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EDITED BY

Veruska De Caro-barek,
Norwegian University of Science and
Technology, Norway

REVIEWED BY

Balwant Singh,
Partap College of Education, India
Serafina Pastore,
University of Bari Aldo Moro, Italy

*CORRESPONDENCE

Leila E. Ferguson
✉ leila.ferguson@kristiania.no

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Norwegian higher education teachers' beliefs about teaching, motivation, and approaches to researching and developing teaching

Leila E. Ferguson^{ID*}

School of Health Sciences, Kristiania University of Applied Sciences, Oslo, Norway

Quality teaching in higher education is enjoying renewed political and scholarly interest in Norway. Building on extant research on teachers at primary and secondary levels, and budding research at the tertiary level, the present investigation focuses on higher education teachers' beliefs about teaching, motivation, and beliefs about researching and developing teaching. Using data from the Teaching in Higher Education (THE) Survey that was subjected to factor and regression analyses, we found that participants ($n = 56$) preferred alternative and personal sources of teaching knowledge over formal sources and those offered by academic developers. On the whole, the participants were motivated to teach. Relations were found between beliefs about sources of teaching knowledge and motivation, respectively, and beliefs about research and development of teaching. Implications in terms of the Scholarship of Teaching and Learning and academic development, including the need for increased focus on teacher beliefs and evidence-based practice in higher education, are discussed.

KEYWORDS

teaching in higher education, teachers' beliefs, motivation, academic development, scholarship of teaching and learning

1 Introduction

The role of teachers' beliefs has steadily gained research interest over the last 70 years, as researchers have transitioned from focusing on teachers' overt behaviors, to underlying cognitions and belief systems (Ashton, 2015). While contemporary research on beliefs in teachers and student teachers at primary and secondary levels has flourished (Brownlee et al., 2011; Fives and Gill, 2015, 2025; Lunn Brownlee et al., 2017; Schraw et al., 2017), there has been less cross-germination to the tertiary level (Ferguson, 2020; Goodyear and Hativa, 2002; Kane et al., 2002; Strømso and Bråten, 2011). Given plenteous work-life and educational experience before embarking on academic careers, it is expected that higher education teachers' beliefs play a central role in teaching, through influencing teachers' understanding, interpretations, and actions (Kane et al., 2002). Further, while teaching in general is bound to have some overlapping qualities, there are also likely distinguishing features at the tertiary level (Entwistle and Walker, 2000).

"Scholarly interest" in academic development has a trajectory starting around the dawn of the 1970s (Åkerlind, 2005, p. 1). But the Norwegian higher education sector is currently enjoying a renewed focus on quality teaching, as described in the White Paper "Quality Culture in Higher Education" (Norwegian Ministry of Education and Research, 2016-2017), as well as being mandated by current employment legislation, requiring academic staff to demonstrate systematic development of their teaching activities over time (Endr. i forskrift om

ansettelse og opprykk i undervisnings- og forskerstillinger [Change in regulations on employment and promotion in teaching and researcher positions], 2018). Push-factors for this revival include increased public demands for relevant, accountable, and work-related educational programs, as well as increased heterogeneity in student populations that has necessarily raised demands for good teaching (Biggs and Tang, 2011; Dekker and Meeter, 2022; Solbrekke and Fremstad, 2018; Åkerlind, 2005). And consequently, institutions in Norway, as worldwide, have established academic development centers with responsibility for supporting educators in increasing the quality of their teaching, and developing their teaching careers.

Help pursuing teaching excellence within the framework of the Scholarship of Teaching & Learning (SoTL) is one way that academic developers can and do support academic staff (e.g., Kirschner et al., 2021). However, HE teachers may hold beliefs about teaching that are at odds with, or even hinder their engagement with SoTL and educational research and theory (Ferguson, 2020; Kane et al., 2002; Newton et al., 2000). This study focused on that problem space by spotlighting higher education teachers' beliefs about teaching and teaching knowledge, their motivation, and their beliefs about researching and developing teaching. As a theoretical framework we look to research literature on teacher beliefs (e.g., Deekens et al., 2024; Diery et al., 2020; Kane et al., 2002), teacher motivation (Daumiller et al., 2020; Eccles, 2009), and academic development (Kern et al., 2015; Hativa and Goodyear, 2002), with the aim of bridging the beliefs teachers in higher education hold about sources of teaching knowledge and their motivation to teach on the one hand, and their beliefs about researching and developing teaching on the other. We draw on work on teachers in higher education where possible, as well as teachers at a lower level (primary and secondary).

1.1 Teachers' beliefs

Teachers' beliefs are experience-based preconceptions held by teachers that influence their practice by merit of their role in teachers' framing and interpretation of activities and actions, spanning from interactions with students, to evaluation and ICT, as well as whether and how they use educational research literature (Ferguson and Bråten, 2022; Fives and Gill, 2015). The beliefs that teachers hold are explicit as well as implicit, and likely interrelated (Pajares, 1992). Due to recent research interest, the beliefs of (student) teachers are acknowledge and may be addressed and transformed through teacher education (Ferguson et al., 2022). However, the lack of regulation of teaching in higher education that currently prevails, and the consequential paucity of arenas for HE teachers to form an awareness or reflexivity regarding their underlying beliefs that might lead to opportunities for change, give grounds for a legitimate need for a research focus on teacher beliefs at this level (Kane et al., 2002).

In 2002, Goodyear and Hativa predicted that the increase in quality teaching in higher education at that time would see an ensuing increase in research on teacher beliefs at the tertiary level. Indeed, their volume on teacher thinking and beliefs gathered together international scholars that explored teaching and learning in higher education with a main focus on thinking and beliefs about "good teaching." Although there is now a limited body of knowledge about conceptions of teaching and whether teachers in higher education hold more student- or teacher-centered views (e.g., Norton et al., 2005,

who focus on "learning facilitation" and "knowledge transmission" beliefs, p. 540), as well as some extension to "subject matter, learning to teach, and self and the teaching role" (Kane et al., 2002, p. 179), Goodyear and Hativa's prognosis, regrettably, has not taken root (Ferguson, 2020; Strømso and Bråten, 2011).

Thus, given this sparsity of research on teachers' beliefs in higher education, the present research extends current thinking by focusing on specific teachers' beliefs that have been shown to be related to professional development and thinking at lower levels (Ferguson and Bråten, 2022; Ferguson et al., 2022; Buehl and Fives, 2009). Specifically, teachers' beliefs about sources of teaching knowledge, teachers' motivational beliefs and beliefs about researching and developing teaching.

1.1.1 Beliefs about sources of teaching knowledge

Considering the importance of teachers' knowledge base for their practice, the sources of said knowledge have garnered considerable interest, as have teachers' beliefs about where their knowledge should come from. Relevant for this study is the perspective of teachers' epistemic beliefs, that are concerned with questions about the nature of knowledge and knowing, including beliefs about legitimate sources of knowledge (Bromme et al., 2010; Ferguson et al., 2022). Beliefs about sources of (teaching) knowledge from an epistemic beliefs perspective have tended to focus on beliefs about personal sources of knowledge to beliefs about knowledge stemming from authority, as well as knowledge that stems from cross-checking and integrating information from multiple sources (Ferguson et al., 2012). Of note is that stronger beliefs in authority as the source of knowledge have been related to lower levels of motivation, and lower levels of meaningful cognitive engagement (Buehl and Fives, 2009). Relatedly, Buehl and Fives predicted that beliefs in authoritative knowledge sources might be related to less reflective teaching practice or views of teachers as active "knowledge contributors" (2009, p. 371). So, to investigate teachers' beliefs about sources of knowledge, Buehl and Fives used the Open-Ended Teaching Belief Questionnaire (OTBQ) to ask teachers "Where does the knowledge of how to teach come from?" Based on teachers' responses, the researchers identified beliefs about six themes relating to different sources of teaching knowledge, including formal education, formalized bodies of knowledge, observational and vicarious learning experiences, interactive and collaborative experiences with others, as well as enactive experiences and self-reflection.

Building on Buehl and Fives' (2009) framework, Ferguson et al. (2022) carried out a longitudinal mixed methods study about sources of teaching knowledge and motivation to learn from theory and practice in teacher education students. In that study, quantitative data from a questionnaire responded to by student teachers, revealed an overall preference for practical, experiential sources of teaching knowledge, rather than formalized sources, that persisted over time. Also, using scenario-based approach, Ferguson and Bråten (2022) examined pre-service teachers' beliefs about sources of teaching knowledge as revealed by their written answers to vignettes, and were able to identify sources of teaching knowledge such as informal sources (colleagues, students, own resources, family and friends), formal sources (textbooks and educational literature, teacher education, research), and digital media resources.

While the reviewed research in this section relates to teachers at primary and secondary levels, Ferguson (2020) also conducted a

small-scale study in higher education teachers showing a preference for personal (over authoritative or multiple) sources of teaching knowledge, and proposed that this may have negative consequences for teachers' learning and for how they teach. We continue that line of investigation by studying a larger group of participants in higher education, as well as a larger pool of sources of teaching knowledge (as recommended by Bader et al., 2023). Furthermore, our focus on epistemic beliefs gives grounds to link to motivational beliefs that may be activated and influenced given relations between the two belief-types (Barger and Linnenbrink-Garcia, 2017; Ferguson et al., 2022; Muis, 2007).

1.1.2 Motivation to teach

Motivation in teachers in higher education refers to “the overall processes that give rise to faculty members initiating, sustaining, and regulating goal-directed behaviors” [for example,] “how much energy they invest in preparing their classes” (Daumiller et al., 2020, p. 3). In recent years teachers' motivational beliefs have come under investigation from several perspectives, including self-efficacy, expectancy-value-, self-determination- and goal theory (Daumiller et al., 2020; Watt and Richardson, 2008, 2015). Given such factors as university and college environments characterized and challenged by high demands on faculty time and the (low) status of teaching, teachers' motivation is likely to play an important role in how they engage in teaching and, importantly, how and whether they engage in systematic development of teaching. Though research on teacher motivation at this level is also somewhat sparse, there is some support in literature on teachers' professional development here also (Appova and Arbaugh, 2018; Zhang et al., 2021). As a sidenote, it may be worth noting that motivation in HE teachers may be somewhat under-researcher given taboos for researchers in asking colleagues about their motivation to carry out their job (Daumiller et al., 2020).

That noted, teachers' valuing of teaching, as a feature of research using an expectancy-value perspective on motivation, has shown to be fruitful in regard to teachers' behavior, and is a focus of this study. Thus, the expectancy-value framework centers on individuals' expectations for themselves, as well as the value they place on a given task—in this case teaching (Eccles, 2005, 2009). Since teaching is an activity in higher education that academics are likely to have some experience with, then they will likely hold expectations about their ability to teach, as well as socialized influences that affect their valuing of teaching (e.g., vs. research). Importantly, the value aspect of this motivational framework has been less studied than expectancy but is likely to be most important for appreciation of tasks and activities (Brophy, 2008; Bråten and Ferguson, 2015). Also, the latter, value-laden, background and contextual variables likely include personal tendencies, but also experiences and social interactions (Eccles, 2009). For example, the notorious relation between research and teaching in higher education (e.g., Hattie and Marsh, 1996, 2004) is likely to play a role, and further supports the argument that motivation for teaching in teachers at the tertiary level is worth investigation via a task-value perspective. Importantly, we assumed that the guiding nature of beliefs, including beliefs about sources of knowledge and motivation, would play a role in teachers' views of teaching development.

1.1.3 Research and development of teaching in higher education

As mentioned in the introductory section, the renewed focus on quality teaching in Norway has seen increased implementation of

national and local pedagogical measures, many of which were drafted in the White paper (Norwegian Ministry of Education and Research, 2016–2017), including, for example, a focus on research and systematic development of own practice and a merit system that recognizes excellent teaching (Ferguson et al., 2024). Common for such measures are their roots in thinking that stems from the tradition known as *Scholarship of Teaching and Learning* (SoTL). SoTL underlines the importance of an inquisitive, systematic and research-based approach to teaching. Moreover, SoTL literature underlines the importance of HE teachers' knowledge of and interaction with educational literature and research, and a willingness to share results from their inquiries with colleagues (Felten, 2013; Kreber, 2003; Larsson et al., 2020).

Kern et al.' (2015) Dimensions of Activities Relating to Teaching model is useful in considering different aspects of teaching in terms of SoTL and the two dimensions of Public \leftrightarrow Private, and Systematic \leftrightarrow Informal investigation. In that model Kern and her colleagues place different teaching related activities in one of four quadrants as divided by the two axes. Relevant for this study is their placement of teaching development as a private activity that is relatively informal, in terms of lacking “a methodical, planned, and deliberate process to acquire knowledge” (Kern et al., 2015, p. 4), that is, activities that may be discussed informally, but are unlikely to be shared in more formal settings.

Adopting a systematic and research-based approach to teaching is also important given the potential impact on student engagement and learning (Prince et al., 2007; Hativa and Goodyear, 2002). But, of course, other factors also play a role in influencing why and how HE teachers research and develop their teaching. For example, “[t]eachers' disciplinary socialization and their beliefs about the fields they teach influence how they plan courses as well as how they teach them. To a lesser extent, the context in which teachers' work shapes how the courses are planned and taught” (Hativa and Goodyear, 2002, p. 128). In other words, teaching research and development is likely to be context dependent. For example, whether teachers have close, interested colleagues to discuss development with, the organizational support that is available, and the value that is placed on teaching at the institution will all be influential for individual teachers' behavior, as will student characteristics and goals, and other pragmatic, personal issues and beliefs (Ferguson et al., 2022; Gjøtterud, 2020; Hativa and Goodyear, 2002).

1.2 The present study

Based on the current situation in the Norwegian higher education sector with a focus on increasing the status of teaching, as well as the above background analysis of the research literature, the purpose of this study was to bridge the research on teachers' beliefs, motivation and teaching research and development, by investigating higher education teachers' beliefs and practices as they relate to teaching, and its development. Specific aims of the current research were to advance the study of teachers' beliefs in higher education, and investigate a possible empirical relation between these teachers' beliefs and development of teaching.

The examination was focused on the following research questions:

RQ1: What are higher education teachers' beliefs about teaching relating to sources of teaching knowledge and motivational

beliefs. We expected that, in likeness with (preservice) teachers at primary and secondary level, the participants in this study might show a preference for more personal sources of knowledge about teaching than formal sources. The question about teacher motivation was more empirically open.

RQ2: What are higher education teachers' beliefs about different ways of researching and developing their teaching? This research question was a more open, empirical question, though building on RQ1, we also expected that there may be a preference for more dialogical, less "institutionally-organized" methods of research and development, since many teachers' would be confident in their own and colleagues' ability, as well as finding this kind of advice more tailored to their needs than generic teaching and learning courses.

RQ3: Are their relationships between participants' beliefs about teaching, their motivation, and their beliefs about different ways of researching and developing their teaching? We expected that (1) a preference for more personal sources of knowledge about developing teaching might predict more trust in informal, dialogical ways of researching and developing teaching practice, and (2) the more participants endorsed formal sources of knowledge about teaching in higher education, the higher they might value organized seminars and other institutional measures for addressing research and development of their teaching.

2 Materials and methods

2.1 Context and participants

The research was carried out at a medium-sized (18,000 students) university-college in southeast Norway. The institution has four faculties, and the university-college employs 800 academic and technical-administrative staff, of whom approximately 340 teach in full- or part-time positions. The university college is owned by a non-profit organization and admission criteria are low in relation to the national sector, thus admitting a broad spectrum of fee-paying students. Participants were academic staff with teaching as part of their position ($n = 56$, male = 28, female = 28). Most participants held a doctoral degree ($n = 30$), and had completed, or were in the process of completing, a mandatory course in teaching and learning in higher education ($n = 46$). Further, most participants had been teaching for more than 5 years ($n = 43$).

2.2 Materials

The Teaching in Higher Education (THE) survey is a digital form consisting of 16 items and an open field for additional comments. The instruction included the information that the project aimed to *investigate beliefs about teaching in higher education (HE), and how HE teachers approach and develop their teaching*. Moreover, it was clearly stated that there were no correct answers, but that the participants' views were of interest to the responsible researcher, and participants were free to respond in English or any Scandinavian language. The questions were a mixture of closed- and open-ended

items. The survey consisted of four sections, where the first two are relevant for the present study: (1) background information, (2) beliefs about teaching, *viz.* beliefs about sources of teaching knowledge, motivation for teaching, and beliefs about the research and development of teaching. By using general questions about teaching and its development, rather than development of specific courses, we were interested in capturing teachers' general conceptions about specific types of beliefs, rather than their specific responses to given teaching situations (cf. [Hativa et al., 2002](#)).

2.2.1 Background information

We assessed demographic and background information relevant for teaching, for example, teaching experience and participation in mandatory courses in teaching and learning in higher education.

2.2.2 Beliefs about sources of teaching knowledge

To assess participants' beliefs about sources of teaching knowledge we asked them to *rate how likely they were to use different sources of teaching knowledge when developing a course*. The questionnaire was based on prior qualitative and quantitative research on teachers in elementary and secondary school ([Bråten and Ferguson, 2015](#); [Buehl and Fives, 2009](#); [Ferguson et al., 2022](#)). Items were adapted to better suit tertiary level teaching after consultation with an experienced professor in higher education (see acknowledgements). Thus, several potential sources of teaching knowledge were considered when designing the revised version of the questionnaire. One source that teachers in higher education may draw on is *formal sources* of knowledge, such as educational literature, knowledge gained from compulsory education in teaching and learning at the tertiary level, or the required reading for specific courses that teachers have responsibility for. From research on elementary and secondary-level teachers, and an earlier meta-study, we also believed that teachers at this level may be likely to draw on *personal sources* of knowledge, such as experience as a student and their prior experience in the classroom ([Ferguson et al., 2022](#); [Kane et al., 2002](#)). Moreover, given that many teachers in higher education hold doctorate degrees and value research, we supposed that they may be inclined to use their own *critical reflection*, as well as drawing on *students and colleagues* as other *informal sources* of knowledge ([Ferguson et al., 2022](#)).

We operationalized these sources of knowledge as items on THE survey. Specifically, *personal sources* of knowledge were assessed with items pertaining to own experience as a student and teacher, respectively, personal knowledge of subject matter, colleagues and personal reflection (5 items). *Formal sources* of knowledge were curriculum (required reading), educational literature, and knowledge gained from courses on teaching and learning in higher education, as well as expertise from the university college's center for academic development (4 items). We also included items referring to the internet, other literature, and formal and informal feedback from students (4 items), as more *informal sources* of knowledge. For all items, participants used a 7-point Likert-type scale with 1 = highly unlikely, 7 = highly likely, as anchor points.

Since we had adapted the source of knowledge questionnaire, we explored the dimensionality of the participants' beliefs about sources of teaching knowledge by performing a principal component analysis using principal axis factoring on their scores on the items referring to sources of knowledge. After having eliminated 5 items because they did

not load unambiguously on any one factor, four factors that met the Kaiser-Guttman criterion of eigenvalues greater than unity were identified. These factors had eigenvalues ranging from 3.57 to 1.21, high loadings (>0.40), no overlap for any item and explained 51.72% of the total sample variation. Building on Bråten and Ferguson (2015) factor solution that focused on sources of teaching knowledge for pre-service teachers, as well as a Bader et al. (2023) on expanding epistemic dimensions, the four factors were labeled *formalized sources*, *personal sources*, *alternative sources*, and *organizational sources*. Item-to-factor loadings, eigenvalues, and reliability estimates (Cronbach's α) for each of the four factors are shown in Table 1.

The three items assigned to the first factor, personal sources, seemed to tap endorsement of personal knowledge and experience, including the participants' own experience as a student, their knowledge of subject matter and previous teaching experience. These sources can be deemed personal funds of practical knowledge. The two items assigned to the second factor, formal sources, tap endorsement of formalized theoretical knowledge, those being educational literature and knowledge gained from a formally required course in teaching and learning in higher education. These sources can be considered formal, theoretical knowledge, rather than practical knowledge. The third factor, labeled alternative sources, included two items, those being, critical reflection and other subject-specific literature (not on reading list). This factor seemed to mainly reflect an endorsement of alternative sources for engaging in critical reflection, rather than pre-defined sources, perhaps a valuing of own integrity and ability to reflect critically (cf. Bader et al., 2023). While the lower α for this factor probably was due to the low number of items, the inter-item correlation was 0.434, with inter-item correlation ranges from 0.15 to 0.50 usually deemed satisfactory (Briggs and Cheek, 1986; Clark and Watson, 2016). Thus, given the oversensitivity of α to the number of items and an inter-item correlation of 0.43, we decided to include this variable as a predictor in subsequent statistical analysis (see also, Streiner, 2003). Still, results concerning this variable should be interpreted with caution. Finally, a single item factor focused on local funds of knowledge, in terms of sources from the institution's educational support center. While single item factors are less desirable, this item pointed itself as not belonging to the other three factors and seemed to be representing more local sources of knowledge such as speaking to colleagues and using student feedback. Unfortunately, due to loading on other factors, the other

items were deleted. However, we deemed it both theoretically and pragmatically important to include this knowledge form (Hayduk and Littvay, 2012).

2.2.3 Motivation for teaching

The motivation for teaching questionnaire was an adapted and abbreviated version of a questionnaire, developed by Ferguson et al. (2022) to measure teachers' motivation to learn from different sources (2022). In this version of the questionnaire, we extracted five items to avoid questionnaire fatigue on behalf of the participants. Motivation is a multi-faceted construct. The motivation construct under investigation is the task-value component of motivation (Wigfield and Eccles, 2000). In this version of the questionnaire, we opted to include items pertaining to importance, passion, habit, and interestingness. For example, "I am interested in developing my teaching" (*interest*).

A principal component analysis was conducted on the five items. The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis (KMO = 0.75). Bartlett's test of sphericity $\chi^2(10) = 146.7$, $p < 0.001$, indicated that correlations between items were sufficient for PCA (Field, 2009). One component with an eigenvalue greater than unity was identified. This factor had an eigenvalue of 3.31, high loadings (>0.70), and explained 66.26% of the total sample variation. This factor was labeled motivation for teaching. Question statements, item-to-factor loading, and reliability estimate (Cronbach's α) for the factor are shown in Table 2.

2.2.4 Beliefs about research and development of teaching

To explore participants' beliefs about given measures for research and systematic development of their teaching, we asked them to rate such measures in terms of usefulness. The items in this questionnaire were based on our research-informed knowledge of systematic work with the promotion of research and development in HE institutions (e.g., Boud and Brew, 2013; Cruz et al., 2019), as well as our practical knowledge of measures available at the specific university college. There were eight items that might be viewed as (more or less) useful for research and development of teaching: research method seminars, writing seminars, courses on teaching and learning, a progress plan with milestones, available funding to support research and development of teaching, supervision of project by academic developer, talking to students and peer discussions. Items were ranked on a 7-point Likert type scale (1 = not useful at all, 7 = extremely useful).

TABLE 1 Factor analysis of the sources of teaching knowledge items.

Items: When developing a course, how likely are you to use the following sources of knowledge?	Factor loadings			
	Personal $\alpha = 0.765$	Formal $\alpha = 0.73$	Alternative $\alpha = 0.58$	Local
Own experience as a student	0.787			
Own knowledge of subject matter	0.807			
Own teaching experience	0.754			
Educational literature		0.70		
Knowledge gained from formal course in university/college teaching		0.66		
Your own critical reflection			0.86	
Other subject-specific literature (not on reading list)			0.55	
Resources from center for academic development				0.55

To uncover any underlying relations between the measures, we performed a PCA with oblique rotation (Kaiser) on the items relating to usefulness of measures in terms of how they might help to develop teaching. The Kaiser-Meyer-Olkin verified the sampling adequacy for the analysis, $KMO = 0.822$. Bartlett's test of sphericity $\chi(28) = 153.3, p < 0.001$, indicated that correlations between items were sufficiently large for PCA (Field, 2009). After having eliminated two items because they did not load unambiguously on any one factor, two components had eigenvalues over Kaiser's criterion of one and in combination explained 61.3% of the variance. Table 3 shows the factor loadings after rotation and reliability for each factor.

The first factor described more organizationally arranged measures, such as seminars on research methods, writing seminars, help to prepare progress plans with milestones, and calls for research funds earmarked for developing teaching. The second factor described more discursive measures for developing teaching, including talking to students and peers.

2.3 Procedure and analysis

In September 2022, the survey was sent to all staff with teaching responsibility at a Norwegian university-college (based on an overview from the university college's central administration $N = 338$). The survey was digital, and participation was voluntary and anonymous (participation rate $\approx 17\%$). While the questionnaire was written in English, so that both Norwegian and non-native academics could understand and respond to it, participants were invited to answer in any Scandinavian language or English, with the majority choosing to reply in English. The survey responses were analyzed to provide descriptions of the population and their beliefs about teaching and research and development of teaching. Factor and regression analyses were performed in SPSS.

3 Results

Regarding the first research question, what are higher education teachers' beliefs about sources of teaching knowledge and motivation to teach, we first report the descriptive data for all measured variables (see Table 4).

Regarding the participants' beliefs about sources of teaching knowledge, we were interested to find out whether teachers endorsed the dimensions of source of teaching knowledge beliefs differently. A repeated-measures analysis of variance (also known as within-subjects analysis of variance) indicated that participants endorsed the four types of sources of teaching knowledge significantly differently, with $F(2.4, 120.1) = 18.81, p < 0.001$. Follow-up paired-sample t -tests with Bonferroni adjustment showed that participants scored statistically significantly higher on personal ($M = 5.73, SD = 0.15$) than formal sources ($M = 5.07, SD = 0.19$), Cohen's $d = 3.86$, and personal than local sources ($M = 4.40, SD = 0.25$), Cohen's $d = 6.45$. There were also significant differences between participants' endorsement of alternative ($M = 5.84, SD = 0.14$) and formal sources ($M = 5.07, SD = 0.19$) Cohen's $d = 4.61$, personal ($M = 5.73, SD = 0.15$) and local ($M = 4.40, SD = 0.25$), Cohen's $d = 6.45$; and alternative ($M = 5.84, SD = 0.14$) and local ($M = 4.40, SD = 0.25$), Cohen's $d = 7.11$, respectively.

Regarding participants' motivational beliefs, the data indicated that the participants were moderate-to-highly motivated

TABLE 2 Factor analysis of the motivation for teaching items.

Items	Factor loadings
	$\alpha = 0.86$
Teaching is an important part of my work at this institution	0.915
I am passionate about teaching	0.893
I think research is more important than teaching*	0.827
I regularly review my teaching	0.707
I am interested in developing my teaching	0.703

*Item reversed.

TABLE 3 Usefulness of measures in terms of how they might help you to research and develop your teaching in a systematic manner.

Items	Factor loadings	
	Organizational	Discursive
	$\alpha = 0.82$	$\alpha = 0.31$
Research methods seminar	0.91	
Writing seminars	0.88	
Progress plan with milestones	0.83	
Funds for developing teaching	0.58	
Talking to students		0.782
Peer discussions		0.65

Organizational, organizational measures; Discursive, discursive measures.

TABLE 4 Descriptive statistics for all measured variables.

Variable	Mean	Standard deviation	Scale
Motivation for teaching	5.76	1.03	1–7
Personal sources	5.74	1.07	1–7
Formal sources	5.00	1.45	1–7
Alternative sources	5.85	0.96	1–7
Local sources	4.30	1.82	1–7
Usefulness of measures: Organizational measures	4.09	1.43	1–7
Discursive measures	5.85	0.94	1–7

in terms of teaching in higher education ($M = 5.76, SD = 1.03, \text{max} = 7$).

The quantitative data gathered by means of the survey was also able to talk to the second research question, that is, what are HE teachers' beliefs about researching and developing their own teaching, specifically regarding the usefulness of available measures for help with research and development of own practice. To compare participants' perception of usefulness for discursive and organizational measures in terms of how they might help when participants develop their teaching in a systematic manner we performed a paired sample t -test. The test showed that participants valued discursive methods ($M = 5.85, SD = 0.94$) significantly more than more formal, organizational (institutional) measures ($M = 4.09, SD = 1.43$), $t(53) = 8.55, p < 0.001$, Cohen's $d = 1.45$. This means that the participants that responded to the survey found methods such as peer discussions and student consultations to be significantly more useful for developing their teaching than

institutionally available measures, such as research method and writing seminars and help to project planning and implementation.

Next, we investigated relationships between participants' beliefs about teaching and their perceptions of the usefulness of the different measures in terms of how they might help to research and develop their teaching in a systematic manner (RQ3). Zero-order correlations among the variables are displayed in Table 5, with gender (males = 0, females =1) also included in the correlation matrix.

To examine the unique predictability of the different types of teacher beliefs, we performed two simultaneous multiple regression analyses with their valuing of organizational and discursive measures, respectively, as dependent variables. To control for any differences due to gender and teaching experience, the dichotomous variable of gender and the continuous variable of teaching experience were included in each regression equation together with beliefs about the source of teaching knowledge.

Table 6 shows the results of the regression analyses for both measures for research and development of teaching variables. With respect to organizational measures for help to develop teaching, the five predictors together explained a statistically significant amount of the variance, with $F(7, 43) = 3.35, p = 0.006, R^2 = 0.35$. In this analysis, neither gender ($\beta = 0.07, ns$) nor teaching experience ($\beta = 0.0-0.06, ns$) was related to perceived usefulness. However, reliance on formalized knowledge sources was a unique positive predictor ($\beta = 0.44, p = 0.002$). Thus, as expected, with respect to the third research question, the more participants endorsed formal sources of knowledge about teaching in higher education, the higher they valued the organized seminars and other

measures for addressing research and development of their teaching. Also, with respect to perceived usefulness of discursive methods for research and development of their teaching, all seven predictors together explained a statistically significant amount of the variance, with $F(7, 43) = 3.97, p = 0.002, R^2 = 0.39$. Again, neither gender ($\beta = 0.08, ns$) nor teaching experience ($\beta = -0.22, ns$) were related to the perception of usefulness variable. In this case, motivation for teaching was a unique positive predictor ($\beta = 0.42, p = 0.004$), indicating that participants that were more motivated for teaching, in terms of valuing teaching and being interested in teaching, were also more likely to perceive the value of discursive measures for researching and developing their teaching.

4 Discussion

The aim of this study was to spotlight teachers' beliefs in higher education by (1) looking at specific teachers' beliefs about sources of teaching knowledge and motivation, and ways of researching and developing their teaching, and (2) examining relations between these beliefs. The study built on existing research on teachers' beliefs at primary and secondary level (Buehl and Fives, 2009), and budding research at the tertiary level (Ferguson, 2020; Goodyear and Hativa, 2002; Kane et al., 2002). The findings from the study align with extant research (Ferguson, 2020), but also extend insight, and provide implications for practice and research, as discussed in the following.

In particular, and echoing research from teachers at lower levels, we found that the participants in this study held stronger beliefs in

TABLE 5 Zero-order correlations for all variables.

Variable	1	2	3	4	5	6	7	8	9
1. Gender	-								
2. Teaching experience	-0.06	-							
3. Motivation - teaching	0.14	0.11	-						
4. Personal sources	0.18	-0.09	0.10	-					
5. Formal sources	0.04	-0.21	0.29*	0.22	-				
6. Alternative sources	0.20	-0.15	0.31*	0.27	0.25	-			
7. Local sources	0.36**	-0.22	0.28*	0.02	0.31*	0.04	-		
8. Organizational measure	0.12	-0.13	0.33*	-0.01	0.55**	0.07	0.40**	-	
9. Discursive measures	0.25	-0.20	0.50**	0.16	0.11	0.33*	0.38**	0.08	-

* $p < 0.05$, ** $p < 0.001$.

TABLE 6 Results of multiple regression analyses for variables predicting preference for organizational and discursive measures.

Predictor	Organizational measures			Discursive measures		
	B	SE B	β	B	SE B	β
Gender	0.19	0.40	0.07	0.14	0.26	0.08
Teaching experience	-0.09	0.21	-0.06	-0.23	0.14	-0.22
Teaching motivation	0.28	0.19	0.20	0.38	0.12	0.42*
Personal sources	-0.14	0.17	-0.11	0.07	0.11	0.08
Formal sources	0.45	0.14	0.44*	-0.15	0.09	-0.22
Alternative sources	-0.17	0.20	-0.12	0.17	0.13	0.18
Local sources	0.13	0.17	0.16	0.11	0.08	0.21

* $p < 0.05$.

personal than formal teaching knowledge sources (Bråten and Ferguson, 2015), while both of these beliefs were stronger than beliefs in local sources of knowledge, in terms of reported likeliness of using different sources for revising a course. This means that teachers are most likely to rely on personal funds of knowledge, rather than turning to research literature, or attending relevant courses at teaching centers when developing or revising courses. There were also significant differences between participants' endorsement of alternative and formal sources (Cohen's $d = 4.61$) personal and local sources (Cohen's $d = 6.45$) and alternative and local (Cohen's $d = 7.11$), respectively. These findings extend current research by showing that critical reflection and sources from one's own subject area also weigh heavily in the belief systems of teachers in higher education. The findings align with Kern et al.'s (2015) placement of course development as a mainly private and informal activity, as well as suggesting that academic developers in Norway may have a way to go when it comes to encouraging a view of teaching as a more public enterprise. The findings point to a need for more empirical investigation to find out how to encourage academics to adopt more systematic, research-based approaches to course development, and perhaps their willingness to share results. Although teaching may no longer be the lonely enterprise it once was, some areas of teaching are still not systematically developed by teachers.

Regarding HE teachers' motivational beliefs, the data indicated that the participants were moderate-to-highly motivated in terms of teaching in higher education ($M = 5.76$, $SD = 1.03$, $\max = 7$), which contrasts some previous findings and popular opinion on faculty's preoccupation with research over teaching (Daumiller et al., 2020), and may suggest that modern academics have a more nuanced understanding of their scholarly roles (cf. Boyer, 1990), but may also relate to the population in focus in this study, given that the research was carried out at a university college with a history for priding itself on quality teaching, a point we return to later.

In terms of developing their teaching, participants displayed several interesting tendencies, including a preference for discursive over organizational methods of development, which highlights the importance of peer discussions and student consultations for this population in developing teaching. Whereas institutionally provided measures were less popular than discussion, they were not unpopular ($M = 4.09$), and this may give hope to academic developers.

Most interesting in terms of findings, however, are relations between participants' beliefs about teaching and their perceptions of the usefulness of the different measures designed to help them research and develop their teaching. To summarize, the more participants endorsed formal sources of knowledge about teaching in higher education, the higher they valued the organized seminars and other measures for addressing research and development of their teaching. Future research may be needed to investigate the nature of this relation in terms of the possibility of some kind of underlying trust in formal sources and measures provided by academic developers. Also, motivation for teaching was a unique positive predictor with respect to perceived usefulness of discursive measures for systematic development of their teaching, indicating that participants that were more motivated for teaching, in terms of valuing teaching (over research) and being interested in teaching, were more likely to perceive the value of discursive measures for developing and researching their teaching. This might reflect local cultures, traditions and interest in teaching, and while this is a culture that

deserves praise, there is also a danger that teachers fail to engage with research findings or adopt innovative teaching practices if they operate within epistemic chambers with business as usual. Rather, local teaching communities may need help to recognize situations when they are "at the edge of their knowledge and should consult additional information" (Deekens et al., 2024, p. 498) in terms of consulting research literature or academic developers that may provide evidence-based guidance.

It is important to underline, however, that our findings do not suggest that one source of teaching knowledge is necessarily superior to another, since this is likely a context-sensitive question that requires adaptive source use in light of prior knowledge (Ferguson et al., 2022). But teachers in higher education may need help to identify reliable sources. Likewise, our results do not give privy to one or the other way of developing teaching in higher education, nor should these be seen as mutually exclusive categories, in fact research on epistemic beliefs underlines the importance of using multiple sources (Deekens et al., 2024). Optimally, teachers in higher education should be doing both, that is, discussing teaching with colleagues and using institutionally available measures and methods, or evidence-based practices to help research and develop their teaching.

The findings in this study underline that teacher beliefs are not only an area of research for teacher education, but that it is equally important that teachers in higher education are given opportunities and encouraged to examine their beliefs in light of practice and policies (see Ferguson, 2020; Kane et al., 2004; Strømso and Bråten, 2011). While opportunities for such examination of beliefs may occur in compulsory teaching and learning in higher education courses, changing beliefs is not an easy endeavor or something that can be done quickly, or once and for all, and rather require practice over time. Rather than direct teaching about teacher beliefs, collegial teaching groups and peer mentoring might be more suitable arenas for examining rather entrenched teaching beliefs and for changing motivational patterns. This might be supported by the findings in this study that show that higher education teachers seem to trust and seek help through discussion with their peers. We would also like to suggest that it may be wise to supplement such groups with consultation with academic developers that can provide evidence-based guidance.

4.1 Limitations and future directions

There are also limitations that should be addressed in considering the findings and implications presented above. In terms of measurement, asking teachers about their beliefs and practice might not be sufficient for capturing sources used, motivations displayed and actual research and development of teaching practices. Although we tried to overcome this problem by relating questions to a specific scenario (course development) and sources, future studies may benefit from triangulation with observation of actual practice, think-alouds and retrospective interviews (see, e.g., Deekens et al., 2024), or asking teachers' students how they interpret teachers' behavior.

Also methodologically, some of the items we have included in analyses have few items and findings should be interpreted in light of this limitation. Further, our findings are limited by their nature; for example, we have determined that collegial and student discussions are important sources of information for development of teaching for

some higher education teachers, but it is not possible for us to ascertain the content of these discussions, and it may well be their very immediate and relevant nature that sets them above more generic courses (cf. [Hativa et al., 2002](#)). Likewise, our focus on “Motivation to teach” is a rather broad way to considering motivation, a large entity that is likely to be much finer-grained. But we view this study as a starting point for more nuanced investigations focusing on beliefs and motivation.

Finally, it is worth noting that the participants in the study were voluntary, were drawn from staff at a university college (as opposed to a research-intensive university), and the participation rate was rather low, and thus it may reasonably be assumed that those who chose to participate held a rather strong interest in teaching, perhaps setting them apart from other teachers. While it may be expected that similar findings may occur at other university-colleges and new(er) universities, our findings may not be transferred so readily to research-intensive universities in other contexts, suggesting that a more varied pool of participants from a variety of institutions could not only give a more representative over-all picture, but also provide possibilities for cross-institutional comparisons. In future research it is therefore important to widen the pool of participants at different teaching and research institutions, as well as conducting a more thorough study of the open-ended questions for comparison across different participants.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors without undue reservation.

Ethics statement

The studies involving humans were approved by Norwegian Agency for Shared Services in Education and Research. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their informed consent by voluntary participation and no identifying information was collected.

References

- Åkerlind, G. S. (2005). Academic growth and development - how do university academics experience it? *High. Educ.* 50, 1–32. doi: 10.1007/s10734-004-6345-1
- Appova, A., and Arbaugh, F. (2018). Teachers' motivation to learn: implications for supporting professional growth. *Prof. Dev. Educ.* 44, 5–21. doi: 10.1080/19415257.2017.1280524
- Ashton, P. (2015). “Historical overview and theoretical perspectives of research on teachers' beliefs” in *International handbook of research on teachers' beliefs*, eds. H. Fives and M. G. Gill (New York, NY: Routledge), 31–47.
- Bader, J. D., Ahearn, K. A., Allen, B. A., Anand, D. M., Coppens, A. D., and Aikens, M. L. (2023). The decision is in the details: justifying decisions about socioscientific issues. *J. Res. Sci. Teach.* 60, 2147–2179. doi: 10.1002/tea.21854
- Barger, M. M., and Linnenbrink-Garcia, L. (2017). Developmental systems of students' personal theories about education. *Educ. Psychol.* 52, 63–83. doi: 10.1080/00461520.2016.1252264
- Biggs, J., and Tang, C. (2011). *Teaching for quality learning at university*. Berkshire, UK: Open University Press.
- Boud, D., and Brew, A. (2013). Reconceptualising academic work as professional practice: implications for academic development. *Int. J. Acad. Dev.* 18, 208–221. doi: 10.1080/1360144X.2012.671771
- Boyer, E. L. (1990). *Scholarship reconsidered: priorities of the professoriate*. New York, NY: Princeton University Press.
- Bråten, I., and Ferguson, L. E. (2015). Beliefs about sources of knowledge predict motivation for learning in teacher education. *Teach. Teach. Educ.* 50, 13–23. doi: 10.1016/j.tate.2015.04.003
- Briggs, S. R., and Cheek, J. M. (1986). The role of factor analysis in the development and evaluation of personality scales. *J. Pers.* 54, 106–148. doi: 10.1111/j.1467-6494.1986.tb00391.x
- Bromme, R., Kienhues, D., and Porsch, T. (2010). “Who knows what and who can we believe? Epistemological beliefs are beliefs about knowledge (mostly) to be attained from others” in *Personal epistemology in the classroom: theory, research, and implications for practice*, eds. L. D. Bendixen and F. C. Feucht (Cambridge, UK: Cambridge University Press), 163–194.

Author contributions

LF: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Validation, Writing – original draft, Writing – review & editing.

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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- Brophy, J. (2008). Developing students' appreciation for what is taught in school. *Educ. Psychol.* 43, 132–141. doi: 10.1080/00461520701756511
- Brownlee, J. L., Schraw, G., and Berthelsen, D. (Eds.) (2011). *Personal epistemology and teacher education*. New York, NY: Routledge.
- Buehl, M. M., and Fives, H. (2009). Exploring teachers' beliefs about teaching knowledge: Where does it come from? Does it change? *J. Exp. Educ.* 77, 367–408. doi: 10.3200/JEXE.77.4.367-408
- Clark, L. A., and Watson, D. (2016). "Constructing validity: basic issues in objective scale development" in *Methodological issues and strategies in clinical research*. ed. A. E. Kazdin. 4th ed (Washington, DC: American Psychological Association), 187–203.
- Cruz, L., Cunningham, K., Smentkowski, B., and Steiner, H. (2019). The SoTL scaffold: supporting evidence-based teaching practice in educational development. *To Improve Acad.* 38, 50–66. doi: 10.1002/tia2.20090
- Daumiller, M., Stupnisky, R., and Janke, S. (2020). Motivation of higher education faculty: theoretical approaches, empirical evidence, and future directions. *Int. J. Educ. Res.* 99:101502. doi: 10.1016/j.ijer.2019.101502
- Deekens, V. M., Cartiff, B. M., and Greene, J. A. (2024). Experts' adaptation of apt epistemic performance: the role of practical knowledge. *J. Learn. Sci.* 33, 465–501. doi: 10.1080/10508406.2024.2338937
- Dekker, I., and Meeter, M. (2022). Evidence-based education: objections and future directions. *Front. Educ.* 7, 1–9. doi: 10.3389/feduc.2022.941410
- Diery, A., Vogel, F., Knogler, M., and Seidel, T. (2020). Evidence-based practice in higher education: teacher educators' attitudes, challenges, and uses. *Front. Educ.* 5:62. doi: 10.3389/feduc.2020.00062
- Eccles, J. S. (2005). Studying the development of learning and task motivation. *Learn. Instr.* 15, 161–171. doi: 10.1016/j.learninstruc.2005.04.012
- Eccles, J. (2009). Who am I and what am I going to do with my life? Personal and collective identities as motivators of action. *Educ. Psychol.* 44, 78–89. doi: 10.1080/00461520902832368
- Endr. i forskrift om ansettelse og opprykk i undervisnings- og forskerstillinger [Change in regulations on employment and promotion in teaching and researcher positions] (2018). Forskrift om endring i forskrift om ansettelse og opprykk i undervisnings- og forskerstillinger (FOR-2018-09-12-1322): Lovdata. Available at: <https://lovdata.no/dokument/LTI/forskrift/2018-09-12-1322> (Accessed June 10, 2024).
- Entwistle, N., and Walker, P. (2000). Strategic alertness and expanded awareness within sophisticated conceptions of teaching. *Instr. Sci.* 28, 335–361. doi: 10.1023/A:1026579005505
- Felten, P. (2013). Principles of good practice in SoTL. *Teach. Learn. Inq.* 1, 121–125. doi: 10.20343/teachlearninqu.1.1.121
- Ferguson, L. E. (2020). Teacher beliefs in higher education. *Læring om læring* 4.
- Ferguson, L. E., and Bråten, I. (2022). Unpacking pre-service teachers' beliefs and reasoning about student ability, sources of teaching knowledge, and teacher-efficacy: a scenario-based approach. *Front. Educ.* 7, 1–16. doi: 10.3389/feduc.2022.975105
- Ferguson, L. E., Bråten, I., Skibsted Jensen, M., and Andreassen, R. (2022). A longitudinal mixed methods study of Norwegian preservice teachers' beliefs about sources of teaching knowledge and motivation to learn from theory and practice. *J. Teach. Educ.* 74, 55–68. doi: 10.1177/00224871221105813
- Ferguson, L. E., Bråten, I., and Strømso, H. I. (2012). Epistemic cognition when students read multiple documents containing conflicting scientific evidence: a think-aloud study. *Learn. Instr.* 22, 103–120. doi: 10.1016/j.learninstruc.2011.08.002
- Ferguson, L. E., Ludvigsen, K., Luimes, M., and Siddiq, F. (2024). "UH-institusjoners arbeid med forskning på egen praksis: en casestudie" in *Det universitets- og høyskolepedagogiske vitenskapsområdet i Norge – fremvekst, grunnlagstenkning og «state of the art»*. eds. D. Husebø, L. Ferguson, O. R. Stalheim, I. C. Erikson, R. Isaksen and A. Mavroudi et al. (Oslo: Cappelen Damm Akademisk/NOASP), 215–238.
- Field, A. (2009). *Discovering statistics using SPSS*. Los Angeles, CA: Sage.
- Fives, H., and Gill, M. G. (2015). *International handbook on teachers' beliefs*. New York, NY: Routledge.
- Fives, H., and Gill, M. G. (2025). *International handbook on teachers' beliefs*. 2nd Edn: Routledge.
- Gjotterud, S. (2020). "Forskning i egen undervisningspraksis i høyere utdanning [research on own practice in higher education]" in *Aksjonsforskning i Norge [action research in Norway]*. eds. S. Gjotterud, H. Hiim, D. Husebø and L. H. Jensen, vol. 2 (Oslo, Norway: Cappelen Damm), 225–251.
- Goodyear, P., and Hativa, N. (2002). *Teacher thinking, beliefs and knowledge in higher education*. Dordrecht, Germany: Springer Science and Business Media.
- Hativa, N., and Goodyear, P. (2002). "Research on Teacher Thinking, Beliefs, and Knowledge in Higher Education: Foundations, Status and Prospects" in *Teacher thinking, beliefs and knowledge in higher education*. eds. P. Goodyear and N. Hativa (Dordrecht, Germany: Springer), 335–359.
- Hativa, N., Goodyear, P., Trigwell, K., Ramsden, P., and Benjamin, J. (2002). "What university teachers teach and how they teach it" in *Teacher thinking, beliefs and knowledge in higher education*. eds. P. Goodyear and N. Hativa (Dordrecht, Germany: Springer Netherlands), 103–126.
- Hattie, J., and Marsh, H. W. (1996). The relationship between research and teaching: a meta-analysis. *Rev. Educ. Res.* 66, 507–542. doi: 10.3102/00346543066004507
- Hattie, J., and Marsh, H. W. (2004). "One journey to unravel the relationship between research and teaching" in *Research and teaching: closing the divide? An international colloquium*, 18–19.
- Hayduk, L. A., and Littvay, L. (2012). Should researchers use single indicators, best indicators, or multiple indicators. *BMC Med. Res. Methodol.* 12, 1–17. doi: 10.1186/1471-2288-12-159
- Kane, R., Sandretto, S., and Heath, C. (2002). Telling half the story: a critical review of research on the teaching beliefs and practices of university academics. *Rev. Educ. Res.* 72, 177–228. doi: 10.3102/00346543072002177
- Kane, R., Sandretto, S., and Heath, C. (2004). An investigation into excellent tertiary teaching: emphasising reflective practice. *High. Educ.* 47, 283–310. doi: 10.1023/B:HIGH.0000016442.55338.24
- Kern, B., Mettetal, G., Dixon, M., and Morgan, R. K. (2015). The role of SoTL in the academy: upon the 25th anniversary of Boyer's scholarship reconsidered. *J. Scholarsh. Teach. Learn.* 15, 1–14. doi: 10.14434/josotl.v15i3.13623
- Kirschner, F., Wijsman, L., and Meijerman, I. (2021). Utrecht roadmap for scholarship of teaching and learning (UR-SoTL): Utrecht University. Available at: https://www.uu.nl/sites/default/files/Utrecht%20Roadmap%20for%20SoTL_EN_2024.pdf (Accessed June 10, 2024).
- Kreber, C. (2003). The scholarship of teaching: a comparison of conceptions held by experts and regular academic staff. *High. Educ.* 46, 93–121. doi: 10.1023/A:1024416909866
- Larsson, M., Mårtensson, K., Price, L., and Roxå, T. (2020). Constructive friction? Charting the relation between educational research and the scholarship of teaching and learning. *Teach. Learn. Inq.* 8, 61–75. doi: 10.20343/teachlearninqu.8.1.5
- Lunn Brownlee, J., Ferguson, L. E., and Ryan, M. (2017). Changing teachers' epistemic cognition: a new conceptual framework for epistemic reflexivity. *Educ. Psychol.* 52, 242–252. doi: 10.1080/00461520.2017.1333430
- Muis, K. R. (2007). The role of epistemic beliefs in self-regulated learning. *Educ. Psychol.* 42, 173–190. doi: 10.1080/004615207014163606
- Newton, P. M., Da Silva, A., and Berry, S. (2000). The case for pragmatic evidence-based higher education: a useful way forward? *Front. Educ.* 5, 1–13. doi: 10.3389/feduc.2020.583157
- Norton, L., Richardson, T. E., Hartley, J., Newstead, S., and Mayes, J. (2005). Teachers' beliefs and intentions concerning teaching in higher education. *High. Educ.* 50, 537–571. doi: 10.1007/s10734-004-6363-z
- Norwegian Ministry of Education and Research (2016–2017). Report to the Storting (white paper). Quality culture in higher education. Available at: <https://www.regjeringen.no/contentassets/ae30e4b7d3241d5bd89db69fe38f7ba/en-gb/pdfs/stm201620170016000engpdfs.pdf> (Accessed June 10, 2024).
- Pajares, M. F. (1992). Teachers' beliefs and educational research: cleaning up a messy construct. *Rev. Educ. Res.* 62, 307–332. doi: 10.3102/00346543062003307
- Prince, M. J., Felder, R. M., and Brent, R. (2007). Does faculty research improve undergraduate teaching? An analysis of existing and potential synergies. *J. Eng. Educ.* 96, 283–294. doi: 10.1002/j.2168-9830.2007.tb00939.x
- Schraw, G., Brownlee, J. L., Olafson, L., and Vanderveldt, M. (2017). *Teachers' personal epistemologies. Evolving models for informing practice*. Charlotte, NC: Information Age Publishing.
- Solbrekke, T. D., and Fremstad, E. (2018). *Universitets- og høyskolepedagogers profesjonelle ansvar [University and college teachers' professional responsibility]*. *Uniped* 41, 229–245. doi: 10.18261/issn.1893-8981-2018-03-05
- Streiner, D. L. (2003). Being inconsistent about consistency: when coefficient alpha does and doesn't matter. *J. Pers. Assess.* 80, 217–222. doi: 10.1207/S15327752JPA8003_01
- Strømso, H. I., and Bråten, I. (2011). "Personal epistemology in higher education: teachers' beliefs and the role of faculty training programs" in *Personal epistemology and teacher education*. eds. J. L. Brownlee, G. Schraw and D. Berthelsen (New York, NY: Routledge), 54–67.
- Watt, H. M. G., and Richardson, P. W. (2008). Motivation for teaching [editorial]. *Learn. Instr.* 18, 405–407. doi: 10.1016/j.learninstruc.2008.06.009
- Watt, H. M. G., and Richardson, P. W. (2015). "A motivational analysis of teachers' beliefs" in *International handbook on research on teachers' beliefs*. eds. H. Fives and M. G. Gill (New York, NY: Routledge) (New York, NY: Routledge), 191–211.
- Wigfield, A., and Eccles, J. S. (2000). Expectancy-value theory of achievement motivation. *Contemp. Educ. Psychol.* 25, 68–81. doi: 10.1006/ceps.1999.1015
- Zhang, X., Admiraal, W., and Saab, N. (2021). Teachers' motivation to participate in continuous professional development: relationship with factors at the personal and school level. *J. Educ. Teach.* 47, 714–731. doi: 10.1080/02607476.2021.1942804