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Abstract. Research methods are part and parcel of good research. Despite this, we often teach research methods in an ad hoc manner and do not reflect on relevant pedagogical aspects. This situation is changing due to the introduction of dedicated research methods courses as part of a transferable skills agenda in many universities. To address pedagogical aspects of teaching methods in IS, we organized a workshop during the 10th Scandinavian Conference on Information Systems (SCIS/IRIS). Our goal was to create a community of practice among supervisors and teachers of research methods in IS. In this paper, we present our findings from the workshop presentations and discussions. Three main themes emerge from our workshop: 1) Coping with student motivational aspects of learning research methods at micro and macro levels, 2) Challenges related to course design for different institutional contexts, and 3) The challenging interplay between IS theory and empirical data when teaching research methods. We discuss these themes and their relation to the field of IS. We propose some future research topics for the community.

Key words: teaching, research methods, teaching practice, theory, pedagogy, research methods course, research methods class, pedagogical culture, IS, information systems.

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1 Introduction

There are good reasons for teaching research methods to our students. An understanding of research methods and their underlying principles has a crucial role in developing a critical and reflective mindset (Chatfield 2018; Wass et al. 2011). With the increasing role that data play in various professions, sufficient knowledge of research methods can help our students to judge the validity of these data and the conclusions based on them, both as private citizens and as future professionals and decision-makers (Gunn 2017). From an academic research perspective, our students at both PhD and master levels are participants to the research done by their teachers and supervisors. Thorough knowledge of research methods means these students will produce high-quality results that can benefit research projects and lead to publications, and in turn improve the quality of research-based teaching (Brew 2012).

Teaching research methods to our students is no longer an option: "Under pressure to increase enrolments and improve completion rates among research students, universities have begun stressing the importance of a sound training in how to conduct research" (Garner et al. 2009, p. 1). Research councils and funding agencies worldwide regard strong research methods knowledge as a necessary capacity-building tool, fundamental to global competitiveness (Gunn 2017; Lewthwaite and Nind 2016). The European Union's program for transferable skills for PhD students (called Innovative Doctoral Training Principles, IDTP) emphasizes the importance of research skills (The European Commission 2011), leading to increased demand for dedicated courses to teach research skills at the European academic institutions.

Despite this increased demand, teaching research methods "is not an established field of research like, for example, math education, nursing education, science education, or statistics education" (Earley 2014, p. 243). Several textbooks and general literature about empirical research methods exist for teachers who want to set up and teach methods courses in computing and IS (See Oates 2006 for an example). However, scant resources are currently available on how to *teach* research methods, especially at a master's level. By resources we mean both textbooks and other literature dedicated to the pedagogical aspects of designing and teaching research methods courses, but also other resources such as peer networks, empirically validated best practice guides, online tools, and other pedagogical materials. As a result:

> Left to their own devices, research methods teachers must rely on a network of peers, scattered research literature, and much trial-and-error as they develop and improve upon their own research methods courses (Earley 2014, p. 243).

This applies equally to the field of computing and IS:

> In computer science, research methods have historically been passed from advisor to student via apprenticeship [..]. Most of us learned these methods from a mentor or not at all (Holz et al. 2006, p. 97).

The situation becomes pressing as we gradually move towards larger research methods classes where neither one-on-one mentorship/apprenticeship nor ad hoc teaching methods and course designs suffice. For instance, our research courses at NTNU's (Norwegian University of Science and Technology) Department of Computer Science enroll more than 100 students each year. NTNU is not an exception. Several computing and IS programs in Scandinavian universities require all their students to gain research skills through dedicated courses or as an integral part of the entire master's program.

The teaching of research methods is, therefore, in need of a pedagogical culture and related frameworks and theories (Holz et al. 2006; Nind and Lewthwaite 2018). A pedagogical culture can be defined as

> the exchange of ideas within a climate of systematic debate, investigation and evaluation surrounding all aspects of teaching and learning in the subject (Garner et al. 2009, p. 2).

There are several challenges related to the teaching of research methods—both within IS and elsewhere—that call for creating a pedagogical culture. First, research methods can be daunting and challenging to learn for students (Daniel et al. 2018; Gunn 2017). Existing research points in the direction of problem-based, student-led course designs where students are exposed to practical research problems instead of a lecture-based transfer of knowledge (Hammersley 2004; Holz et al. 2006; Humphreys 2006). Second, the diversity among research methods, particularly the different paradigms and the qualitative-quantitative divide, can be challenging for teachers (Galliers and Huang 2012; Onwuegbuzie and Leech 2005). For instance, some researchers believe that qualitative methods require fundamentally different pedagogical approaches and theories than those needed for teaching quantitative research (Galliers and Huang 2012; Gunn 2017).

Third, a more fundamental challenge for the IS field is that we have few research methods and tools developed explicitly by IS researchers, and pedagogical resources for these emerging methods are often entirely missing. Many of the methods that IS researchers use are adapted from other research fields such as social sciences and organ-

izational research. We usually send our PhD students to courses organized by other faculties. Such imported methods have no doubt contributed strongly to the field of IS and resulted in rigorous research over many decades. New dedicated IS methods will surely build upon and share many fundamental properties with empirical research methods in general. However, we envision future IS methods to demonstrate a reflexive sensitivity and systematic approach to studying the evolving relationship between digital technologies and society. Within IS many research problems require not only multidisciplinary research but also multi-methodological approaches (Nambisan et al. 2017; Van De Ven 2007). Emerging IS methods should increasingly acknowledge the role of the digital phenomenon and its affordances (Bygstad et al. 2016; Nambisan et al. 2017) but also the need for new research designs emphasizing breadth and longevity in research (Bailey and Barley 2020; Hyysalo et al. 2019). The same should apply to our ways of teaching these methods.

Based on the above challenges, and our experienced challenges of teaching several research methods courses to computing and IS students, we set out to organize a workshop during the 10th Scandinavian Conference on Information Systems (SCIS), in Nokia, Finland, in August 2019. The overall research question for the workshop was:

> What are the current practices and experiences among IS scholars in Scandinavian academic institutions when teaching research method courses?

We aimed at initiating a discussion among scholars and teachers of research methods in IS in Scandinavia and elsewhere. Workshop participants presented several cases from research methods teaching in their institutions. A follow-up discussion resulted in several cross-cutting themes based on the teaching experiences of the participants.

This paper is part of our long-term goal of contributing to the development of a pedagogical culture for the teaching of research methods in IS. Our contribution in this paper is two-fold. First, we provide a diverse picture of how methods are taught in some leading Scandinavian academic institutions, and how experiences from this teaching correspond to existing international research. Second, we reflect on the status quo for methods teaching and develop some overarching themes as candidates for future research. We will discuss mainly issues related to the IS field and related sociotechnical disciplines, although several of these challenges will apply to computing disciplines as well.

In what follows we first discuss some topics in the field of research methods teaching. We then present our method, cases, and findings, before we conclude with a discussion and our agenda for future research activities.

2 Related research

Numerous high-quality textbooks and articles are available on research methods in general and within IS[1]. At the same time, comparably few resources exist about the *pedagogical aspects of teaching* methods (Earley 2014; Garner et al. 2009; Holz et al. 2006). By resources, we mean both textbooks, articles, and other resources such as example cases, instructions, peer networks, templates, and the like. Moreover, most of the available resources are scattered in journal articles and papers published in a wide variety of scientific outlets, making it difficult for a teacher to create a holistic picture of the field and its best practices. As stated by Holz et al.

> the most frequently mentioned barriers to establishing a successful [methods] course are: (1) not being sure what material to teach, and (2) a lack of resources from which to build a course (2006, p. 96).

Due to this lack of resources, research methods textbooks that IS students are recommended to read often originate from other fields such as social sciences, business and management, psychology, and medicine. Some authors have attempted to adapt existing empirical research methods to IS-related fields (See e.g. Oates 2006) but often do not reflect on fundamental ontological and epistemological issues specific to IS. Resources dedicated to the teaching of methods within IS are still scarce.

In this section we aim to summarize existing research in three specific areas of interest for us. We first look at how the teaching of research methods is founded on an *apprenticeship model* and a one-on-one relationship between supervisors and students, and how this affects the development of a pedagogical culture and associated resources. We will then look at some aspects of the recent steady increase in the number of students at universities, how this impacts the apprenticeship model, and why it creates the need for a new pedagogical culture catering to alternative teaching models. Finally, we will discuss some issues related to teaching methods to IS students specifically, and why relying solely on methods imported from other fields can be problematic in the long run. Table 1 below summarizes the findings from our short review of available literature.

Topic	*State of current research*	*Example references*
The apprenticeship model	Although useful as a one-on-one supervision method, the apprenticeship model has contributed to research methods knowledge being treated as tacit knowledge, leading to a lack of emphasis on the pedagogical aspects of methods training.	(Galliers and Huang 2012), (Hammersley 2004)
Teaching large courses	There is a general lack of pedagogical models, resources, and designs to teach large classes. Attempts are made to transfer the apprenticeship model to large classes. However, this might prove problematic due to e.g. diversity of student aspirations and the multiplicity of available research designs and paradigms.	(Holz et al. 2006), (Edwards and Thatcher 2004), (Galliers and Huang 2012)
Teaching research methods in IS	There is, in general, a lack of ad hoc resources to teach the design of research that requires longitudinal sensitivity to both technical and social aspects in IS. The guiding frameworks used in research design are often presented as an input-output pipeline that irons out the pervasive role of theory across all phases of the research process.	(Johnson et al. 2019), (Hyysalo et al. 2019)

Table 1: A summary of our findings from the reviewed literature.

2.1 The apprenticeship model

One reason for the lack of de facto pedagogical resources on how to teach methods might be related to the fact that doing research is traditionally considered to be a highly contextual craft. As a craft, the knowledge can only be transferred from a senior researcher to a novice student through supervision in the context of a research project; i.e.; in an apprenticeship setting (Hammersley 2004). Apprentices

> learn in contexts very similar to the situations they seek for further activity or employment. Given this framework, apprenticeship learning for graduate students aspiring to be professional scientists represents an ideal educational approach (Sadler et al. 2010, p. 236).

Promoting career aspirations in science and research has been quoted as one of the main reasons apprenticeship is used in graduate schools (Sadler et al. 2010).

The complexity of research methods can also justify the apprenticeship model, and that a contextualized and continuous dialogue is needed to learn doing research. Therefore, classroom teaching might not be the ideal pedagogical approach, as stated by the group of experts interviewed by Galliers and Huang in their study:

> What is evident is that there is considerable agreement among our panel members concerning the difficulties in transferring tacit skills in class, and the resultant difficulties faced by novice qualitative researchers, especially when such training is so limited (Galliers and Huang 2012, p. 128).

Apprenticeship replaces classroom-based approaches that are based on the transfer of packaged abstract knowledge:

> […] what is required of novitiates is not that they acquire a discrete body of abstract knowledge which they can then simply apply, but that they work their way into a certain form of habitus: an orientation and a range of skills that will enable them to pursue the craft well (Hammersley 2004, p. 10).

The apprenticeship model also has limitations. Some of these limitations are related to the differences underly students' and supervisors' perceptions of supervision, such as available time for supervision, the subject of supervision, and the amount of feedback needed (Ismail et al. 2011). At a more fundamental level, an apprenticeship might also result in a superfluous understanding of the role of methods in science and lead to

> relatively low level gain compared to many of the philosophical and sociological ideas advanced by NOS [Nature of Science] educators such as the evolution of scientific thought over time and the social embeddedness of science (Sadler et al. 2010, p. 244).

This might be the result of some supervisors focusing solely on the procedural aspects of knowledge creation, leading to apprentices maintaining "naïve views relative to the significance of social processes" (ibid). In fact, the term supervisor in the apprenticeship model seems to be related more to the activities of research than educating, pointing to the "still-subordinate position of education to disciplinarity" and the "need for richer and more complex theorisations of the conceptual and discursive space of pedagogy in doctoral education" (Alison Lee and Green 2009, p. 617).

Power relationships in an apprenticeship model can limit apprentices to conducting peripheral activities, allowing only supervisors to make the fundamental decisions about research (Benmore 2016; Campbell and Hart 2018). The close relationship, coupled with imbalance in power, can also have negative effects on learning:

> It is not uncommon for graduate supervision to be likened to a parent-child relationship […], which may inadvertently disadvantage the dyad and interfere with the development of a critical qualitative researcher (Campbell and Hart 2018, p. 408).

This relationship is also discussed by Wisker and Robinson in their account of orphaned doctoral students, when

> supervisors or even the full supervisory team change, move on, leaving the student with emotions resembling those caused by loss of family or others who normally care for their development (Wisker and Robinson 2013, p. 301).

In this way, the apprenticeship model depends strongly on the craftsmanship and tacit knowledge of the individual supervisor and does not lend itself easily to be the subject of a more transparent pedagogical culture. As noted by McCallin and Nayar:

> While the context [of postgraduate supervision] has changed significantly, most research teaching takes place in the traditional model. The result is numerous academics teaching individual students the same thing in separate situations (2012, p. 70).

Recent research calls for community approaches to apprenticeship and supervision, such as peer groups, research seminars, and multiple supervisors, rather than a dyadic process between one supervisor and one student (Anne Lee 2018; Vehviläinen and Löfström 2016).

2.2 Teaching large courses

The number of experience reports published in recent years in various journals and conferences suggests that we are currently witnessing a transition from perceiving methods teaching as purely tacit craftsmanship to a more systematic and transparent treatment of this type of teaching (Gunn 2017; Nind and Lewthwaite 2020). Many of these experience reports are from courses with large numbers of students, making the craftsmanship model difficult to practice (Hammersley 2004; Humphreys 2006). For example, a research methods course in computing and IS that we teach in our faculty has around 100 students each year. In the literature, we have seen experience reports from even larger classes (Edwards and Thatcher 2004; Humphreys 2006). The majority of authors report classes with 10-50 students.

This scaling-up of research methods teaching and the various settings in which teachers teach their classes make it necessary to consider novel course designs beyond the craft-focused apprenticeship model. New course designs should support varying numbers of students, from one-on-one apprenticeship style supervision aimed at future researchers (Hammersley 2004) to large courses with minimum levels of teacher-student time (Humphreys 2006). Holz et al. (2006) divide the various settings into what they call "learning contexts," as shown in Table 2. The majority of experience reports of teaching methods published recently fall into the *studio* and *dedicated* teaching models. The master/apprentice model seems to be documented mainly in texts related to supervising Ph.D. and master students. Embedded teaching is much rarer in existing experience reports.

Scaling the teaching of research methods might suffer from a lack of a matching pedagogical culture that allows "the exchange of ideas within a climate of systematic debate, investigation, and evaluation surrounding all aspects of teaching and learning in the subject" (Garner et al. 2009, p. 2). A pedagogical culture creates an awareness that "there are skills, knowledge and processes required for teaching a subject that are related to, but distinguishable from, expertise in the subject itself" (ibid, p.2). In building such a pedagogical culture, there are many aspects that we need to pay attention to.

Firstly, transition to new course designs for potentially large and diverse student populations calls for a debate about the overall learning goals of a research methods course or program. The current debate regarding learning goals is whether students taking the course intend to pursue an academic research career and how this affects the way methods are taught. This is discussed in the literature as a division between *consumers* and *producers* of research (Earley 2014). Consumers of research might have different motivations and see different values in a methods course than those who plan to pursue a research carrier; i.e. become research producers. Some argue that

Learning context	*Description*
Master/ apprentice	"a one-to-one relationship, where a supervisor guides a student through the process of a research project, introducing and teaching research methods on the way, and providing continual, personalized feedback on the student's progress."
Studio	"allows research supervisors to teach research methods to their students in a small group teaching format. Thus, a supervisor may meet with all her research students in sessions whose sole purpose is to focus on research methods."
Dedicated	"dedicated CRM [Computing Research Methods] courses can be attended by many students. This one-to-many model entails defining course content that is taught independent of any particular research project or any particular research supervisor."
Embedded	"Through embedded teaching, CRM can be taught implicitly within computing courses that explicitly teach other computing topics."

Table 2: A taxonomy of teaching formats (Holz et al. 2006).

> both types of students require the same foundational research knowledge; introductory courses should therefore address both types equally with the same content and assessment (ibid, p.243)

This kind of foundational research knowledge can include such learning goals as becoming reflexive, analytical, self-regulating, and being good at presenting own work (Holz et al. 2006). Even at this foundational level, some researchers believe that differences in learning goals might exist. For instance, learning goals can vary between qualitative and quantitative research students (Galliers and Huang 2012; Gunn 2017).

Secondly, large and diverse student populations might challenge the underlying values that a teacher or supervisor employs tacitly. For instance, many teachers consider research methods as a purely academic topic. At the same time, large courses and diverse student populations might bring a demand for teaching research methods as problem-solving tools and applied skills (Gunn 2017), especially in engineering studies (Yearworth et al. 2013). Even the type of methods and paradigms the teachers themselves use as researchers can be challenged. Research suggests that we—as researchers—often use our preferred and trusted research methods regardless of the problem to be

solved (Bryman 2007; Saunders and Bezzina 2015). For instance, research shows that IS researchers tend to rely heavily on quantitative methods at the expense of qualitative methods (Galliers and Huang 2012). However, within IS many research problems require not only multidisciplinary research but also multi-methodological approaches (Nambisan et al. 2017; Van De Ven 2007). These challenges might need teachers to take adequate distance from the content of the class they teach—compared to an apprenticeship model—and focus on the pedagogical aspects and the diverse needs and aspirations of the students.

Thirdly, teaching large methods courses might require a wide array of competencies from different types of methods that few teachers can be expected to have, let alone to be able to teach. Fluency in multiple methods can be a challenge even for full-time researchers (Mathiassen and Nielsen 2008; Van De Ven 2007). Teacher competency can therefore be an issue to consider when teaching multiple methods in the same class

> because many teachers of research methodology are not trained research methodologists themselves, some rely on their peers or embark in much trial and error as they develop and improve upon their teaching of methodology courses (Daniel et al. 2018, p. 223).

At the same time, some have argued that students taking dedicated methods courses should learn multiple methods—e.g., qualitative and quantitative methods—to become "pragmatic researchers" (Onwuegbuzie and Leech 2005). Galliers & Huang (2012) show that qualitative and quantitative research requires fundamentally different modes of teaching. Investigating the reasons behind the lack of qualitative studies in IS journals, Galliers & Huang (ibid) point to causes such as lack of course provision, lack of supervisory expertise, and the difficulty of understanding qualitative research by novice researchers.

Some earlier initiatives have tried to address some of the above challenges by approaching the topic of teaching research methods as a standardized endeavor aimed at creating a universal pedagogical culture in this field. An early attempt—within computing in general—was made by the ACM SIGCSE Committee on Teaching Computer Science Research Methods (SIGCSE-CSRM) (Holz et al. 2006). The group, though, seems to have been inactive in recent years. A recent example in social sciences is the research done by Nind & Lewthwaite (2020) on creating a typology—consisting of pedagogical *approaches*, *strategies*, *tactics,* and *tasks*—as a framework for methods teachers to organize and reflect on their teaching. The European Union has research methods as

part of its program of transferable skills for PhD students (Innovative Doctoral Training Principles (IDTP)) (The European Commission 2011).

2.3 Teaching research methods in IS

In addition to the challenges common to all subject areas, new issues often arise when research methods are applied to a specific field of research. The IS field is not an exception. The empirical problems that the IS field tries to address—and the methods and theories used to explain or predict them—involve phenomena that encompass both social and technical aspects. As a result, in our view, the IS field would benefit from dedicated research methods and skills beyond those found in, e.g., pure social sciences.

A central topic in teaching research methods is the role of theory—both in general (Kawulich 2009) and in IS and digitalization (Gregor 2006; Truex, Duane, Jonny Holmström 2006). Theory is a fundamental brick supporting the development of meaningful and relevant questions and answers, but it intervenes in different ways across the research design cycle. It takes at least three fundamental forms: a body of literature that provides a framework—or a lens—to understand a situation and propose a solution; a background—sometimes implicit—vocabulary that describes the researchers' assumptions about a phenomenon; and a paradigm that guides the way we talk about and discover the world—such as interpretivism or positivism (Kawulich 2009). Theories in IS have been a hot topic for many years. The role of theory has been discussed extensively, e.g., in relation to theoretical versus design contributions (Baskerville et al. 2018), what theories are good for (Schultze 2017), and the perils of too much theorization (Dennis 2019). Most IS scholars agree on the central role that theory development plays in our relatively young field.

Theories and theorization can often get neglected when teaching research methods (Charmaz 2015; Swedberg 2016). Whereas frameworks in the form of guiding paradigms are available, the role of theory in students' formulating a practical problem is often taken for granted or left unquestioned. The guiding frameworks used in research design are often flattened when presented—as a pipelinesque, input-output process. An illustration of this shortcoming is the framework developed by Oates (2006)—a popular tools for our students. This framework points to theory only implicitly, and as part of the initial literature review that should be input to the actual research design. There are some exceptions in the literature where theory is treated as a guide for students and researchers performing data analysis in the social sciences (Charmaz 2015; Swedberg 2016; Tjora 2018). However, in general, the role of theory across the whole research

process in the frameworks that we use to illustrate research methods to IS students is often taken for granted or left unquestioned.

In addition—but also related—to the underdeveloped role of theory, research designs that are imported from other fields often lack reflexivity towards the epistemological needs of IS and digitalization. Phenomena that are studied within IS include but are not limited to the long-term design and use of digital platforms, ubiquitous sensing technologies, and AI-based algorithmic decision making (Johnson et al. 2019; Kruse and Tumbas 2016). The distinctive vein of IS is that it deals with complex, longitudinal, and sociotechnical problems. As a result, the methods we adopt should be a combination of what is required to study the interplay of people and organizations with technology. IS research problems require multidisciplinary and multi-methodological approaches (Nambisan et al. 2017; Van De Ven 2007). This contrasts with many imported methods that focus on empirical snapshot studies of technology design, implementation or use (Bailey and Barley 2020). As stated by Hyysalo et al.,

> if we wish to develop an effective understanding of contemporary technological innovation, we will need new kinds of research design - a move from 'snap shot' studies to the linking together of 'a string of investigations' (Hyysalo et al. 2019, p. 4).

A major future research agenda for teaching methods in IS is to find pedagogical methods to teach research designs that go beyond snapshot studies and teach how to design and run strings of investigations to our students.

3 Workshop background

This paper draws on the authors' efforts to adopt an inclusive and reflective approach to teaching research methods in IS. Specifically, we report on the results of a workshop organized in connection with the 10th Scandinavian Conference on Information Systems (SCIS), in Nokia, Finland, in August 2019. The workshop, called TERMIS (Teaching Research Methods in Information Systems) aims to create a Scandinavia-based community of scholars and educators who teach empirical research methods to IS students at MSc and PhD levels, and who are interested in sharing knowledge and experience about their teaching. We hope such a community can become a community of practice across institutional boundaries. We also hope to create a platform of resources for educators in Scandinavia and elsewhere, in this way also promoting the Scandinavian way of doing IS research.

The main research question we asked ourselves before creating the call for papers for our workshop was

> What are the current practices and experiences among IS scholars in Scandinavian academic institutions when teaching research method courses?

We broke down this question into several more practical questions, such as how the participants organized their methods courses, what resources they used in their teaching, and how they kept updated with current knowledge. We used these questions in our call for papers. Our idea was that these questions would be addressed by presenting and discussing real-world cases during the workshop. Although, as we will see below, the actual discussion resulted in only partly overlapping topics.

We invited submissions by academic and practitioners who had experience or strong interest in the topic area. There was no strict requirement for a position paper since we were more interested in discussing how to set up a community of practice. Before the workshop, we received five written contributions. Furthermore, a few people became interested just before or during the conference and joined the workshop. This increased the number of written contributions to six. The workshop at the end included presentations of four cases followed by a plenary discussion. Two of the contributors did not manage to participate in the workshop; we have, however, included a presentation of their written contribution in our report due to their relevance.

Each presenter had 15 minutes to present his or her own experience with teaching research methods, followed by an overview of the main challenges and reflections encountered so far. We asked participants to write down questions and topics for dis-

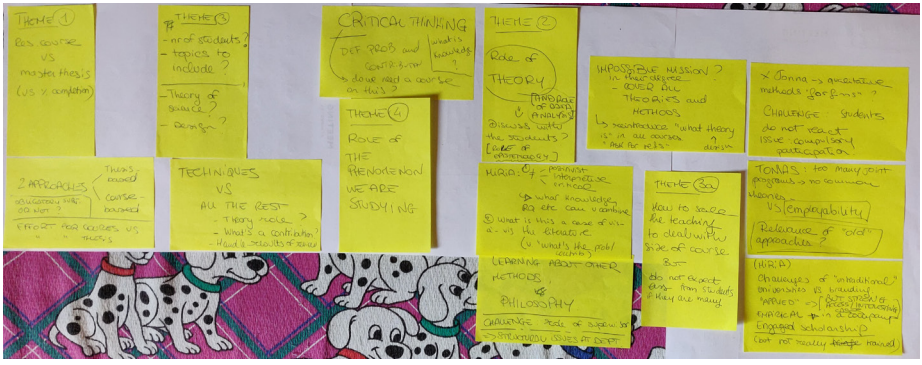

Figure 1: The result of our short thematic analysis of brainstorming results during the workshop.

cussion in post-it notes. During a discussion session at the end, we all used our post-it notes to analyze the material. We did this through a collaborative thematic analysis, where we grouped and clustered the notes into a set of emerging themes. Figure 1 shows the result of this thematic analysis.

4 Case descriptions and findings

In this section, we provide a short description of workshop contributions and the people behind each. We first present the four cases presented during the workshop and then the two cases where the contributors did not manage to participate in the workshop. At the end of this section, we will present a set of three cross-cutting themes.

4.1 Presentations during the workshop

The workshop organizers (authors of this article) from the Norwegian University of Science and Technology (NTNU) presented a research method course we teach as part of a Master's program in computing and IS. This is a yearly project- and problem-based course with approx. 80-100 students. Students are divided into groups of 5-6. Each group is asked to choose a practical digitalization problem, prepare a research plan, conduct the empirical research, write and revise a paper, and participate in peer reviews and a final conference. The course also acts as the basis for two other master and doctoral courses, bringing the total number of students to approximately 150. This is a mandatory master level course, and not all the students intend to become researchers. When designing the course, our focus has been student motivation. Our approach has therefore been to create an active learning environment by simulating a realistic research project. Student groups choose their research design based on a practical problem. Another challenge is teaching multiple research designs, which we have attempted to solve by involving guest lecturers with expertise in various methods. We also experience that it is challenging to introduce students to theory and theorization. We are currently investigating better ways to teach theorization in our course, and integrating frameworks to assists students in doing so (e.g. March and Smith 1995; Mathiassen 2017). The large size of the course is also a challenge that makes direct teacher supervision difficult. To address the challenge of scale we engage senior doctoral students as supervisors.

In our second case, Jonna Järveläinen from University of Turku, Finland, presented her IS methods course involving around 20-25 international master students. Jonna's main challenge is how to motivate the students and how to create an experimental

learning environment for the students. She uses gamified teaching methods. For instance, Jonna uses flipped classroom methods combined with creative tasks. As a form of gamified research, Jonna uses escape rooms where students are 'locked up' in a room and have to solve 'methodological puzzles' in order to escape the room. Groups of students have to solve tasks such as selecting a theoretical framework for a problem, selecting suitable methods for a study, selecting data generation methods and sources (Järveläinen and Paavilainen - Mäntymäki 2019). Other elements are used to increase the fun factor and the experimental setting, such as competition among groups, and creating dependency on the teachers to provide missing pieces of the puzzle. Jonna has now been running her class for the second year.

Miria Grisot from Kristiania college (and the University of Oslo since January 2020) discussed her approach to research methods amid the applied nature of the studies at the college. Most of the students in Miria's department are not planning to become researchers but will work outside academia. This poses a challenge to the teachers to motivate the students to do rigorous research. Teachers try to use engaged scholarship (Van De Ven, 2007) in their teaching using real companies as cases during the master's program. By engaging the students in real-world business problems, the engaged scholarship approach is a potential remedy against a lack of interest in research methods among students. However, Miria mentioned that there is a lack of good teaching material to teach this approach. Therefore, supervisors use their personalized flavor of methods and their way of doing research. An additional challenge is that students—through working with their cases—often do learn a few research techniques but without learning the fundamental building blocks of research. For instance, Miria brought up the issue that there are few resources to guide the teaching of theory and theorization in research methods.

Tomas Lindroth, Charlotte Arghavan Shahlaei, and Masood Rangraz participated from the Informatics Department of the University of Gothenburg. In his position paper and presentation, Tomas focused not on a specific course or education setting, but on a general reflection of how they have been educating their students in research methods. Thomas emphasized the multidisciplinarity of research in informatics. A degree in informatics in any Scandinavian university might include subjects from a wide variety of fields such as IS, CSCW (Computer Supported Cooperative Work), HCI (Human-Computer Interaction), PD (Participatory Design), and various computing areas such as AI (Artificial Intelligence) and data sciences. This multidisciplinarity is necessary but also brings with it several challenges. To answer real-world research questions, students need to acquire an understanding of multiple research methods, data collection, and analysis techniques, both within qualitative and quantitative research.

All this must happen in a short period of time assigned to a master's program. The result might be that students do not learn anything well enough and loose motivation. The approach taken by Univ. Gothenburg's Media and Communications Study is to start early to expose students to empirical methods. Theories and empirical research approaches are already part of the study's bachelor's program. When the students start writing their master's thesis, they are already versed in empirical methods. The message is that multidisciplinary studies need a more strategic approach to teaching empirical methods, where students do not only practice with a specific method but also gain in-depth knowledge about a broader range of research approaches and designs.

4.2 Other submissions

In addition to the above four presentations during the workshop, we also received position papers from Pertti Jarvinen from Univ. Tampere, Finland, and Line Kolås from Nord University, Norway. Unfortunately, Pertti and Line could not attend the workshop. We include a short summary of their very relevant contributions.

Pertti has written extensively on research methods. In his position paper, Pertti did not present a specific teaching case but provided several taxonomies of various research methods, e.g., methods focusing on improving our understanding of the world versus those focusing on utility and innovation. He also discusses the importance of action research and design science for IS and other areas of research such as social sciences. His position is that a distinction between qualitative and quantitative methods is not fruitful for teaching research methods. Instead, one should focus on whether a method is suitable for testing an existing theory or creating new theories.

Line Kolås reported on a project where research methods—or knowledge production methods in general—are used as teaching tools in various courses. Based on an existing framework of research-based learning (Griffiths, 2004), Line's group has designed courses in different subjects where students use research methods (e.g., evaluation methods, systematic review methods, game analysis) as part of their courses' exercises. Line describes how the students used these methods and what their experience was. A critical point for reflection is that the exercises in the main subject of the course need to be designed to motivate the students to work with research tasks (in groups) related to that subject.

4.3 Cross-cutting themes

The following three themes emerged from our discussions and collaborative thematic analysis:

1. Motivational aspects, including motivating students through pedagogical techniques such as gaming, and aspects related to the value proposition of methods courses.

1. Course design, including internal design of a course and its relation to other courses and teaching programs in the hosting institution.

1. The relationship between theory and empirical data, including issues related to teaching this relationship to students.

Regarding theme 1, our discussion was about motivating students in the classroom and through overall course design. Research methods as a topic can be boring for first-time students. Novel classroom techniques such as gamified teaching or flipped classroom can help. At the same time, our courses need to clarify the value proposition of research and research-based knowledge—particularly for students who don't plan to become academic researchers—and immerse students in an enjoyable overall experience. Several of the discussed courses and initiatives were designed to include problem- and group-based activities that aimed to create a realistic research environment for the students.

A lesson learned from our theme 1 discussion is that the academic model of doing research—which often involves the publication of high-level academic papers as the end goal—might not be the best model to motivate a variety of students who take our methods courses. Instead, introductory courses need to focus on an engaging teaching style. They should involve a variety of learning goals—e.g. blog posts or newspaper articles instead of academic papers as the final means of disseminating results. In this respect, one challenge and direction for future research will be to develop adequate teaching resources as existing resources often focus on the academic model of research.

Regarding theme 2, our discussion related to whether research methods should be taught as an individual course at all, or whether they should be integrated into a study program, or, alternatively, taught through one-on-one supervision, e.g. during a master's thesis project. Each of these approaches is viable, and the choice will depend on several contextual factors. When the number of students is large and study programs are less flexible, a dedicated course can have its merits. An introductory course can teach many students. At the same time, more thorough one-on-one interactions can be offered to students who want to become academic researchers (e.g., enroll in a doctoral

program). Another contextual factor is the nature and the traditions of the hosting institution. In some universities with an engineering focus, research methods teaching has not been a priority. In these universities, having a class can help to expose students to research methods. In other research-focused universities, research methods can be taught thoroughly by embedding them into several semesters and courses, and then gradually become a one-on-one supervision task. We also discussed whether—for the majority of our students—it was more important to have thorough education in critical thinking than having a short methods class, or maybe a combination of both.

We think the lesson learned from theme 2 is to think systematically about the teaching of methods and reflect on which approach—dedicated class or embedded teaching—is more suitable for the specific institutional setting. This reflection should not be done in isolation. The teaching should be planned and discussed with other teachers in the host institute. Dedicated courses might seem a quick way to introduce methods into a study program. Still, involvement from other teachers can make the methods course more motivating for the students and ease a potential transition towards embedded teaching.

Regarding theme 3, our discussion was about teaching students to move between empirical data—collected during a field study or an experiment—and theory. This seemed to be an underlying challenge for all workshop participants. Many of us teach courses as part of professional studies within applied IT. Many such studies focus on applied skills and do not prioritize theory-relevant aspects of research. On the other hand, learning to generalize own findings to something that is of interest to a broader audience is central to any empirical research. There are too many IT theories to teach during an individual class, but we should be able to think of and teach a set of generic theorization skills to our students to help them to move from field data to theory and back. This was deemed to be important because theories for digitalization are not yet well-established and are still emerging. Being able to contribute to theory-building in the research community can be motivating for both students and teachers.

Theme 3 highlights a challenging area for us. Teaching theorization in methods education is, in general, a neglected area (Kawulich 2009; Swedberg 2016). We lack teaching resources and methods, especially those we can use in introductory courses in IS. Developing resources to teach generalization from naturally occurring sociotechnical phenomena, but also emphasizing the value of theory and generalization to solve business problems, can be the next steps for teaching theorization to our students.

5 Discussion

This workshop report's contribution has been to illustrate methods teaching in several Scandinavian academic institutions, and to shed light on some practical challenges that teachers meet and how they address these challenges. Our cases demonstrate that research methods teaching is a distinct topic of interest for Scandinavian IS academics. They also show various teaching configurations in those institutions ranging from apprenticeship, to large and dedicated classes, to embedded teaching inside a study program—typically a master's or a bachelor's program. Research methods teaching is becoming an integral part of many IS-related studies, and the number of students being exposed to some form of methods education seems to be growing.

These cases also demonstrate that the workshop participants struggle with several challenges recurrently discussed in earlier research. One such challenge is student diversity, background knowledge, and aspirations. Among our cases, we see a range of different types of students taking the courses, with varying degrees of interest in academic research. The apprenticeship model is often applicable when the student has already decided to become an academic researcher—e.g., during doctoral studies. Contrary to this model, most students in large courses at bachelor and master levels are not planning to become academic researchers. This is also one of the main pedagogical challenges for those who teach these courses; i.e.; adapting their teaching to the different interests—and motivating students with varying aspirations.

One finding from our cases—not discussed in the reviewed literature—is that student motivation needs to be addressed at both micro and macro organizational levels in an academic institution. Consequently, student perception of research can be implemented in our courses in various ways at each level. At a micro level, several participants from our workshop already discussed their problem-based and engaged approaches to organizing their teaching. This is also what we typically see in cases from existing literature; i.e.; applying research skills to typical problems taken from real-world professional and societal contexts (Earley 2014; Gunn 2017). This can be done by using techniques such as specific group-based activities and gamification.

But we need to do more than motivate the students to engage with the topic of today's lecture *within* our courses. To sustain motivation, our students need to know what benefits a research methods course will have for their later careers and how the course relates to other classes they take. This requires proper course organization at a macro level, which should affect learning goals, course design, and the relation between methods teaching and the rest of the IS study program.

As we have seen in the reviewed literature, one common approach to discuss learning goals in teaching methods is to perceive students as being consumers and/or pro-

ducers of research (Earley 2014). In our view, this division is not fruitful when designing a course. Labeling students as consumers of research can exclude them from certain learning opportunities and can—consciously or unconsciously—lead to lower expectations and demands towards students who are not interested in academic research. Moreover, there are specific skills that are needed to consume research results (Gunn 2017) that can be important to learn also for those who will primarily generate the results—e.g. learning to understand the impact of own research, and the best ways to disseminate own research results.

We believe the division between producers and consumers of research originates from an academic perception of research methods: research is regarded as useful only when published in academic journals. Because of this point-of-view, our courses are often designed with the academic way of life as the aspiration. For instance, our methods courses at NTNU are modeled based on the real-world academic process that leads to the presentation of a paper at an academic conference. An alternative way of organizing a course would be to take students' aspirations—e.g., their career plans—as the starting point and ask how can research methods help these aspirations (Daniel et al. 2018). As teachers of research methods, our underlying assumption should be that these skills are applicable to more than academic research. By taking students' aspirations as a starting point, we can have the same demands of producing knowledge for all students, regardless of whether they plan to become academic researchers. At the same time, we can make students aware of the variations in rigor and different audiences for research results. For instance, teachers can make it clear that a research report produced by a consultancy firm has other demands for rigor—and is often less reliable—than a paper published in a well-known academic journal.

Besides taking student backgrounds and aspirations into consideration when designing a methods course, another macro-level topic emerging from our workshop is the relationship between methods teaching and the other subjects in an IS study program. In our workshop, we had examples of dedicated methods courses in, e.g., NTNU and Univ. Turku, but also of embedded teaching from Univ. of Gothenburg and Nord University, where research methods are integrated into a study program lasting several semesters. Embedded teaching might increase motivation among students—by applying research skills in subject areas—but can also lead to institute-level coordination issues and make course design more complicated.

The issue of embedding research methods into their subject areas is also related to the ongoing debate in the literature about whether research methods teaching can exist as a separate discipline (Gunn 2017). Some researchers argue that research methods need to be taught alongside the research field's theories (see also our discussion of

theory below). This happens in the apprenticeship model (Hammersley 2004) where theories and methods are closely intertwined. Others argue that it is, in fact, possible to generalize—and codify—a set of research skills somehow independently from subject area theories (Nind and Lewthwaite 2020; Swedberg 2016).

We think the truth lies somewhere in between. Even when taught as separate courses, research methods need some adaptation to the subject or application area. Therefore, a methods course for, e.g., psychology students should be different from a methods course for IS students. Regardless of dedicated or embedded teaching, we think an essential task for the teachers of research methods is to employ an open and inclusive approach towards their host institution. For instance, in our methods course at NTNU, we have invited staff from our institute to teach their preferred research strategies. In this way, we manage to involve experts from a broad set of research methods—most of which we as course coordinators do not master. Moreover, we also allow our students to get to know other teachers' research interests and find potential supervisors for their upcoming master's thesis. Embedded approaches take this kind of integration a step further and coordinate methods teaching with other teaching at an institutional level.

Although many institutions use such micro- and macro-level strategies, there is in our view a lack of research about the various organizational models and their impact. For instance, we are not sure whether an embedded model is better at motivating students than a dedicated course, and in which ways. Most existing research is in the form of experience reports without adequate evaluation data. Learning goals and assessment methods are not discussed much in existing literature (Earley 2014). More evaluation research is therefore needed.

Another topic for discussion that emerges from our workshop is the relationship between research methods and theory and how teachers of research methods can best nurture this relationship. Our participants reported that specific research skills—e.g. doing interviews or field observations—are often quite easy for students to grasp and learn. On the other hand, theory-related topics—e.g., framing of own data, generalization to a wider context, or contributing to a theory—are much harder to teach.

The divide between the teaching of theory and method is in a sense endemic to academia's handling of theory in general: theory is understood differently and plays different roles in different disciplines (Corvellec 2013). As a result, discipline-agnostic frameworks for addressing the theory-method relationship are unlikely to be effective. We need to know how IS should handle this duality in our teaching of research methods.

Our discussions point to the observation that the theory-methods divide might be due to the—often implicit—duality between students qua consumers and students qua

producers. In IS, it is not uncommon to use theories imported from other fields (Truex, Duane, Jonny Holmström 2006). We believe the IS field should engage more systematically with a reflective discussion of the research and theory consumption/production duality and its impact on the design of our research methods courses. Some questions that can arise from this type of reflection are: What are better ways of motivating students to see the theory and its relevance? How can theories benefit from being applied to problem-solving? What roles can students as future professionals, also in non-academic positions, play in improving our theories? And what implications does this have to our methods and the way we teach them?

The challenge of connecting to theory in teaching is further complicated by the nature of the phenomenon that IS is concerned with; i.e.; digitalization. As several IS scholars have observed, the increasingly complex nature of this phenomenon is evident by the growing complexity of the methods that IS students should master. Novel approaches, such as computational social sciences (Alvarez 2016) and mixed methods (Venkatesh et al. 2013), are needed. More research is needed to adapt existing methods to theorizing digitalization, and to investigate ways to scale the teaching of such methods to a diverse population of students.

We consider the development towards more students being exposed to research methods to be a positive one. Students who know about research methods can use them in their future professional and private lives—and produce a higher quality of research if they choose an academic researcher career. But within this growth also lies the urgent need to create a pedagogical culture to teach research methods in IS properly. What has traditionally been tacit knowledge exchanged between a supervisor and a student needs to become explicit in the form of course design, learning objectives, assessments, and credit points. As an explicit course or part of an embedded study, research methods education is becoming a formal acknowledgement of learning. Therefore, it needs to have a standardized content to be recognized and exchanged in an internationally oriented academic world. In standardizing research methods teaching, one should strive not to over-simplify and de-contextualize the necessary skills. We can use various student-centered and problem-based approaches to achieve a realistic setting for learning methods, but one should also engage with macro-level issues of teaching methods.

6 Conclusions

This paper presents the results from a workshop on teaching research methods in IS held in Nokia, Finland during the SCIS/IRIS conference. Our contribution to the IS field is two-fold. First, we have provided a better understanding of how methods are

taught in some leading Scandinavian academic institutions and how experiences from presented cases correspond to existing literature. Second, we have reflected on possible reasons for the status quo and discussed some overarching themes. We have raised several points for future research.

We hope that our workshop will be the first step in setting up a TERMIS community of practice. We will continue to facilitate such a community by organizing TERMIS workshops in relevant avenues in the future. We have also set up several online tools for readers to participate in the TERMIS community, including a growing catalog of methods courses. More information about how to contribute and participate is available at TERMIS web page[2].

> Rather than 'Here is one I have cooked earlier, now eat it', researchers may increasingly say: 'Here's the kitchen, let's choose the ingredients and method, make the meal, sample and refine it together, and shoot for Masterchef'. (Jackson and Greenhalgh 2015, p. 284)

Notes

1. For qualitative research, see the excellent web page "Qualitative Research in Information Systems" maintained by Michael D. Myers at https://www.qual.auckland.ac.nz. See also (Recker 2013) .
2. See https://termis.idi.ntnu.no/.

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