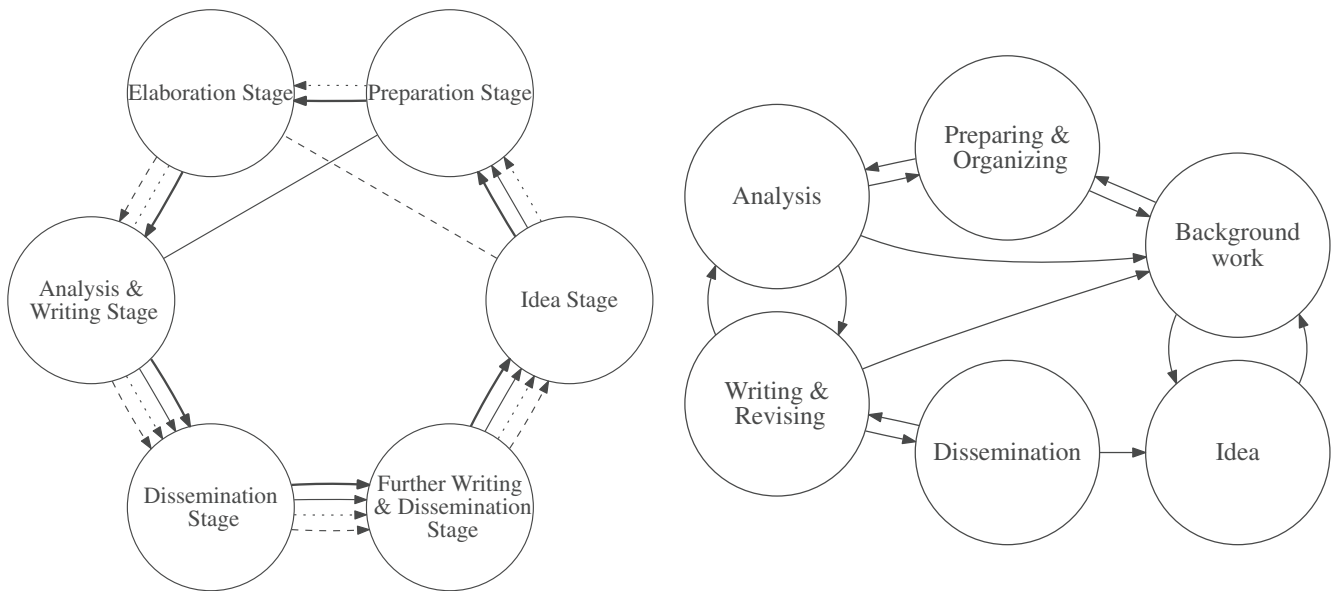
FIG. 5. The model on the left shows the research cycle as proposed by Chu (1999). The different arrow styles each indicate a different variant of the model. Directed edges indicate the order in which stages are observed, and undirected edges indicate stages that are merged in a particular variant. The model on the right shows the research cycle of music scholars as proposed by Brown (2002).

during a paper proposal writing task: initiation, recognition of a need, selection and identification of a topic, exploration of relevant information, formulation of a focused topic, collection of relevant information, and presentation of search results. Here the first four stages align with our exploration phase, the next two align with our contextualization phase, and the final stage aligns with our presentation phase. Vakkari (2001) used three phases in the task performance model, that is, prefocus, formulation, and postfocus. An important difference is that these models focus on information-seeking behavior that corresponds to a single iteration of the research cycle in our model. We show the frequency with which particular activities lead researchers to engage in another iteration of the research cycle, that is, revisiting or transitioning to a particular phase (Figure 4).

Strategies such as browsing and differentiating (Bates, 1989; Ellis & Haugan, 1997) are observed during the activities of the media studies' research cycle. Whether researchers utilize these strategies depends on the stage and phase of the research cycle they are in.

Models of information behavior proposed by Wilson (1999), Byström and Hansen (2005), or Ingwersen and Järvelin (2005) provide a general framework to describe users' information behavior in context. We have not considered all possible variables indicated by these models as these are too broad. Instead, we focused on the research-related activities during a research project.

Specific models of the research cycle. Our model shares more similarities with models of the research cycle of other humanities researchers (Stone, 1982; Uva, 1977) than those

of the social sciences (Bhattacherjee, 2012; Kendall, 2012). Most closely related to our work are models of literary critics and music scholars, which we discuss in more detail next.

The model on the left of Figure 5 shows the research cycle (and a number of its variants) of literary critics as proposed by Chu (1999). The different arrow styles each indicate a different variant of the model. Directed edges indicate the order in which stages are observed, and undirected edges indicate stages that are merged in a particular variant. The canonical variant of the research cycle in this model consists of six stages, starting with the Idea Stage, moving to the Preparation Stage, Elaboration Stage, Analysis, Dissemination, and Further Dissemination Stage, as indicated by the bold arrows. Chu also discusses three variants: (a) a variant where the preparation stage is skipped and idea generation is merged with elaboration (dashed line), (b) a variant where elaboration is merged with analysis and writing (dotted line), and (c) a variant in which elaboration is skipped and preparation is merged with analysis and writing (solid line). Chu's model is presented as a linear cyclical process, although she notes that the stages do not occur in a strictly linear order, depending on the number of active projects, familiarity of the researcher with the topic, and personal working style.

The model on the right of Figure 5 shows the research cycle of music scholars as proposed by Brown (2002). Brown's model consists of six stages, as does Chu's model, and has similar activities associated with each stage. However, it differs from Chu's model in making the dynamic nature of the research cycle explicit, that is, the moves back and forth between different stages.

In contrast, our model provides a more detailed picture of the transitions between activities and how they reoccur during the research cycle. Based on these transitions between activities three phases emerged. The preparation stage of literary critics corresponds with our exploration phase. The elaboration and the analysis and writing stages correspond to our contextualization phase, whereas the dissemination and further dissemination and writing stages correspond to our presentation phase (Chu, 1999). The additional preparation and organization stage in the model of music scholars' research cycle is characterized by information-gathering activities such as interviews and participant observation (Brown, 2002). We observed similar activities in the exploration phase of our model. However, we additionally observed that targeted information gathering and analysis in the contextualization phase led to revisiting the exploration stage. Further, the reporting activity led to revisiting the contextualisation phase. These patterns of revisiting phases are related to particular challenges that researchers encountered during their research project.

Next we look into the factors underlying these patterns of transitions and how they relate to changes in the research questions of media studies researches.

Factors Influencing Research Questions in Media Studies

With our second research question we investigated whether the research questions of media studies researchers change during research projects and whether we can identify factors that influence this change. Our analysis above shows that research questions change as media studies researchers become increasingly familiar with the material and the topic under study. Both Kuhlthau (1991) and Vakkari (2001) observed that research questions become more focused as a research project progresses. They note that increased familiarity with the topic leads to a focus in their information need and research questions. More recently, Sukovic (2008) made a similar observation when working with digital texts, that is, that exploring and browsing material allows researchers to make connections between previously unconnected material leading to the convergence of ideas and in that sense to new research questions.

These observations, however, are made without the context of the research activities that lead to these changes. For example, does the research question gradually become more focused during an ideal sequence of activities, for example, having an idea, studying literature, gathering material, performing an analysis, and writing, or are changes in the research questions more affected by particular activities?

We provide the context in which research questions change in terms of transitions between activities. Figure 4 shows this in the connections between the analysis, targeted information gathering, and revised research question activities. Not all participants explicitly mentioned the interactions between these three steps in response to the interview questions about the activities during the research cycle, for example, mentioning only going back and forth between information gathering and analysis or between several analysis activities. Consequently, the edges in Figure 4 are not all equally strong. The analysis of Q11 and Q12, however, demonstrates the dynamics between information gathering, analysis activities, and changes in the research question. Additionally, our analysis in Table 8 shows that research questions generally changed during data gathering or analysis.

One explanation for these observations is that before the mass availability of digital documents, researchers studied smaller samples, for example, a particular literary work, music score, or even works by a particular person, for which a single information-gathering activity was sufficient. However, with the increase of available material in the form of digital texts and the freedom it provides for researchers to make connections between previously unrelated material, analysis of this material may lead to new insights. This affects the research question not only in that it may become more specific, but also that it may lead to additional research questions or a completely new research question. To be able to answer these new questions new source material needs to be gathered and new analyses are necessary. In Information Sources and Data Gathering Challenges, next, we look into these information sources and associated information gathering challenges of media studies researchers.

In summary, we found three types of change that research questions may undergo during the media studies research cycle: (a) the research questions become more focused, (b) an additional research question is added; and (c) the perspective of the research questions changes. Additionally, we found that two of the main activities in the media studies research cycle are responsible for changes in the research questions of media studies researchers: information gathering and analysis. During information gathering, media studies researchers discovered the extent to which accounts in primary source materials cover their research topic and whether this material was available. During analysis, researchers gained insight into trends in the data and the existence of alternative views on their research topic. It shows the importance of the availability of data in data-driven research, underlining the urgency of well accessible and well searchable digital collections.

Information Sources and Data Gathering Challenges

Finally, we turn to our third research question: which information needs and information-gathering challenges do media studies researchers face during research projects? We found that they use various information sources and that the specificity with which media studies researchers are able to characterize the information they need and the type of material sought depends on the phase in the research cycle. In the exploration phase, media studies researchers engage in an activity of a broad gathering of a single type of primary material, for example, television. As the media studies researcher becomes familiar with the material available on a topic, the work becomes more focused. In the

contextualization phase, theoretically informed selection criteria are used to gather the media type that is the focus of the research. In contrast to the exploration stage, however, additional types of primary and secondary materials are consulted, for example, newspapers, to provide context for the interpretation of the primary source material focused on in the research.

Earlier work identified how the information needs of humanities researchers become more focused as they move through the stages of the humanities research cycle and the need for context information arises. Duff and Johnson (2002) discovered that historians need to orientate themselves on the archive before starting the search for relevant material. The process of (re-)examining finding aids leads to refinement of the questions and builds up contextual knowledge that increase historians' understanding of the research topic. Chu (1999) identified how literary critics go through stages of preparation, in which the context of the work is identified, and elaboration where the exact area of interest is determined. Brown (2002) noted as well that music scholars do background work to establish the viability of the research idea before information gathering is narrowed to a certain topic and organized in a certain way. We found a similar pattern in the research cycle of media studies researchers. The differences, however, are in the type and number of sources used by media studies researchers. Next to traditional sources of contextual material such as books and monographs, media studies researchers now also turn to the web and use websites, online fora, and blogs. Archives are picking up on this and the need for tools that add contextual material of various kinds to, for example, audiovisual material (Auffret & Bachimont, 1999). Newspapers are popular context documents as well and are consulted for various reasons, e.g., television schedules, interviews, or reviews. The accessibility to newspaper archives via services such as LexisNexis[5] may have increased their use.

We further identified four types of challenge that media studies researchers face in their data collection activities with current technologies. One of these challenges is the availability of information, for example, production information. We found that for media studies researchers conducting interviews is an important way of acquiring this type of contextual information that has not been preserved or that is difficult to obtain. Another observation was that although participants mentioned the need for analog material and digitization thereof, few actually visited archives. Participants mentioned that material was not available because it was not digitized: "availability" is, therefore, often taken to mean "digital availability." The activity of visiting physical archives is considered time-consuming and often inefficient.

Other challenges derive from archival search systems and cataloging practices. Participants mentioned they were not always allowed to operate search systems themselves and had to work through an intermediary, or if they had access

systems turned out to be difficult to operate. Additionally, material was not described or made accessible as researchers expected due to the limited capacity of archives and libraries to extensively catalog material. This problem may be expected to become worse with the advent of digitally born material. Even if material is accessible, copyright issues and the cost of acquiring material are posing challenges to media studies researchers. Although tools that support browsing and filtering are becoming available in libraries and archives (Bron, van Gorp, Nack, Baltussen, & de Rijke, 2013; Shiri, 2008), these challenges underline the importance of support for gaining an overview of the available material on a topic and determining suitable selection criteria (Bron et al., 2012; Huurnink et al., 2013). Furthermore, once challenges with respect to access to material are resolved, researchers will require tools to search within multimedia content. Such needs have already been identified for media professionals who are not limited in their access to multimedia material (Huurnink, Hollink, van den Heuvel, & de Rijke, 2010).

Conclusion

In this study we investigated the research cycle of media studies researchers, a group of researchers situated both within the humanities and social sciences who deal with various information types and technologies and on which few studies in information behavior have focused.

Our first contribution is the development of a model of the media studies research cycle, which confirms earlier studies into the research cycle of humanities disciplines. Specifically, we found that the research cycle of media studies researchers shares similar activities as models developed to characterize the research cycle of literary critics and music scholars. We add to existing work by providing a detailed quantitative and qualitative analysis of the activities within the research cycle and how they interact. In particular, we found that information gathering and analysis activities are especially influential on research outcomes, which may be observed through changes in the research questions of media studies researchers.

Our second contribution is an identification of three types of changes that research questions may undergo during a research project: (a) questions become more specific, (b) additional questions are added, (c) or a changed perspective in the research question. Reasons for the changes in research questions can be found in the observation that media studies researchers learn about the availability of material, discover trends in the material, or gain alternative views on a topic. The main activities during which these changes occur are information gathering and data analysis. This finding implies the growing importance of data and tools and their role in the development of the questions researchers ask. It provides evidence for the concept of "data-driven" research, in which research questions are believed to be strongly related to the data available. Research questions are the main instrument of research that determines the appropriateness and sufficiency of the gathered material, the analysis, and

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[5]http://academic.lexisnexis.com

scope of a research project. Through analysis of changes in these questions we may be able to assess the effects of tools developed to support humanities researchers and the archival practices of data providers.

Our third contribution is the identification of the role of information sources and tools during information gathering and analysis activities and how these factors affect researchers' questions. We found that media studies researchers turn to new information sources for contextualization on the web, for example, blogs, online fora, as well as a diverse set of sources accessible though individual search services, for example, newspapers and archives. Due to the abundance of material that seems to be available, at first sight a researcher may think that a particular research question can be answered. However, digging deeper, material is often unavailable due to copyright or other restrictions. Another factor are the tools used to gather material. These often lack transparency in terms of how documents are retrieved in response to search terms, which part of a collection is indexed, and which preprocessing steps have been applied, for example, exclusion of a particular field a researcher expected to be present. Finally, we found that challenges of accessibility and discoverability of primary source materials remain a concern and require continued attention.

As to the limitations of our work, we performed an analysis on a diverse but small sample of media studies researchers. Future work may conduct surveys on larger samples of researchers in media studies and other disciplines. The challenge is not only to provide tools that support media studies researchers in answering questions through collection and analysis of large amounts of material, but to develop tools that assist media studies researchers in documenting the questions asked about particular collections of material and how these tools were used to answer them.

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