

**Research and Teaching: An In-depth Study into Lecturers' Beliefs and Experienced
Challenges**

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Abstract

As society and higher education rapidly change, universities continue to prioritize the integration of research into teaching. This is vital to higher education and the development of students to prepare them for the future. Lecturers are crucial for the integration of research into teaching. Nonetheless, this integration has proven to be difficult for lecturers. One reason is that lecturers' beliefs can come into play, as well as their experienced challenges originating from the environment. The present study aimed to address the gap in current research regarding possible relations between lecturers' beliefs and challenges and how this relation might influence their ability to integrate research into teaching, which has been rarely studied before. After interviewing 18 Dutch lecturers, none of the participants explicitly emphasized a connection between beliefs and challenges. However, after interpreting the results, a high workload appeared to be one of the biggest challenges while integrating research in teaching. Furthermore, we found that lecturers' belief regarding the importance of the integration of research into teaching may pose a challenge itself to lecturers' abilities to do so. This study provided some recommendations as to how university policy makers could address these issues.

Key words: Research-teaching relationship, lecturers, beliefs, challenges.

As knowledge in the current society changes rapidly and information is available in large quantities, the importance of understanding the relationship between research and teaching as well as developing this relationship within institutions of higher education has grown substantially in recent years (Brew, 2010). This growth in importance is due in part to the emphasis on students' development of 21st century skills such as critical thinking, problem-solving and decision-making. As such, many universities prioritize the integration of research in teaching, which is seen as fundamental to higher education and vital for the development of students to prepare them for the future (Hattie and Marsh, 1996). Lecturers, or individuals working at universities who teach classes and conduct research concurrently, are key actors in this integration (Schimank & Wine's, 2000). Lecturers are the focal point in the present study because they have a pivotal role in improving students' learning through university teaching as they are able to integrate research in teaching (Prosser & Trigwell, 2014; Schimank & Winnes, 2000; Wilson & Simons, 2002). Correspondingly, the Dutch Association of Universities (VSNU) emphasizes research, teaching, and societal impact as the three most influential academic performance areas for lecturers, causing universities to place higher value on lecturers' research output (e.g., the number of citations in studies, publications in high-impact journals, and bringing in external research finances; VSNU, 2019). The increasing emphasis on research output could change the environment in which lecturers operate, and if so, this can have a positive or negative impact on the quality of higher education; however, this link has yet to be established.

Not only do students and universities benefit from the integration of research into teaching, but lecturers can as well. Smeby (1998) found that lecturers who integrated research in teaching were more able to keep up with new developments in their field, provide students with examples and anecdotes originated from their own research, and develop a more critical attitude towards knowledge. Therefore, it is important to assess the relation between research

and teaching. To do so, Hattie and Marsch (1996) conducted a quantitative meta-analysis of 50 different studies and found that there was no correlation between research and teaching, despite results from various studies suggesting the opposite. As such, this study used a qualitative design to gain a deeper understanding of the difficulties lecturers face when attempting to integrate research into teaching, and how the environment in which lecturers operate shapes the way they successfully execute this integration.

Challenges Experienced by Lecturers when Integrating Research into Teaching

While it can be beneficial for lecturers to integrate research into teaching, lecturers still experience difficulties when doing so (Brew & Mantai, 2017), and these experienced challenges are critical for the way how lecturers shape the integrating of research in teaching (Prosser & Trigwell, 2014). There are multiple conditions which can hinder the integration of research in teaching; for example, teaching and research are often funded separately, which can cause the two practices to drift apart (e.g. Gibbons et al., 1994; Visser-Wijnveen, van Driel, van der Rijst, Verloop, & Visser, 2010). Another example is that a majority of lecturers often prefer performing research over teaching, particularly due to the higher status that being a researcher brings to an individual (Coate et al., 2001; Colbeck, 1998). This higher status is often rewarded with promotions, and rewards are generally based on research accomplishments rather than teaching quality (Colbeck, 1998). Schimank and Winnes (2000) mention that although lecturers teach and conduct research simultaneously, research and teaching each contain different subjects, goals, rules, and tools. These differences between the two practices can inflate the tension between research and teaching (Schimank & Winnes, 2000).

The challenges lecturers experience when integrating research into teaching can originate from the department they work in (Mathieson, 2019) or from the teaching environment (Prosser & Trigwell, 1997). Mathieson describes these departments as a

significant source of identity for lecturers and forms a base on which academics build “their values, the knowledge base of their work, their modes of working and their self-esteem” (p. 802). Mathieson conducted a qualitative study into the challenges experienced by lecturers within 8 departments in a British research-intensive university and found that lecturers experienced multiple challenges when integrating research into teaching, such as weak institutional strategies promoting the integration of research into teaching, a lack of time and funding, and a lack of recognition and rewards for integrating research into teaching. Brew and Mantai (2017) conducted a similar qualitative study within several departments at an Australian university and found that a workroom space deficit, too much focus from the university on research, and a lack of rewards for integrating research into teaching posed challenges to lecturers. In another qualitative study, Prosser and Trigwell (1997) concluded that lecturers experienced challenges within the teaching environment. Examples are large class sizes, a high workload and variation in the abilities of students.

Regardless of whether challenges originate from the department or the teaching environment, the results from these studies suggest that the overall environment in which lecturers operate can pose challenges to lecturers when integrating research into teaching. For brevity, we refer to the challenges that lecturers experience originating from the department or overall teaching environment that they work in when integrating research into teaching simply as *challenges*. These challenges can influence how lecturers integrate research into teaching (Brew & Mantai, 2017; Mathieson, 2019). Therefore, by understanding these challenges, policy makers and educational advisors could more suitably support and strengthen lecturers’ ability to integrate research into teaching.

Lecturers’ Beliefs About the Integration of Research in Teaching

In addition to challenges, previous research has emphasised the importance of lecturers’ beliefs on the role of research in teaching, as these beliefs have a strong influence

on how lecturers integrate research in teaching (Robertson, 2007; Visser-Wijnveen et al., 2010). In higher education, beliefs can be defined as mental representations that influence the practice of a lecturer (Hutner & Markman, 2016). Beliefs are deeply rooted in human beings, but lecturers can use prior experiences to alter their perceptions of a given context, which can then change their beliefs (Pajares, 1992). Beliefs generally differ per individual and influence how individuals see the world, which – in the case of lecturers – includes their vision about how to integrate research in teaching (Visser-Wijnveen et al., 2010). Some examples of lecturers' beliefs regarding the integration of research in teaching, provided by Hu (2014), are that education should adapt constantly to the latest research discoveries, and that research in teaching is valuable because it develops students' critical attitude. Because lecturers' beliefs shape how they integrate research in teaching, we are interested in the lecturers' beliefs about research in teaching. For the purpose of brevity, we refer to lecturers' beliefs which influence the way lecturers integrate research in teaching simply as *beliefs*.

Relations Between Challenges and Beliefs

Challenges, which originate from the environment, and lecturers' beliefs, which originate from lecturers themselves, relate to one another (Brew & Mantai, 2017). For example, lecturers believe that when they effectively integrate research into teaching, the students will become critical thinkers and independent scholars. Contrarily, challenges can hinder this process, resulting in lecturers believing that integrating research in teaching is impossible (Brew & Mantai, 2017; Mathieson, 2019). This illustrates how beliefs and challenges relate to one another, which again affects how lecturers experience the integration of research into teaching. In order to strengthen the integration of research in teaching, in the present study we attempted to explore the relations between lecturers' beliefs and challenges.

There are multiple frameworks or models through which we understand the integration of research in teaching (Healey & Jenkins, 2009; Zimbardi & Myatt, 2014). Most of these

models focus on the advantages for students, while this study focussed on the advantages for lecturers. In doing so, we were able to identify lecturers' beliefs and challenges they encounter regarding this integration. This study adds to the knowledge base of research integrated into teaching through an exploration of relations between lecturers' beliefs and challenges, which has rarely been studied before.

Present Study

The present study aimed to address the gap in current research regarding possible relations between lecturers' beliefs and challenges and how this relation might influence their ability to integrate research into teaching. A deeper understanding of this relation could inform initiatives to support lecturers in strengthening the integration of research into teaching. To do so, we conducted a qualitative analysis via semi-structured interviews to elicit lecturers' beliefs and challenges, and how these factors may have shaped the way that lecturers integrate research into teaching.

Method

Design

In order to explore relations between lecturers' beliefs and challenges, we conducted a qualitative study. We chose a qualitative design because based on findings from previous studies, many factors appear to be in play which indicate a complex relation between beliefs and challenges (Brew & Mantai, 2017; Hu, 2014; Mathieson, 2019; Prosser & Trigwell, 1997; Visser-Wijnveen et al., 2010). Thus, a qualitative design may allow for a more in-depth exploration of beliefs and challenges compared to a quantitative approach (c.f., Hattie & Marsch, 1996). The decision to use qualitative methods and semi-structured interviews allowed us to gather rich information regarding personal experiences, which enhances the credibility of this study.

Participants

We gathered data from 18 participants, who were all lecturers at Utrecht University, a Dutch research-intensive university. In the context of qualitative research, this sample size is high according to the standard requirements of Guest et al. (2006), who found saturation to occur within 12 interviews. We selected only lecturers who hold dual appointments, meaning that they teach and conduct research concurrently, and limited the selection to participants with a minimum of four years' experience teaching and conducting research at a research-intensive university. This allowed participants to explicate their beliefs and challenges regarding the integration of research into teaching using concrete experiences. Of the 18 participants, nine work for the faculty 'Science' and the remaining nine participants work for the faculty 'Humanities'. These two faculties were chosen to ensure variety in the participants' environment. This study collected information from a diverse range of individuals and settings, which increases the reliability of this study (Denzin, 1970). More background information on these participants is displayed in Table 1.

Table 1

Overview of Background Information of Participants

Faculty	Participant number	Research experience		Teaching experience		Gender	
		Mean	Range	Mean	Range	Male	Female
Humanities	1, 2, 4, 5, 8, 9, 11, 16, 18	32.3	20-41	27.3	4.5-43	7	2
Science	3, 6, 7, 10, 12, 13, 14, 15, 17	20.9	1-35	23.8	1-36	8	1

In order to gather participants, the thesis supervisors approached the educational directors of both faculties and asked for permission to collect data in their department. After the educational directors gave their approval, we provided them with a recruitment email (see Appendix A) inviting participants to participate in the study, which contained the goal of the

study, the focus of the interview, and contact details of the researchers. The educational directors then forwarded the email to lecturers who met the selection criteria. This approach did not elicit a sufficient number of responses, so we then consulted the university's Intranet, which provided the contact details and function titles per department. We then contacted potential participants personally via email after obtaining consent from the educational directors to do so, which generated sufficient participants.

Instrument

The data was gathered via 18 semi-structured interviews, using the interview guide which can be found in Appendix B. This interview guide distinguishes between questions meant to elicit participants' beliefs and the challenges they experience when doing so. The interview guide (as well as the interview itself) was developed in Dutch, as this was the native language of the participants. The use of semi-structured interviews with an interview guide provided a guideline during the interview, while allowing space to elaborate on topics we might not have anticipated but were nonetheless relevant to the study.

The interview guide was divided into three main sections: the introduction, the body, and the conclusion. The introduction consisted of a few statements explaining the goal of the study and reassuring participants that there were no "wrong" or "right" answers, as well as a few questions regarding participants' backgrounds, such as their years of experience and in which educational program they teach. The introduction also served to ensure the participants felt comfortable, as beliefs and experienced challenges regarding one's environment can be a difficult and confidential topic to talk about; for example, these topics can involve colleagues or supervisors. Moreover, the question, "Is there a course in which research has a big role?" was included in the introduction, which allowed participants to activate their prior knowledge regarding past experiences while implementing research in teaching (Pajares, 1992; Visser-Wijnveen, 2010).

After the introduction, the interview guide contained several questions designed to address how the participants integrate research in their teaching in order to elicit their beliefs about the topic. According to Visser-Wijnveen and colleagues (2010), there is no universal “best” way to integrate research into teaching. Therefore, multiple questions based on the studies of Visser-Wijnveen (2010) and Hu (2014) were included in the interview guide that stimulated lecturers to produce a variety of beliefs. The first question, “What would you like to teach students about research in the course [course name]?” was included in order to access underlying beliefs via concrete experiences by encouraging participants to think about how they believe research should be integrated in teaching. We then included the follow-up question “Why do you think that is important?” to trigger the participants’ beliefs behind their responses to the first question. In order to ensure all necessary topics were discussed, we included the question “Are there any other things you would like to teach students about research within [course name]?”. Lastly, the questions, “Can you describe a situation in which you, in your opinion, successfully taught your student something about research?” and “Can you describe a situation in which you, in your opinion, were less successful in teaching your student something about research?” were included to probe if the lecturers experienced successful and/or less successful attempts of integrate research into teaching, which may have influenced their beliefs (c.f., Hu, 2014; Visser-Wijnveen, 2010).

Following the interview questions regarding participants’ beliefs, the interview guide contained questions aimed at determining to what extent teachers experience challenges. According to Brew and Mantai (2017) and Mathieson (2019), lecturers can experience a variety of challenges, so the interview guide was designed to elicit a variety of responses from participants regarding the challenges they experience. As such, multiple questions were included based on the studies of Brew and Mantai (2017) as well as Mathieson (2019), such as, “To what extent does the department support you to conduct research?”, “Are there also

impeding factors in your department that hinder you from conducting research?”, and “What makes it difficult to provide education within your department?”. In addition, questions such as “What would be the ideal environment within the department for you to conduct research in education?” and “How would you ideally like to use research in education?” were included in order to stimulate lecturers to describe their ideal environment, which probed them to address all current challenges they might experience. Finally, the interview guide concluded with inquiring whether participants had anything else to add, thus allowing space to bring up new topics or information, and some final concluding remarks.

Before the actual interviews took place, we conducted three pilot interviews in order to calibrate the interview guide. The pilot interviews were held with experienced lecturers in their native language, Dutch. During the pilot interviews, one researcher held the interview and one researcher observed the interview. Within each pilot interview, we made sure the interview did not exceed the intended duration, and that the questions were clear for the lecturers. Another important goal in the pilot process was to optimise the interview guide by ensuring both topics, lecturers’ beliefs about research integrated into teaching and the challenges lecturers experience, were represented sufficiently after analysing the results of the interviews. This process improved the validity of the instrument. After analysing the interviews, the interview guide was adjusted. Only the questions “Why do you think this is important?” were added in multiple places throughout the interview guide in order to enable us to elicit the deeper beliefs and experienced challenges within the environment. No further adjustments were made.

Procedure

The data for this study was collected between March 2020 and April 2020, after sending in the FERC form (Appendix D) and receiving approval from the ethical commission of Utrecht University. The interviews were intended to take place in person; however, due to

problems associated with the Coronavirus pandemic and social distancing requirements, it was necessary to reschedule the interviews to take place online via multiple remote meeting platforms (e.g., Microsoft Teams, Skype, and Zoom). All participants were asked to sign an active consent form prior to the interview (Appendix C), which was sent via email.

The interviews lasted between 30-60 minutes. Shortly after the interviews were conducted, the audio-fragments were transcribed verbatim according to the guidelines of the Verbatim-principle (Callahan, 1995). The pseudonymized transcripts were uploaded and stored in a designated folder provided by Utrecht University. Additionally, a brief review of the pseudonymized transcripts containing fragments we intended to use in the analysis were sent to each of the respective participants as a member-check. Two fragments were removed at the request of one participant, who mentioned that these fragments were not based on facts and therefore they preferred that the comments were omitted from the transcripts. Upon obtaining approval from all participants, the transcripts were uploaded into NVivo, a qualitative data analysis computer software package.

Analysis

The data analysis proceeded in four phases: (1) developing and finalising the coding scheme, (2) coding the transcripts, (3) interpreting the coded fragments for beliefs and challenges, and (4) exploring possible relations between beliefs and challenges. In the first phase, we created a coding scheme using a template Prosser and Trigwell (1997) that guided the analysis of participants' challenges as well as a template from Hu (2014) that guided the analysis of the participants' beliefs. The finalised coding scheme used in the present study, which includes descriptions of the codes, can be found in Table 2.

Table 2

Finalised Coding Scheme with Definitions of Codes

Concept	Codes	Definition
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Challenges

Appropriate class size	The lecturer indicates a focus on the extent to which the appropriate class size influences the nature and amount of interaction between student and lecturer
Appropriate academic workload	The lecturer indicates a focus on the amount of time spent on teaching and/or assessment and its interference or balance with time for research
Teacher control	The lecturer indicates a focus on room for variation and diversity in how and what is taught
Departmental valuing of teaching and research	The lecturer indicates a focus on the balance between the valuing of teaching and research at departmental level
Enabling student characteristics	The lecturer indicates a focus on variation in the ability of the student and (educational) background
Departmental (lack of) support for teaching and researching	The lecturer indicates a focus on the opportunities for exchanging ideas regarding research or teaching with colleagues, on the quality and amount of facilities available for lecturers and on financial matters

Beliefs

Reflection on research in teaching	<p>The lecturer indicates that he/she believes that research in teaching is valuable because:</p> <ul style="list-style-type: none"> · it stimulates students to learn about research findings · it teaches students to pay attention to the way research is carried out · it makes the scientific research process an essential part of the curriculum · it pays attention to research methodology
Reflection on teaching in research	<p>The lecturer indicates that he/she believes that teaching in research is valuable because:</p> <ul style="list-style-type: none"> · it stimulates the lecturer to think critically about their own research · participation in research helps teachers to get a bigger dataset
Students as participants	<p>The lecturer indicates that he/she believes that research in teaching is valuable because:</p> <ul style="list-style-type: none"> · he/she values the students' contribution to research · he/she considers students' participation in research important · he/she asks students to make contribution to research · he/she involves students in scientific studies · participation in research forces students to participate
Research skills	<p>The lecturer indicates that he/she believes that research in teaching is valuable because:</p> <ul style="list-style-type: none"> · it increases students' ability to analyse complex situations · it develops students' research skills · it increases students' ability to conduct research · participation in research aims to stimulate development of research skills

Students research interests	<p>The lecturer indicates that he/she believes that research in teaching is valuable because:</p> <ul style="list-style-type: none"> · it motivates students to learn more about the discipline · it increases students' enthusiasm about the scientific world · it encourages students' interest for research · participation in research aims to stimulate students' enthusiasm
Critical disposition	<p>The lecturer indicates that he/she believes that research in teaching is valuable because:</p> <ul style="list-style-type: none"> · it develops students' critical attitude · it stimulates students not to be easily satisfied with an explanation · it stimulates students to read scientific literature critically · it stimulates students to ask critical questions about their work · it stimulates students to critically reflect on the impact of research in society
Creative disposition	<p>The lecturer indicates that he/she believes that research in teaching is valuable because:</p> <ul style="list-style-type: none"> · it fosters students' sense of innovation for improvements in society or in research · it encourages students to have creative ideas of their own regarding innovation in society or in research
Current research in the domain	<p>The lecturer indicates that he/she believes that research in teaching is valuable because:</p> <ul style="list-style-type: none"> · it increases students' awareness of the research issues currently being discussed · it shows students the kind of studies carried out in areas related to hot topics in the research field · it makes links to current research practices

First, to examine the challenges experienced by the participants, we utilized the template of Prosser and Trigwell, which contained the following five codes: 'Appropriate class size', 'Appropriate academic workload', 'Departmental (lack of) support for teaching and conducting research', 'Enabling student characteristics', and 'Teacher control'. After comparing the code trees and based on the studies of Brew and Mantai (2017) and Mathieson (2019), an additional code was added: 'Departmental valuing of teaching and research'. This code, despite not being present in Prosser and Trigwell's initial framework, was mentioned frequently by participants and covers fragments in which participants mentioned the way they feel the department values research and teaching.

In addition to the coding scheme on participants' challenges, we developed another coding scheme addressing participants' beliefs based on a template from Hu (2014). Hu's template contained seven codes: 'Reflection on research', 'Students as participants', 'Student

research interests', 'Critical disposition', 'Research skills', 'Creative disposition', and 'Current research in the domain'. Using this coding scheme, we (the three principal researchers) coded two of the transcripts individually and compared them with one another to check if new codes were created and calibrate the selection process of the fragments. Based on this calibration session, the additional code 'Reflection on teaching in research' was added to the coding scheme as this topic was mentioned frequently by participants and appeared relevant to their beliefs, but was not present in Hu's initial framework.

Additionally, we concluded that some codes were difficult to distinguish from each other; for example, the beliefs codes 'Research skills' and 'Critical disposition' appeared similar because participants saw a critical attitude as a component of research skills. Thus, we decided to add example fragments to the coding scheme in order to facilitate differentiation between these codes. After calibrating the coding scheme using a third transcript, no new codes emerged. The resulting finalised coding scheme for both beliefs and challenges containing the example fragments was then used to code the remaining transcripts. This scheme can be found in Appendix E.

In the second phase, we divided the transcripts evenly among the three researchers so that each researcher coded six transcripts using the finalised coding scheme from the first phase. Overall, we identified 288 interview fragments regarding lecturers' beliefs and 212 fragments regarding challenges. Interview fragments were selected only if they were a meaningful whole (i.e., containing an element of a belief or experienced challenge and comprehensible without context).

Following this initial selection procedure, we commenced the third phase of the analytical strategy, in which we each read coded fragments from all 18 transcripts and recorded our initial interpretations of the transcripts. With interpretation we mean that we wrote down the most important things per code, based on the fragments. An example of an

interpretation of the participants’ beliefs based on the coded transcript fragments can be found in Table 3. These interpretations were then verified by searching for fragments within each transcript that either supported or contradicted the ideas. No preliminary interpretations needed adjustments after the verification procedure.

Table 3

Example of Interpretations Based on Coded Fragments

Code	Fragments*	Preliminary interpretation of researcher
Research in teaching	<p>“If we stop integrating research, if we are no longer active in both research and teaching, we won’t be able to convey our students the latest ideas”. (P13)</p> <p>“without research you cannot say that you are offering academic education”. (P7)</p>	The data suggest that lecturers value the integration of research in teaching

Note: Fragments included in this table are not comprehensive

* Fragments were translated into English

The final phase of the coding process focussed on exploring possible relations between lecturers’ beliefs and challenges. To do so, we examined the coded fragments from each of the 18 transcripts regarding the beliefs and challenges. After thoroughly familiarizing ourselves with the coded fragments from each transcript, we attempted to draw connections based on our interpretations of the coded fragments between participants’ beliefs and challenges. This was done by examining emerging trends within and between participants’ beliefs and challenges as well as the preliminary interpretations of the fragments.

Results

In this section we present the results from the analysis of the coded fragments.

Lecturers will hereafter be referred to as Participant 1, 2 and so forth (e.g., P1). All fragments

from interviews were translated from Dutch to English for the purpose of reporting. For an overview of the coded fragments with examples, see Appendix E.

Challenges

After reviewing the coded fragments, we discerned that the participants expressed several concerns regarding the challenges that they face when integrating research in teaching.

Overall, 14 participants emphasized a high academic workload. P9 elaborates:

It is not without a reason that there is a [university-specific protest group] and there are things that are structurally wrong concerning demarcation of work pressure. And especially for people who are now starting to work for the university, their workload is really high because they have to give a lot of education but also have to conduct research.

In addition, some lecturers are considering leaving their position. P7 explained the dangers of overworking lecturers:

This guy is nominated for the UU-lecturer of the year award. He is an appreciated teacher and researcher, but if he is overused like this.. what does he do it for, all of this. That's what happens. You don't want people only working for their mortgage.

Lecturers mention that a high workload results in reduced time spent on conducting research, which can be a problem for research because of the way how it's being valued within the department. As P14 stated, "If we have to give more education than what we are appointed for, it will be at the expense of the research and we will be evaluated on that. You get the paradox".

Eight participants emphasised large class sizes. This, according to the participants, leads to lecturers being hindered giving personal attention. As P17 stated, "the number of students compared to teachers is gigantic. Does this hinder you giving personal attention to students? Yes". Moreover, the participants state that these large classes increase the academic workload. As P7 stated:

I do think that because of the huge number of students, there is enormous time pressure and pressure on the employees. And because of that they can do a little too little about educational innovation, about the advancement of education.

Twelve lecturers emphasized the valuing of research over teaching within the department. The data concerning the valuing of research over teaching seemed to indicate that this follows from departmental values, as most lecturers are recruited and evaluated on their research results and less on education results. As P15 stated:

As an educational director, in a job interview I talk 80 minutes about research, and we also have to discuss education. And if they are bad researchers they won't get hired, but if they are a bad teacher they still have the possibility to get the job.

P15 gives another example which indicates that departments within universities generally value research as higher compared to teaching:

Well, I think it would help if education was better appreciated in the university. Education has less status than doing research. In the board meeting, the subject of education is easily removed from the agenda, while raising research money is very high on the agenda.

Lastly, ten lecturers mentioned the topic 'Teacher control', which discusses whether there is room for variation and diversity in how and what is taught. The participants who commented on this topic expressed that those with less experience appear to have less control on the subjects they teach about than their more experienced colleagues. As P8 states: "I have a great influence on the content of the courses I give. My seniority puts me in a different position from my younger colleagues at the start of their careers". The participant elaborates on this sentiment and illuminates potential frustrations experienced by young or novice teachers, as "they spend a lot of time in education and that education often does not match their research, so it does not pay off for that research, and that soon threatens to become a trap where you can't get out". Therefore, the data suggest that the level of control lecturers have on their respective topics influence the integration of research into teaching.

Beliefs

After reviewing the coded fragments, several themes emerged from the coding scheme that allowed us to draw preliminary interpretations about the participants' beliefs. In general, we found that a majority ($N = 16$) of the 18 participants expressed that they valued the

integration of research into teaching. For example, P13 mentioned: “If we stop integrating research, if we are no longer active in both research and teaching, we won’t be able to convey our students the latest ideas”. Moreover, P7 emphasized the importance of integrating research in teaching, stating that “without research [implemented in teaching] you cannot say that you are offering academic education”. These comments represent the majority of the participants’ sentiments regarding the integration of research into teaching.

Fourteen participants stated specifically that integration could facilitate students’ development of research skills. As P9 stated, “Students should learn different methodological ways of researching. Then, they can learn how to plan research, and how to compare different situations with each other”. Twelve participants mentioned that the integration of research in teaching is valuable because it stimulates students’ interest and enthusiasm about research, whereas 10 participants cited a desire to develop students’ critical disposition and stimulates them to not be easily satisfied with an explanation. As P14 stated, “I think it is important that you as a scientist know how knowledge arises and how research is carried out, by looking critically at the data, statistics, things like that”.

According to the data, none of the participants explicitly emphasized a connection between beliefs and challenges. However, upon examining and interpreting the coded fragments from all 18 transcripts, we found that some of the beliefs expressed by participants appeared to pose challenges themselves, and there are possible relations between the challenges. These connections are explored more elaboratively in the discussion section.

Discussion and Conclusion

The aim of the present study was to explore possible relations between lecturers’ beliefs and challenges regarding the integration of research into teaching. This study attempted to strengthen this connection in order to assist lecturers in integrating research in teaching (e.g., Visser-Wijnveen, 2010). The results of this study may contribute to the

understanding of lecturers' beliefs and challenges and provide insights into how to most effectively support lecturers when integrating research into teaching. Overall, the most noteworthy finding of the present study was that a majority of the participants felt that the high workload of lecturers hinders their ability to effectively integrate research into teaching. In the present section we discuss this finding and the factors that contribute to lecturers' high workload, as well as offer recommendations regarding how universities and policy makers can best support lecturers to integrate research into teaching.

High Workload

Our findings suggest, in line with the research of Prosser and Trigwell (1997) and Mathieson (2019), most participants experienced a high workload, which posed a significant challenge to their ability to effectively integrate research into teaching. This high workload restricted the amount of time spent by lecturers on integrating research into teaching. As such, lecturers often are unable to spend as much time on research as on teaching. As Visser-Wijnveen (2010) emphasises, having research experience in the topic of a given course enhances the reciprocal research-teaching relationship, so if lecturers are not able to conduct research and implement this in their teaching, this hinders the integration of research in teaching. Moreover, due to the high workload, the participants also expressed difficulty in presenting and implementing innovative educational techniques to integrate research in teaching. We identified several factors that appear to contribute to this high workload.

Firstly, this study found that one of the reasons the participants perceive a high workload is that research is valued higher than teaching in the department, which paralleled findings of Coate and colleagues (2001) as well as Colbeck (1998). These studies found that lecturers often prefer performing research over teaching, particularly due to the higher status that being a researcher brings to an individual. For example, the participants expressed that lecturers are mostly being recruited and evaluated on their research results, and less on

education results. This study found, in line with the findings of Colbeck (1998), that the higher status of research is often rewarded with promotions, and rewards are generally based on research accomplishments rather than teaching quality (Colbeck, 1998). As such, there seems to be an incongruity; although research seems to be more valued within the university and lecturers are often judged more on research results than teaching results, lecturers have contracts which, timewise, focus mainly on teaching. Consequently, lecturers have to conduct research in a limited amount of time, or in their own time. This leads to an increased workload, because lecturers feel pressure to obtain conclusive research results in a limited amount of time. As our focus in the present study was on lecturers' experiences and beliefs, we did not include policy makers as participants; however, their input could be valuable in gaining clarity on the purpose behind these policies. Therefore, future research may wish to include policy makers and members of university administration to gain insights regarding the back end of this policy. More specifically, we recommend that future researchers examine the process endured by policy makers in order to determine whether adjustments can be made to alleviate the situation experienced by lecturers (e.g., more time allotted to research tasks, less emphasis on research achievements, promotions administered based on educational merit as well as research merit, clear communication in recruitment, etc.).

Secondly, in addition to the value of research over teaching within universities, this study confirmed the findings from Prosser and Trigwell (1997) that the size of lecturers' classes also contributes to lecturers' workloads. These large classes, according to the participants, lead to lecturers being unable to give sufficient personal attention to students, which can cause students' motivation and learning outcomes to suffer. This is in line with the study of Cuseo (2007), who reviewed 95 published articles reporting research into the effects of large classes. Cuseo (2007) found that large classes reduces the quality of lecturers'

interactions with their students, and also were associated with decreases in students' academic achievements. To reduce the workload, there should be initiatives aimed at reducing class sizes, but according to the study of Prosser and Trigwell (2014), it is inevitable that the class sizes will outweigh the number of teachers available. As such, Prosser and Trigwell advise universities to support teachers in adopting more Conceptual Change/ Student Focus (CCSF) teaching approaches. Future research should examine how policy makers could support teachers with this approach.

Thirdly, our findings indicated that lecturers who have less control over which courses they teach (i.e., teacher control) appear to be less familiar with the topic of the course, which might hinder their ability to integrate research into teaching. As Visser-Wijnveen (2010) emphasised, having research experience in the topic of a given course enhances the reciprocal research-teaching relationship. Therefore, when offering support to lecturers while integrating research into teaching, lecturers should have some teacher control in order to effectively integrate research into teaching. Policy makers within the university and lecturers should discuss strategies aimed at increasing of teaching control whenever possible. Additionally, support should be offered to lecturers trying to come up with ideas to make their research more accessible to students.

Connection Between Challenges and Beliefs

While none of the participants explicitly identified connections between their beliefs and the challenges they experience, an interpretive exploration of the connections between the participants' beliefs and challenges revealed that in certain cases, lecturers' beliefs may pose a challenge to the integration themselves. Almost all of the participants mentioned that the belief that the integration of research into teaching is imperative is consistently promoted within and outside the department, which is in line with the findings of previous studies (e.g. Gibbons et al., 1994; Visser-Wijnveen et al., 2010). It is our contention that this constant

pressure to integrate research into teaching could lead to lecturers holding an unattainably high self-imposed standard for doing so. This standard might then act as another internal source of stress, thus contributing to the high workload of lecturers. Brew and Mantai (2017) found similar findings, that when lecturers encounter challenges, they often are led to believe that successful integration of research into teaching is impossible. Therefore, our interpretation that the belief of the importance of integration of the two practices can pose a challenge itself illuminates the potential connection between participants' beliefs and challenges; however, as this is the first study that examined this particular link and is based on interpretations, more research is necessary to solidify the notion that lecturers' beliefs can pose challenges themselves. If the link is confirmed, policy makers should take this belief into account when supporting lecturers to integrate research in teaching.

Limitations

While the findings from this study are helpful in pointing researchers and practitioners in the right direction regarding strengthening the integration of research into teaching, we experienced some limitations. First, conclusions about the environment in which lecturers teach and conduct research were made based on comments of lecturers; we did not approach the colleagues of the participants regarding their shared work environment. Therefore, lecturers' self-reports might not entirely match the real environment. Future studies can make a more complete picture of the environment by interviewing colleagues, educational management and other actors in the environment.

Another limitation to the present study is that the structure of the interview guide may have been designed to elicit responses in favour of integrating research into teaching, rather than offering space to disagree or express indifference towards integration. For example, the interview guide contained the following line: "One of the goals of the university is to familiarize students with research in order to learn to use research in their later work and to

conduct research within their studies”. This could put pressure on the lecturer to agree with the statement or express a belief that the integration of research into teaching is important, even if this is not the belief they hold. Future research should come up with an interview guide that is entirely neutral about research or teaching and provides space for the lecturer to feel comfortable expressing the belief that research is not that important.

Conclusion and Implications

Overall, we have illuminated some of the beliefs and challenges of lecturers regarding the integration of research into teaching and discussed potential relations between lecturers’ challenges and beliefs. The high workload appeared to be one of the biggest challenges while integrating research in teaching. Based on the sentiments expressed in the interviews, we provided some recommendations as to how university policy makers could address this issue. Furthermore, we found that lecturers’ belief regarding the importance of the integration of research into teaching may pose a challenge itself to lecturers’ abilities to do so. However, more research is needed to establish this connection. Supporting lecturers who face challenges when integrating research into teaching could strengthen this relationship.

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Appendix A

Recruitment Email for Potential Candidates

Dear Dr. X,

At Utrecht University we are conducting research into lecturers' perceptions of research and teaching. This research is carried out by Dr. Christel Lutz (<https://www.uu.nl/staff/cilutz/Profile>) and Dr. Mayke Vereijken (<https://www.uu.nl/staff/MWCVereijken>), here in cc. We are their research assistants on this project. We are approaching you with permission of your dean.

With this email we would like to ask you whether we may interview you. We are interested in your experiences in research and teaching at Utrecht University, the content of your expertise and of your course(s), and the place that research and teaching hold for you in your work as an academic. The interview will take approximately one hour, and no preparatory work on your part is required.

We very much hope that you will allow us to interview you. Please know that we are of course working in accordance with all rules regarding privacy, data protection, and informed consent. If you are willing to participate we will explain this in more detail, but it is of course important to say at this time that your interview will be treated confidentially and filed anonymously, and that no one besides Christel Lutz, Mayke Vereijken and ourselves will have access to the data. We will share our research report with you, if you would like.

Please let us know whether you would allow us to interview you?

Warm regards, on behalf of Christel Lutz and Mayke Vereijken,

Truke Krijnen, Sander van der Lee and Aniek van den Ham

Appendix B

Interview Guide

Benodigdheden

- Recorder met oplader
- Informed consent formulieren
- Geprinte versie van de enquête, mocht een docent het meteen in willen vullen
- Pen en papier voor de zekerheid

Introductie

- Goeiedag. Fijn dat u er bent. Mijn naam is... en ik ben een master-student(e) 'Educational Sciences'.
- Zoals u waarschijnlijk al heeft gelezen in de *informed consent brief*, ben ik geïnteresseerd in uw beleving van academisch werk en factoren die u in staat stellen onderzoeks- en onderwijstaken uit te voeren. De universiteit heeft namelijk als een van hun doelen om studenten vertrouwd te maken met onderzoek om onderzoek in hun latere werk te leren gebruiken en om binnen hun studie onderzoek te doen. Dit gebeurt bijvoorbeeld in masterscripties, werkgroep-begeleiding of door literatuur te gebruiken in hoorcolleges. Ook zijn we benieuwd naar ervaringen van docenten en of zij nog dingen zouden op het gebied van het onderwijs dat zij geven.
- Wij zouden het interview graag willen opnemen. Heeft u daar bezwaar tegen? U kan na het interview kiezen op welke manier uw antwoorden gerapporteerd worden in ons onderzoek.
- We willen u meegeven dat er geen 'goede' of 'foute' antwoorden bestaan. U mag alles vertellen wat in u opkomt wanneer u een vraag hoort. Ook mag u ieder moment aangeven als u zou willen stoppen met het interview.
- Heeft u nog vragen voordat we beginnen?

Algemene vragen

- Hoeveel jaar ervaring heeft u als onderzoeker?
- Hoeveel jaar ervaring heeft u als docent?
- In welke onderwijsprogramma's geeft u les?
- Zijn deze studenten bachelor- of masterstudenten?

Check: In welke vak of vak(ken) die u geeft aan studenten heeft u aandacht voor onderzoek?

- **OPTIE BIJ MEERDERE VAKKEN** --> Is er één vak waarin onderzoek een grote rol speelt?
- Ik ben geïnteresseerd in uw onderwijsaanpak en overwegingen binnen één van die vakken. De vragen die ik stel zijn daarop gericht.

Centrale Vraag 1: Hoe geven docenten onderzoek vorm binnen het onderwijs?

1. **Beliefs:** Wat wilt u studenten leren over onderzoek binnen [naam vak]?
2. Waarom is dat belangrijk voor studenten?
3. **LSD:** Zijn er daarnaast nog andere dingen die u studenten over onderzoek wil leren binnen [naam vak]?
4. **LSD:** Als ik het goed begrijp, dan vindt u de integratie van onderzoek in onderwijs belangrijk omdat... (erop doorvragen wanneer van toepassing). Dan ben ik benieuwd

hoe u dat vertaalt in de praktijk. Hoe pakt u het integreren van onderzoek dan bijvoorbeeld aan in colleges?

5. **LSD:** Waarom pakt u dit zo aan? (doorvragen tot alles duidelijk is)
6. Zijn er ook andere momenten dan in colleges in [naam vak] waarop u onderzoek integreert in het lesgeven? Hoe pakt u dat aan binnen [naam vak]?

Centrale vraag 2: In hoeverre ervaren docenten uitdagingen die voortkomen uit de afdeling binnen de universiteit waar zij werkzaam wanneer zij proberen onderzoek in onderwijs te integreren?

We hebben het net gehad over hoe u onderzoek integreert in onderwijs en wat u van belang vindt in deze integratie. Uw werkomgeving op de afdeling kan ook invloed hebben op de manier waarop u onderzoek in onderwijs vormgeeft in de praktijk. Daar wil ik graag wat vragen over stellen.

7. **Challenges environment.** In hoeverre ondersteunt afdeling u om onderzoek uit te voeren?
8. Zijn er ook belemmerende factoren binnen uw afdeling die u hinderen om onderzoek uit te voeren?
9. **LSD:** zo ja, welke?
10. Wat zou voor u de ideale omgeving binnen de afdeling zijn om onderzoek in onderwijs uit te voeren?
11. **LSD:** wat maakt het dat u dat fijn vindt?
12. In hoeverre wordt u gestimuleerd om onderwijs te verzorgen en onderzoek te doen?
13. **LSD:** wat vindt u daarvan (van die mate van aanmoediging)?
14. Wat maakt het binnen uw afdeling lastig om onderwijs te verzorgen?
15. Wat vindt u fijn aan uw afdeling om onderwijs te verzorgen?
16. Heeft u het binnen de afdeling over de rol van het onderzoek in onderwijs?
17. **LSD:** Wat komt er dan naar voren? Op welke manier?
18. Hoe zou u ideaal gezien onderzoek willen inzetten in het onderwijs?
19. **LSD:** Wat heeft u daarvoor nodig/wat moet je daarvoor laten?

Afsluiting

- Oké, dit waren onze interviewvragen.
- Heeft u verder nog zaken die u nog kwijt wilt?
- Heeft u het gevoel dat u alles heeft kunnen zeggen wat u wilde of wilt u nog wat kwijt over onderzoek in onderwijs?
- Alvast ontzettend bedankt voor uw deelname. Wat er nu gaat gebeuren is het volgende:
 - We willen u vragen om het informed consent formulier te tekenen. Hierop staan twee opties beschreven die we kunnen inzetten om de data te analyseren. Leest u ze eens rustig door.
 - Binnen twee weken zal ik u een samenvatting van het interview voorleggen. U kunt dan nagaan of we uw informatie juist weergeven. Eventueel vragen we u dan naar aanvullende informatie over uw functie om tot diepere inzichten te komen in ons onderzoek. Aan het einde van het onderzoek wil ik daarnaast een

conceptversie van de resultatensectie met u delen. U kunt dan aangeven of de informatie juist is geïnterpreteerd.

- We gaan u een digitale vragenlijst toesturen over de mate waarin docenten ervaren het leren van hun studenten te beïnvloeden. We hopen dat u deze wilt invullen. Het zal maximaal 10 minuten duren.
- Deze heeft u thuis al kunnen bestuderen. Keuze voorleggen over hoe gerapporteerd wordt.
- Hartstikke bedankt voor uw deelname en heeft u nog vragen, neem vooral contact met me op!

Appendix C

Informed Consent Form

Informed consent deel I: Beschrijving van de studie [voorafgaand aan het interview]

Middels het ondertekenen van dit formulier stemt u in met deelname aan de studie naar de docentbeleving van academische taken aan de Universiteit Utrecht (UU). De studie wordt uitgevoerd onder leiding van Christel Lutz, universitair hoofddocent van de afdeling Social Sciences van het Utrecht University College en Mayke Vereijken, universitair docent binnen de afdeling Educatie, faculteit Sociale Wetenschappen UU. De onderzoekers binnen deze studie zijn geïnteresseerd in uw beleving van academisch werk en factoren die u in staat stellen onderzoeks- en onderwijstaken uit te voeren.

Drie masterstudenten Onderwijswetenschappen, Truke Krijnen, Sander van der Lee en Aniek van Ham maken deel uit van het onderzoeksteam. Een onderdeel van deze studie is een interview waarin u uw ervaringen kunt toelichten. Het interview zal ongeveer een uur duren (max. 90 minuten). Om de data te kunnen analyseren wordt een audio-opname gemaakt. Mocht u daar bezwaar tegen hebben, zal de interviewer aantekeningen maken tijdens het gesprek. Op elk moment tijdens het interview kunt u aangeven de opname te stoppen. Naast het interview zullen we u eenmalig benaderen om na te gaan of we uw informatie juist weergeven en om eventueel te vragen naar aanvullende informatie over uw functie. Er is geen vergoeding voor deelname. Deelname aan het onderzoek geeft u gelegenheid te reflecteren op uw werk.

De informatie die u deelt met het onderzoeksteam wordt vertrouwelijk behandeld. We gebruiken pseudoniemen in plaats van namen van deelnemers. U kunt de door u verstrekte informatie aanmerken als 'off the record'. In dat geval wordt informatie in generieke termen beschreven of weggelaten in mondelinge en schriftelijke rapportage over de studie. Inzichten uit de studie zullen uiteindelijk worden gedeeld met docenten en onderwijsonderzoekers, in de vorm van masterscripties, presentaties op onderzoeksbijeenkomsten en een wetenschappelijke publicatie in een internationaal, peer-reviewed tijdschrift. Indien gewenst informeren we u over de bevindingen uit de studie. Data wordt opgeslagen en gebruikt onder supervisie van Christel en Mayke.

De onderzoekers delen geen persoonlijke details van deelnemers in rapportage over de studie. Desondanks kan het gebeuren dat u te herkennen bent voor mensen die u of uw werk goed kennen. Bijvoorbeeld vanwege demografische kenmerken, de onderwerpen waar u onderzoek naar doet, les over geeft of u anderszins voor inzet. Het onderzoeksteam zal uw identiteit verhullen door zo'n 20 academici te interviewen verdeeld over meerdere afdelingen en door het aanpassen van bewoordingen in citaten uit het interview. Hiermee beperkt het onderzoeksteam de kans dat informatie terug te leiden is naar individuele deelnemers tot een minimum.

Na het interview zal de interviewer u vragen een keuze te maken op welke manier uw informatie weergegeven mag worden in rapportage. In het ene geval (optie A) zult u mogelijk herkenbaar zijn voor degenen die u of uw werk kennen. In het andere geval (optie B) zullen de onderzoekers geen persoonlijke kenmerken en uitingen rapporteren, door vaag te blijven of gegevens weg te laten, zodat u niet herkenbaar bent voor degenen die u of uw werk kennen.

Deelname aan deze studie is geheel vrijwillig en vrijblijvend. U kunt op elk moment afzien van deelname zonder opgaaf van redenen. U kunt ook aangeven bepaalde vragen niet te beantwoorden of informatie niet te verstrekken. Als de studie is afgerond wordt de data mogelijk gedeeld met andere onderzoekers in een databank. Mocht dit het geval zijn, wordt persoonlijke informatie verwijderd voordat de data gedeeld wordt zoals beschreven onder optie B.

Bedankt voor uw tijd.

Namens het onderzoeksteam,

Christel Lutz & Mayke Vereijken

Titel studie: 'Research and teaching practices in a research-intensive university'

Versie datum formulier: November 2019

Hoofdonderzoeker (voor vragen): Dr. M. Vereijken, FSW/UU, m.w.c.vereijken@uu.nl, 06 4157 7641

Onafhankelijk contactpunt (voor klachten): Klachtenbureau Utrecht University, klachtenfunctionaris-fetcsocwet@uu.nl.

Informed consent, deel II

Verklaring van voorkeur voor informatieweergave

De onderzoekers hebben aangegeven hoe uw privacy en anonimiteit geborgd worden en op welke manieren uw informatie beperkt of niet herleidbaar weergegeven kan worden in mondelinge en schriftelijke rapportage. Namelijk; A) de weergave in rapportage bevat persoonlijke kenmerken die tot u te herleiden zijn voor degenen die uw werk kennen (e.g., uw veld, vakken waarin u onderwijs over geeft, demografische achtergrondinformatie), of B) in rapportage wordt deze informatie vervaagd of weggelaten, zodat deze niet tot u te herleiden is.

Geef hieronder uw voorkeur aan:

RUNNING HEAD: RESEARCH AND TEACHING

____ (A) Ik geef Christel, Mayke en de masterstudenten toestemming data over mij te presenteren waarin kenmerken van mijn academische en persoonlijke identiteit weergegeven worden. Deze optie houdt in dat mijn identiteit gemaskeerd wordt door een pseudoniem en aanvullende manieren. Rapportages die toegankelijk zijn voor docenten en onderwijsonderzoekers geven de discipline(s), onderzoeksveld(en), vakken en demografische gegevens weer die voor de studie relevant zijn. De onderzoekers geven geen informatie weer waarvan ik aangegeven heb dat deze 'off the record' is.

____ (B) Ik geef Christel, Mayke en de masterstudenten geen toestemming data over mij te presenteren waarin kenmerken van mijn academische en persoonlijke identiteit weergegeven worden. Deze optie houdt in dat mijn identiteit gemaskeerd wordt door een pseudoniem en aanvullende manieren. Rapportages die toegankelijk zijn voor docenten en onderwijsonderzoekers geven de discipline(s), onderzoeksveld(en), vakken en demografische gegevens niet weer, al zijn ze voor de studie relevant. Deze informatie wordt dan weergegeven in generieke termen of wordt weggelaten uit de rapportage. De onderzoekers geven geen informatie weer waarvan ik aangegeven heb dat deze 'off the record' is.

(Handtekening deelnemer)

(Handtekening interviewer)

(Date)

(Date)

Titel studie: 'Research and teaching practices in a research-intensive university'

Versie datum formulier: November 2019

Hoofdonderzoeker (voor vragen): Dr. M. Vereijken, FSW/UU, m.w.c.vereijken@uu.nl, 06 4157 7641

Onafhankelijk contactpunt(voor klachten): Klachtenbureau Utrecht University, klachtenfunctionaris-fetcsocwet@uu.nl.

Appendix D

FETC Form

Section 1: Basic Study Information

1. Name student:

Sander van der Lee

2. Name(s) of the supervisor(s):

Mayke Vereijken and Christel Lutz

3. Title of the thesis (plan):

Research and Teaching: An In-depth Study into Lecturers' Beliefs and Experienced Challenges

4. Does the study concern a multi-center project, e.g. a collaboration with other organizations, universities, a GGZ mental health care institution, or a university medical center?

no

5. Where will the study (data collection) be conducted? If this is abroad, please note that you have to be sure of the local ethical codes of conducts and permissions.

The data will be collected at different faculties at Utrecht University.

Section 2: Study Details I

6. Will you collect data?

Yes / No
Yes Continue to question 11
No Continue to question 7

7. Where is the data stored?

Surfdrive

8. Is the data publicly available?

Yes / No
If yes: Where?

9. Can participants be identified by the student? (e.g., does the data contain (indirectly retrievable) personal information, video, or audio data?)

Yes / No
If yes: Explain.

10. If the data is pseudonymized, who has the key to permit re-identification?

Section 3: Participants

11. What age group is included in your study?

29-67

12. Will be participants that are recruited be > 16 years? **Yes/No**

13. Will participants be mentally competent (wilsbekwam in Dutch)? **Yes/No**

14. Does the participant population contain vulnerable persons?
(e.g., incapacitated, children, mentally challenged, traumatized, pregnant) **Yes/No**

15. If you answered 'Yes' to any of the three questions above: Please provide reasons to justify why this particular groups of participant is included in your study.

Conditions in this research program are that participants will be interviewed to elaborate on their experience with research and teaching. Therefore, we chose a particular group of participants which are academics with a minimum of 5 years of research and teaching experience. The interviews foster a deep understanding of (dis)continuities between research and teaching.

16. What possible risk could participating hold for your participants?

In recruiting participants through deans and vice-deans of faculties, academics might feel pushed to participate by their staff. During the interviews academics might feel joy or frustration when elaborating on their experiences. In reports about this study, academics might be identified by people who are very familiar with their research interests, teaching and/or societal activities.

17. What measures are implemented to minimize risks (or burden) for the participants?

Participants can withdraw from the study without reason or consequences. Furthermore, during the interview they can chose not to answer questions, leave information out and to stop the audio-recording. In addition, they choose how personal information (e.g., discipline, field of study, teaching subjects, relevant demographics) will be reflected in oral and written reports on this study. In any case the research team minimizes the risk of revealing participants' identity by 1) providing pseudonyms, 2) interviewing 18 academics from several departments and 3) by carefully adjusting quotations before using them in public records. Additional measures will be taken when participants ask for that, which means that personal information will be blurred using generic terms or will be left out. Moreover, we appointed an independent contact person who participants can approach for complaints about the way the research team treated them.

18. What time investment and effort will be requested from participants?

From the participants, who'll be interviewed, we ask 1 hour time investment to elaborate on their experiences in research and teaching.

19. Will be participants be reimbursed for their efforts? If yes, how? (financial reimbursement, travelling expenses, otherwise). What is the amount? Will this compensation depend on certain conditions, such as the completion of the study?

There will be no (travel) expenses involved. Participants may receive a token of appreciation, such as a piece of chocolate or a small gift certificate.

20. How does the burden on the participants compare to the study's potential scientific or practical contribution?

This study has both a significant societal and scientific relevance. Recently, the question has been raised (inter)nationally on how to value academic work (DORA, 2012; VSNU, 2019). This is based on the idea that academic performance should be determined in three areas, namely research, teaching and societal impact and that there should be more differentiation in career paths. This study gains deeper insight into the practices of academics and how they intertwine. Implications of this study inform this discussion. Furthermore, previous studies mainly approach the problem of academics combining research and teaching on individual level. For example, studies into academics beliefs about research and teaching (Van der Rijst et al., 2013; Visser-Wijnveen et al., 2010). Findings from this study suggest that the link between research and teaching exists on the level of individual academics but also in their environment (Brew & Mantai, 2017; Visser-Wijnveen et al., 2010). The starting point from this perspective is that research and teaching are separate practices. Using a theoretical lens based on the notions of boundary crossing and (dis)continuity in this research program contributes to theorizing research and teaching as partly related practices (cf. Akkerman, Bronkhorst, & Zitter, 2013). More importantly, this research program aims to describe the nature of this relationship between research and teaching. Therefore, we think that the burden on participants is limited compared to the potential contribution of the research program.

21. What is the number of participants? Provide a power analysis and/or motivation for the number of participants. The current convention is a power of 0.80. If the study deviates from this convention, the FERB would like you to justify why this is necessary.

(Note, you want to include enough participants to be able to answer your research questions adequately, but you do not want to include too many participants and unnecessarily burden participants.)

We will include 18 academics for this study.

22. How will the participants be recruited? Explain and attach the information letter to this document.

The thesis mentors will approach the educational directors of the 18 participants and ask for permission to collect data in their department. Additionally, the researchers will provide the educational directors a recruitment mail to forward to lecturers for who it is relevant, to invite them to participate in the study (Appendix B). This letter will include the goal of the study, the focus of the interview, and contact details from the researchers.

23. How much time will prospective participants have to decide as to whether they will indeed participate in the study?

2 weeks

24. Please explain the consent procedures. Note, active consent of participants (or their parents) is in principle mandatory. Enclose the consent letters as attachments. You can use the consent forms on Blackboard.

Lecturers who made clear they want to participate, already read the recruitment mail containing the goal of the study and the focus of the interviews (Appendix B). All participants will be asked to sign an active consent form prior to the interview (Appendix C).

25. Are the participants fully free to participate and terminate their participation whenever they want and without stating their grounds for doing so? Explain.

Yes, this is explained prior to the interview.

26. Will the participants be in a dependent relationship with the researcher?

No

27. Is there an independent contact person or a general email address of a complaint officer whom the participant can contact?

yes

28. Is there an independent contact person or a general email address of a complaint officer whom the participant can contact in case of complaints?

yes

Section 4: Data management

29. Who has access to the data and who will be responsible for managing (access to) the data?

The principal investigators (Lutz and Vereijken) are responsible. They and the three researchers can access the data

30. What type of data will you collect or create? Please provide a description of the instruments.

We will collect audio recordings and transcripts of 18 interviews. The interviews cover the following topics: 1) background information such as gender, age, discipline and years of research and teaching experience; 2) academics' beliefs and perceptions of research and teaching linkages; 3) academics' experiences with the integration of research and teaching in their work.

31. Will you be exchanging (personal) data with organizations/research partners outside the UU?

Yes / No
If yes: Explain.

32. If so, will a data processing agreement be made up?

Yes / No
If yes: Please attach the agreement.
If no: Please explain.

33. Where will the data be stored and for how long?

In Nvivo, for the during of the research (till July 2020)

34. Will the data potentially be used for other purposes than the master's thesis? (e.g., publication, reporting back to participants, etc.)

Yes, potentially publication.

35. Will the data potentially be used for other purposes than the master's thesis? (e.g., publication, reporting back to participants, etc.)

Yes / No
If yes: Explain. See above

Appendix E

Coding Schemes

Final Coding Scheme with Examples of Teachers' Beliefs

Coded Beliefs	Definition	Example from transcripts
Reflection on research in teaching	<p>The lecturer indicates that he/she believes that research in teaching is valuable because:</p> <ul style="list-style-type: none"> · it stimulates students to learn about research findings · it teaches students to pay attention to the way research is carried out · it makes the scientific research process an essential part of the curriculum · it pays attention to research methodology 	<p><i>Not everyone realises what the essence of academic education is: to learn, that we educate students to actually conduct research. Especially when you are participating in a masters' studies (P4)</i></p>
Reflection on teaching in research	<p>The lecturer indicates that he/she believes that teaching in research is valuable because:</p> <ul style="list-style-type: none"> · it stimulates the lecturer to think critically about their own research · participation in research helps teachers to get a bigger data-set 	<p><i>Without my students, I would never have written about such beautiful subjects where I am absolutely happy about these days. Directly or indirectly, these students triggered me to think in a direction, not directly, but things that made me feel like: you said something interesting, which I want to hang on to! (P5)</i></p>
Students as participants	<p>The lecturer indicates that he/she believes that research in teaching is valuable because:</p> <ul style="list-style-type: none"> · he/she values the students' contribution to research · he/she considers students' participation in research important · he/she asks students to make contribution to research · he/she involves students in scientific studies · participation in research forces students to participate 	<p><i>In the first course of the entire curriculum the students already need to execute a field research in an organisation, gather audiotapes, conduct interviews to gain practical experience and work in a team with different backgrounds. That's how you learn to execute research and what research actually means (P9)</i></p>
Research skills	<p>The lecturer indicates that he/she believes that research in teaching is valuable because:</p> <ul style="list-style-type: none"> · it increases students' ability to analyse complex situations · it develops students' research skills · it increases students' ability to conduct research · participation in research aims to stimulate development of research skills 	<p><i>Well, students should learn different methodological ways of researching. Then, they can learn how to plan research, and how to compare different situations with each other (P9)</i></p>

Students research interests	<p>The lecturer indicates that he/she believes that research in teaching is valuable because:</p> <ul style="list-style-type: none"> · it motivates students to learn more about the discipline · it increases students' enthusiasm about the scientific world · it encourages students' interest for research · participation in research aims to stimulate students' enthusiasm 	<p><i>How can you possibly get out of your bed if you aren't motivated by what you are doing? (P7)</i></p>
Critical disposition	<p>The lecturer indicates that he/she believes that research in teaching is valuable because:</p> <ul style="list-style-type: none"> · it develops students' critical attitude · it stimulates students not to be easily satisfied with an explanation · it stimulates students to read scientific literature critically · it stimulates students to ask critical questions about their work · it stimulates students to critically reflect on the impact of research in society 	<p><i>I want them to become a kind of critical, well-calibrated civilians in the world. Don't let anything impress you or scare you (P1).</i></p>
Creative disposition	<p>The lecturer indicates that he/she believes that research in teaching is valuable because:</p> <ul style="list-style-type: none"> · it fosters students' sense of innovation for improvements in society or in research · it encourages students to have creative ideas of their own regarding innovation in society or in research 	<p><i>Sometimes you want students to think: how should I approach this? And, then they should actually be able to answer that question. So we try to really mobilise the creativity of students a little. Hence, that is research: research partially equals creativity (P10)</i></p>
Current research in the domain	<p>The lecturer indicates that he/she believes that research in teaching is valuable because:</p> <ul style="list-style-type: none"> · it increases students' awareness of the research issues currently being discussed · it shows students the kind of studies carried out in areas related to hot topics in the research field · it makes links to current research practices 	<p><i>You need to know what is currently happening in biotechnology. So, the course is constantly stirred from research, so that students are really hands-on conducting current research (P7)</i></p>

Final Coding Scheme with Examples of Teachers' Experienced Challenges

Experienced challenges	Description	Example from transcripts
Appropriate class size	<p>The lecturer indicates a focus on the extent to which the appropriate class size influences the nature and</p>	<p><i>I do think that because of the huge number of students, there is enormous time pressure and pressure on the employees. And because of that they can do a little too little about educational innovation, about the advancement of education (P7)</i></p>

amount of interaction between student and lecturer

Appropriate academic workload	The lecturer indicates a focus on the amount of time spent on teaching and/or assessment and its interference or balance with time for research	<i>I have shortened my research time for six years because I had published too little. Yes you know, I cannot go fast if I am not allowed to teach about my research. That does not help either (P4)</i>
Teacher control	The lecturer indicates a focus on room for variation and diversity in how and what is taught	<i>So I set up a new course this year. So I got another first-year course in my stomach split over an area that I thought was not my job at all. But then I thought, wait a minute, but how am I going to make it interesting for myself, because I will have to check 180 papers? So then I thought: I choose a topic related to communication, namely listening to music (P4).</i>
Departmental valuing of teaching and research	The lecturer indicates a focus on the balance between the valuing of teaching and research at departmental level	<i>Actually, I also had no research task at the beginning, in Utrecht. But then I always did research because I wanted to fit in, you see. I still had an educational task on my own, but I thought: yes, if I do that alone, I never get along on the track. So I had, yes, I actually just worked to death to still deliver publications to belong to the club (P5)</i>
Enabling student characteristics	The lecturer indicates a focus on variation in the ability of the student and (educational) background	<i>Nowadays you can no longer rely on what the students know about the background. That also makes it difficult in parentheses if I can continue, because you have students who know the Bible better than I do. Hey, the ones from the Bible Belt and those sides. And there are people who really don't know anything (P5)</i>
Departmental (lack of) support for teaching and researching	The lecturer indicates a focus on the opportunities for exchanging ideas regarding research or teaching with colleagues, on the quality and amount of facilities available for lecturers and on financial matters	<i>Yes, as complete as possible. Because without support from the working environment, that is to say the department, and the University, we never would have, the University makes laboratories available, the University pays salaries, the University invests in research resources. (P7)</i>

Overview of Codes Concerning Lecturers' Beliefs

Code	Description: Research in teaching is valuable because:
Reflection on research in teaching (n = 16)	<p>...it stimulates students to learn about research findings.</p> <p>...it stimulates students to learn to look at the world in a certain way.</p> <p>...it makes the scientific research process an essential part of the curriculum.</p> <p>...it makes the students pay attention to research methodology.</p>
Research skills (n = 14)	<p>...it increases the students' ability to analyse complex situations.</p> <p>...it develops students' research skills.</p>
Students' research interests (n = 12)	<p>...it increases students' enthusiasm about the scientific world.</p> <p>...it encourages students' interest for research.</p> <p>...participation in research aims to stimulate students' enthusiasm.</p>
Reflection on teaching in research (n = 12)	<p>...it keeps lecturers up to date of new developments in the scientific world as they learn from discoveries of students.</p> <p>...it stimulates the lecturer to think critically about their own research.</p> <p>...participation in research helps teachers to get a bigger dataset.</p>
Current research in the domain (n = 11)	<p>...it increases students' awareness of the research issues currently being discussed</p>
Students as participants (n = 11)	<p>...he/she values the students' contribution to research</p> <p>...he/she involves students in scientific studies</p>
Critical disposition (n = 10)	<p>...it develops students' critical attitude</p> <p>...it stimulates students to read scientific literature critically</p> <p>...it stimulates students to critically reflect on the impact of research in society</p>
Creative disposition (n = 6)	<p>...it encourages students to have creative ideas of their own regarding innovation in society or in research</p>

Note: n = number of participants who made statements about code

Overview of Codes Concerning Lecturers' Perception of the Environment

Code	Description
Appropriate class size (n = 8)	The lecturer indicates a focus on the extent to which the appropriate class size influences the nature and amount of interaction between student and lecturer.
Appropriate academic workload (n = 14)	The lecturer indicates a focus on the amount of time spent on teaching and/or assessment and its interference or balance with time for research.

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Teacher control ($n = 11$)	The lecturer indicates a focus on room for variation and diversity in how and what is taught.
Departmental valuing of teaching and research ($n = 12$)	The lecturer indicates a focus on the balance between the valuing of teaching and research at departmental level.
Enabling student characteristics ($n = 10$)	The lecturer indicates a focus on variation in the ability of the student and (educational) background.
Departmental (lack of) support for teaching and researching ($n = 17$)	The lecturer indicates a focus on the opportunities for exchanging ideas regarding research or teaching with colleagues, on the quality and amount of facilities available for lecturers and on financial matters.

Note: n = number of participants who made statements about code