



Research paper

Promoting pre-service teachers' critical cultural and multilingual awareness and responsiveness, and beliefs about multilingualism through practice-oriented, (self-)reflexive intervention

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ABSTRACT

Educational inequalities affecting culturally and linguistically diverse students highlight the importance of teachers' positive beliefs about multilingualism, critical cultural and multilingual awareness, and responsiveness. This quasi-experimental pre-post study investigates how pre-service teachers' beliefs about multilingualism, awareness, and responsiveness can be promoted through a practice-oriented, (self-)reflexive opportunity to learn about culturally and linguistically responsive teaching. An intervention group ($n = 25$) and a control group ($n = 15$) completed a questionnaire about their beliefs and responded to videos depicting classroom situations in which teachers lacked awareness and responsiveness. Written responses were analyzed using quantitative content analysis based on a four-level coding manual. Awareness and responsiveness improved in both groups, but beliefs increased only in the intervention group and decreased in the control group. Overall, the intervention group improved more in beliefs and responsiveness than the control group, supporting the implementation of practice-oriented (self-)reflexive opportunities to learn about culturally and linguistically responsive teaching in teacher education.

1. Introduction

More than a quarter of the German population has a migration background (Federal Office of Statistics, 2024), and educational disparities affecting students with migration backgrounds persist (e.g., Henschel et al., 2022; Mang et al., 2023). Preparing teachers for culturally and linguistically diverse classrooms thus requires not only fostering positive beliefs about multilingualism but also developing critical cultural and multilingual awareness and responsiveness. These constructs involve understanding language and culture as socially constructed and embedded in power structures and enacting culturally and linguistically responsive teaching (CLRT) to address structural disadvantages (García, 2017; Gay & Kirkland, 2003; Guilherme, 2022).

Although research has increasingly addressed teachers' beliefs about diversity and, to a lesser extent, aspects of awareness and responsiveness, findings remain inconsistent (e.g., Aleksić & Bebić-Crestany, 2022; Fu et al., 2023; Tannenbaum et al., 2024). Many studies address either cultural or linguistic diversity rather than both (e.g., Civitillo et al., 2019; Dursun et al., 2023; Fu et al., 2023), and investigations on critical cultural and multilingual awareness and responsiveness have largely

been qualitative (e.g., Huang & Guo, 2024; Shepard-Carey & Gopalakrishnan, 2021). Longitudinal intervention studies are still limited and often lack control groups (e.g., Civitillo et al., 2018; Eren, 2023), but findings suggest that structured reflection, guided exchange, and practice-oriented formats may support (pre-service) teachers in developing positive beliefs and critical awareness about cultural and linguistic diversity (e.g., Civitillo et al., 2018; Shepard-Carey & Gopalakrishnan, 2021). However, CLRT-related opportunities to learn (OTL) have not been systematically implemented in German teacher education (Berkel-Otto et al., 2021), highlighting the need to examine whether and how (pre-service) teachers' beliefs, awareness, and responsiveness can be fostered systematically within teacher education.

To address these gaps in the literature and teacher education practice, our quasi-experimental study evaluates a practice-oriented (self-)reflexive CLRT workshop using a pre-post control-group design, providing empirical insights into the changeability and development of beliefs about multilingualism, critical cultural and multilingual awareness, and responsiveness.

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2. Theoretical background

2.1. (Pre-service) teachers' critical cultural and multilingual awareness and critical cultural and multilingual responsiveness

Teachers' situational awareness refers to teachers' perceptions and interpretations of what does or will happen in the classroom, informing whether to (re-)act (Wolff et al., 2021). Critical cultural awareness and critical multilingual awareness build on Intercultural Communicative Competence (Byram, 1997) and Language Awareness (Andrews, 2007). Extending these approaches, critical cultural and multilingual awareness emphasizes culture and language as socially constructed and shaped by power structures that privilege dominant over minoritized varieties (Alim, 2010; Guilherme, 2022). To address injustice, teachers can cultivate awareness of students' diverse backgrounds, value and empower them in voicing their identities, while acknowledging classroom hierarchies (García, 2017). In classroom situations, critically aware teachers could recognize whether actions contribute to inequity to decide on (re-)acting in a culturally and linguistically responsive way.

Teachers' pedagogical responsiveness refers to professional judgment that results in inclusive, student-centered, dialogic, and socially just practices (Walton & Osman, 2022). Our understanding of critical cultural and multilingual responsiveness is based on teacher education frameworks like linguistically responsive teaching (LRT) (Lucas & Villegas, 2013), culturally responsive teaching (CRT) (Gay, 2002; Villegas & Lucas, 2002), culturally sustaining pedagogy (Paris, 2012), and critical language pedagogy (Crookes, 2021). These approaches link teachers' critical reflection on language, culture, and power with concrete pedagogical practices. The critical dimension extends beyond merely acknowledging diversity, requiring teachers to reflect on their own beliefs and experiences and to question the dominant norms and values they assumed were universal (Gay & Kirkland, 2003). In response, teachers may counteract exclusionary policies by consciously adapting their practices to sustain students' linguistic and cultural heritages and repertoires (Paris, 2012). Exemplary practices are scaffolding, translanguaging, and incorporating culturally diverse content and resources about or developed by marginalized voices in class (e.g., García, 2017; Lucas & Villegas, 2013; NYSED, 2019). While scaffolding includes targeted and temporary support that enables learners to meet linguistic and cognitive demands independently (Gibbons, 2015), translanguaging is understood as the strategic use of students' full linguistic repertoires to support learning and challenge hierarchical language ideologies (García, 2017). These practices represent observable manifestations of critical cultural and multilingual responsiveness in classroom contexts.

Critical awareness and responsiveness require teachers to actively address structural inequalities rather than merely recognize diversity. The Cultural Proficiency Continuum by Lindsey et al. (2018) comprises six stages, offering a developmental framework for school leaders and educational institutions to reflect on institutional practices and to promote culturally inclusive school development. The low end of (1) cultural destructiveness represents the rejection or erasure of differences, which can transform into (2) cultural incapacity, where cultural groups are stereotyped or marginalized. The following stage of (3) cultural blindness describes the belief that all students are perceived and treated the same, ignoring the influence of culture and language. (4) Cultural pre-competence marks the recognition of one's limitations and the desire to improve. At the level of (5) cultural competence, teachers begin aligning their practices with the needs of their diverse students. Finally, Lindsey et al.'s (2018) vision of (6) cultural proficiency reflects an ongoing commitment to equality, inclusion, and advocacy for social justice through education.

In the following, we use the terms *awareness* and *responsiveness* to refer to critical cultural and multilingual awareness and critical cultural and multilingual responsiveness.

2.2. (Pre-service) teachers' beliefs about multilingualism

In psychological research, beliefs are regarded as a theoretical concept referring to "psychologically-held understandings, premises or propositions" that individuals consider true, even when lacking objective evidence (Richardson, 1996, p. 104). 'Teachers' beliefs', often used synonymously with terms such as attitudes or perspectives (Pajares, 1992), refer to professional views on "teaching, learning, and learners; subject matter (i.e., EFL [English as a foreign language] or language); self as a teacher, or the role of a teacher" (Borg, 2001, p. 187). As "filters for interpretation", "frames for defining problems" and "guides or standards for action", teachers' beliefs can affect their professional perceptions, decision-making, and (inter-)actions (Fives & Buehl, 2012, p. 478; Pajares, 1992). Moreover, they can impact student evaluation (Pishghadam et al., 2015) and students' learning engagement (Schroeder et al., 2011).

Based on a comprehensive literature review, Fischer (2018) proposed a theoretical model comprising seven interrelated dimensions of professional teachers' beliefs and applied it to cultural and linguistic diversity with a focus on multilingualism (see also Fischer & Ehmke, 2019). The dimensions included (1) epistemological beliefs about students' home languages, (2) beliefs about teaching and learning in linguistically diverse classrooms, (3) beliefs about teachers' professional roles and responsibilities, (4) beliefs about students, (5) beliefs about school structures, (6) beliefs about teacher education, (7) and beliefs grounded in broader societal norms and values (Fischer, 2018). Complementing this thematic differentiation, Hachfeld et al. (2011) developed the Teachers' Cultural Beliefs Scale, which differentiates beliefs based on evaluations of cultural and linguistic diversity and the perceived relevance of group differences. Within this framework, multicultural beliefs are characterized by a positive evaluation of diversity and the recognition of group differences, whereas egalitarian beliefs evaluate diversity positively while minimizing cultural differences. In contrast, assimilative beliefs reflect negative evaluation combined with the expectation that students adapt to dominant norms, whereas separatist beliefs involve both negative evaluation and an emphasis on group differences, often resulting in exclusionary orientations (Hachfeld et al., 2011; Hachfeld & Syring, 2020). In the present study, the term "monolingual beliefs" refers to teachers' beliefs that prioritize monolingual norms of schooling and evaluate linguistic diversity primarily as a challenge rather than a resource. Drawing on Hachfeld et al. (2011), these beliefs are conceptually aligned with assimilative or separatist beliefs.

In terms of (pre-service) teachers' beliefs about multilingualism, several international studies found participants to hold deficit-oriented, monolingual beliefs (e.g., Arocena Egaña et al., 2015; Pulinx et al., 2015; Young, 2013) and consider multilingualism as a burden or challenge (e.g., Tandon et al., 2017; Vikøy & Haukås, 2021). However, research has also shown positive beliefs about multilingualism and CLRT among (pre-service) teachers who viewed cultural and linguistic diversity as an asset (e.g., Alisaari et al., 2019; Brandt et al., 2024; Schroedler & Fischer, 2020). Moreover, certain characteristics were associated with higher levels of (pre-service) teachers' beliefs: multilingual background (Bello et al., 2017; Llompert & Birello, 2020; Schroedler & Fischer, 2020), female gender (Schroedler et al., 2022; Schroedler & Fischer, 2020), primary teacher education programs (Kardel et al., 2024), language school subjects (Hammer et al., 2016; Kardel et al., 2024; Riebling, 2013; Schroedler et al., 2022), higher study levels or semesters (Fischer & Ehmke, 2019; Paetsch et al., 2023; Schroedler et al., 2022), and prior experience in teaching students with migration backgrounds (Alisaari et al., 2019).

The changeability of teachers' beliefs is controversial: On the one hand, they are described as "less malleable" and "relatively static" (Nespor, 1987, p. 321); on the other hand, longitudinal studies report changes over time (e.g., Fischer & Lahmann, 2020). Fives and Buehl (2012) similarly point to divergent conceptualizations regarding the

stability of teachers' beliefs, proposing that "specific beliefs may be considered on a continuum with long-held, deeply integrated beliefs at the most stable end and new, more isolated beliefs at the most unstable end" (Fives & Buehl, 2012, p. 475). Regarding (pre-service) teachers' beliefs about multilingualism, current research found that participants hold more positive beliefs after participating in CLRT-related OTL (e.g., Kardel et al., 2024; Schroedler et al., 2022; see 2.4). However, other studies reported more nuanced results. Döll and Guldenschuh (2022) showed that only OTL addressing the full linguistic repertoire led to changes in beliefs, whereas OTL focusing exclusively on the language of schooling had no significant effects. Pötzl et al. (2021) found that interventions increased awareness of the connection between language and subject learning but did not significantly change pre-service teachers' beliefs about their responsibility for language support nor their beliefs about multilingualism.

2.3. The relationship between (pre-service) teachers' beliefs, awareness, and responsiveness

Despite the acknowledged importance of beliefs in shaping pedagogical practices, there are discrepancies between teachers' beliefs and their (reported) practices (Tannenbaum et al., 2024). For instance, Lambeth and Smith (2016) reported that pre-service teachers viewed CLRT as a method for promoting discussions on racial issues, empowering and engaging multicultural students. However, participants struggled to translate these beliefs into concrete teaching strategies. Similarly, Lorenz et al. (2021) found that although teachers held generally positive beliefs about cultural and linguistic diversity and intended to adopt CLRT, they implemented such practices only minimally. A case study by Liang and Yu (2023) also reported that despite the teacher's high appraisal of critical multilingual awareness, its practical application was limited by contextual factors. Aleksić and Bebić-Crestany (2022) revealed discrepancies between teachers' positive beliefs about translanguaging and their videotaped classroom practices, where well-intentioned activities resulted in exclusionary outcomes. However, certain studies found congruence between beliefs and (reported) practices among (pre-service) teachers. Haim and Tannenbaum (2022) demonstrated that teachers' perceptions of multilingualism as a resource correlated with their reported CLRT practices. In line with this, Civitillo et al. (2019) found a positive association between the degree of CLRT and teachers' positive beliefs about cultural diversity, as well as the level of self-reflection on their own teaching.

2.4. Research on the promotion of awareness, responsiveness, and positive beliefs about multilingualism in teacher education

International teacher education offers different approaches to foster (pre-service) teachers' critical multilingual awareness, including peer discussions (e.g., Godley et al., 2015; Shepard-Carey & Gopalakrishnan, 2021), language portraits (e.g., Busch, 2012; Lau, 2016), counter-storying through autonarratives, reflective writing, and equity coaching (Fránquiz et al., 2011), multimodal activities (Deroo & Ponzio, 2023; Fu et al., 2023), and written reflections (e.g., Shepard-Carey & Gopalakrishnan, 2021; Shi & Rolstad, 2020). EFL materials have been reported to affect teachers' awareness positively (Huang & Guo, 2024), and critical thinking interventions have been found to enhance pre-service teachers' critical intercultural competence (Yaprak & Özmen, 2021). Experiential formats such as study abroad programs (Lindahl et al., 2020), telecollaboration (Eren, 2023), and international online cooperation (Finkbeiner et al., 2024) were shown to support the development of (pre-service) teachers' awareness through intercultural reflection and exchange. Romijn et al. (2021) emphasize that effective intercultural training is contextually embedded and supports both critical reflection and the sustained integration of intercultural practices into classroom routines.

Regarding beliefs about multilingualism in school, several studies

reported positive effects of CLRT-relevant seminars or workshops with pre-service teachers (e.g., Fischer & Lahmann, 2020; Kardel et al., 2024; Mahalingappa et al., 2025; Schroedler et al., 2022) and in-service teachers (e.g., Guler, 2018; Mast & Sachse, 2021; Schneider et al., 2025). Civitillo et al.'s (2018) synthesis showed that training measures were particularly effective when incorporating experiential, practice-oriented learning, structured reflection, or discussion (e.g., Acquah & Commins, 2013; Baldwin et al., 2007).

Across approaches to promote (pre-service) teachers' awareness and positive beliefs about multilingualism, three elements recur: structured reflections on assumptions and experiences regarding diversity and power (e.g., Shepard-Carey & Gopalakrishnan, 2021; Yaprak & Özmen, 2021), practice-oriented engagement with classroom situations or learning materials (e.g., Deroo & Ponzio, 2023; Huang & Guo, 2024), and collaborative exchange, supporting perspective-taking and dialogue through discussions or group work (e.g., Eren, 2023; Godley et al., 2015). Guided reflection allows (pre-service) teachers from dominant backgrounds to question monolingual norms, biased beliefs, and white privilege (see Davis et al., 2015; Palmer & Martínez, 2013), while minority (pre-service) teachers can navigate discriminatory experiences and structures (see Manzoor, 2023; Rosen & Lengyel, 2023; Yip & Xu, 2024) and face potentially internalized deficit perspectives (see Haddix, 2010; Kohli, 2008). Practice-oriented engagement connects CLRT principles to pedagogical decisions, and peer exchange challenges and differentiates existing assumptions (e.g., Godley et al., 2015).

Based on these considerations, we designed a practice-oriented (self-)reflexive intervention that integrates guided (interactive) reflection on linguistic and cultural biographies, theoretical input on CLRT practices and materials, and engagement with CLRT-relevant classroom situations through video-based group tasks. To address the lack of controlled studies (e.g., Paetsch et al., 2023), we conducted a quasi-experimental pre-post control-group study, implementing a quantitatively driven mixed-methods design with embedded qualitative components. Drawing on previous research, the identified gaps, and the intervention design, the following research questions guided this study.

3. Research questions

Previous research on teachers' beliefs and aspects of awareness and responsiveness remains fragmented and heterogeneous (see 2.2 and 2.3). Most studies focus either on language or culture (e.g., Civitillo et al., 2019; Dursun et al., 2023; Fu et al., 2023), and research on awareness and responsiveness has predominantly relied on qualitative approaches (e.g., Huang & Guo, 2024; Shepard-Carey & Gopalakrishnan, 2021). Although studies in German-speaking contexts increasingly examine beliefs about multilingualism (e.g., Paetsch et al., 2023; Schroedler et al., 2022), investigations that jointly assess awareness, responsiveness, and beliefs are limited. Longitudinal studies in this field often lack control groups or statistical comparisons (e.g., Civitillo et al., 2018; Eren, 2023; Schneider et al., 2025), limiting comparative evidence. Previous research has identified associations between (pre-service) teachers' personal and academic characteristics and their beliefs about multilingualism (e.g., Hammer et al., 2016; Schroedler et al., 2022). However, findings on interrelations between beliefs, awareness, and responsiveness remain inconsistent (e.g., Aleksić & Bebić-Crestany, 2022; Lorenz et al., 2021). Taken together, these gaps highlight the need for a systematic investigation of pre-service teachers' initial levels, potential changes, and predictors of awareness, responsiveness, and beliefs. Therefore, this study addresses the following research questions.

- (1) What are the pre- and post-test levels of pre-service teachers' awareness, responsiveness, and beliefs about multilingualism in the intervention and control groups?
- (2) To what extent are changes in awareness, responsiveness, and beliefs about multilingualism associated with participation in a

practice-oriented, (self-)reflexive intervention on CLRT compared to a control group?

- (3) How are pre-service teachers' personal and academic characteristics associated with their post-test levels of awareness, responsiveness, and beliefs about multilingualism, controlling for initial scores?

Based on previous research using similar belief instruments, we anticipate medium-to-high initial levels in both groups. Furthermore, we expect to observe increases in awareness, responsiveness, and beliefs over time, with potentially larger gains in the intervention group than in the control group, as the workshop systematically combines structured reflection, practice-oriented engagement, and collaborative exchange. Additionally, certain personal and academic characteristics (e.g., female gender, primary teacher education, language-teaching subjects) may be positively associated with post-test levels, and there may be interrelations among beliefs, awareness, and responsiveness.

4. Method

In this study, a quasi-experimental pre-post control-group design was employed within a quantitatively driven mixed-methods approach with embedded qualitative components. Participants were pre-service teachers ($n = 40$) from Leuphana University in northern Germany. Data was collected at two measurement points (t1 and t2) during the winter semester in 2024/25, with a three-week interval between them. For the intervention group, the post-measurement occurred immediately after participation in a 60-min workshop.

This study comprised an intervention group ($n = 25$) and a control group ($n = 15$) from the same population of pre-service teachers enrolled at Leuphana University. The group assignment was not randomized; rather, it was based on participants' choice between two parallel OTL, which were offered at the same time and taught by two instructors. In one OTL, participants first participated in the workshop and subsequently completed the post-measurement (intervention group). In the other, the post-measurement was administered first, followed by the intervention (wait-list control group).

The intervention consisted of a 60-min, practice-oriented, and (self-)reflexive workshop. During the workshop, participants engaged in a self-reflexive, interactive inquiry into their cultural and linguistic backgrounds. They also analyzed a videotaped classroom situation in which a teacher lacked awareness and responsiveness.

Both groups completed a pre-post-test, including a video-based assessment of their awareness and responsiveness, as well as questionnaires on their beliefs about multilingualism, engagement in the workshop, and their personal and academic characteristics. Since all participants had provided informed consent, and the study had been conducted in accordance with the German Research Foundation guidelines, the study was considered ethically acceptable by the institutional Ethical Review Board of Leuphana University (202410_20).

4.1. Sample

The convenience sample comprised $n = 40$ pre-service teachers. Table 1 shows their personal and academic characteristics, including age, gender, multilingual background, study level, teacher education programs, teaching subjects, practical experience in linguistically responsive teaching (LRT), and experience with practice-oriented CLRT-related OTL. Most participants were female pre-service primary school teachers, 24 years old, without a multilingual background, and studying one or no language subjects. Moreover, participants reported relatively little experience with the practical implementation of LRT ($M = 1.43$, $SD = 0.46$, range 1–4), indicating that, on average, they had rarely engaged in such practices. They also had limited exposure to CLRT-related OTL during their studies ($M = 2.42$, $SD = 0.77$, range 1–5), suggesting that these topic-specific learning experiences occurred

Table 1
Sample description.

		n ($n = 40$)	%	M	SD
Age	<24 years	13	32.5		
	24 years	15	37.5		
	>24 years	12	30		
Gender	Female	35	87.5		
	Male	5	12.5		
Multilingual background	Yes	5	12.5		
	No	35	87.5		
Study level	Bachelor	8	20		
	Master	32	80		
Teacher education program	Primary School	34	85		
	Secondary School	6	15		
Teaching subjects	no languages	20	50		
	at least one language	20	50		
LRT experience ^a		40	100	1.43	0.46
CLRT-relevant OTL ^b		40	100	2.42	0.77
Engagement in intervention ^c		25	62.5	3.13	0.43

Notes: LRT = Linguistically responsive teaching; CLRT = Culturally and linguistically responsive teaching; OTL = Opportunities to learn.

^a 1 = almost never (<three times a year), 2 = occasionally (>three times a year), 3 = once a month, 4 = once a week and more.

^b 1 = never, 2 = in one session, 3 = in several sessions, 4 = in a complete course, 5 = in several complete courses.

^c 1 = strongly disagree, 2 = rather disagree, 3 = rather agree, 4 = strongly agree.

occasionally.

4.2. Practice-oriented, (self-)reflexive workshop on CLRT

This study involved pre-service teachers participating in a 60-min workshop on cultural and linguistic diversity in school. Based on prior research on teacher professionalization and OTL to foster awareness, responsiveness, and positive beliefs about multilingualism (see 2.4), this workshop was designed to integrate self-reflection, practice-oriented learning, and collaborative exchange. These theoretically informed elements guided the workshop's structure and task selection. The aim was to engage pre-service teachers in critical reflection and exchange on language, culture, and power, while providing opportunities to acquire knowledge of CLRT practices and apply them through a collaborative video-based learning activity (e.g., Gaudin & Chaliès, 2015; Seidel et al., 2011).

In the introductory phase, participants' subjective concepts of culture and language were explored by having them draw a tree that reflected their cultural and linguistic identity. To recognize language and culture as social, dynamic, and hierarchical constructs, an exchange about the drawing with peers, guided by reflexive questions, prompted them to reflect on privileges, experiences of discrimination, and internalized stereotypes. During the input phase, participants were instructed on classroom power dynamics and their role as teachers, and on the importance of raising awareness and acting responsively when addressing cultural and linguistic diversity in schools. The workshop instructor presented principles, methods, and examples reflecting CLRT, awareness, and responsiveness. In the application phase, participants worked in small groups on a video-based task focusing on cultural and linguistic diversity. The video shows a secondary school mathematics class. Two students previously attended school in Syria and have lived in Germany for two years. When one of them has difficulty formulating a calculation, a white classmate sarcastically suggests, "Why not simply execute the task in Arabic?", followed by laughter from others. In the workshop, participants were tasked with developing options for action in their groups, considering principles and methods they encountered during the input phase. Each group recorded its results digitally in a

shared tool, which was then projected on the smartboard for plenary discussion, making all contributions visible.

4.3. Pre-post-test instrument

The present study used a pre-post design and employed a quantitatively driven mixed-methods approach with embedded qualitative components. The design combined participants' written responses to videos as qualitative components (participants' awareness and responsiveness) with their beliefs about multilingualism and individual characteristics as quantitative data. To examine pre-service teachers' awareness, responsiveness, and beliefs, we used a pre-post-test instrument divided into three sections. The first focused on the video-based assessment of participants' awareness and responsiveness (adapted from Lemmrich et al., 2020), the second measured their beliefs about multilingualism across three scales (adapted from Fischer & Ehmke, 2020), and the third assessed participants' personal and academic characteristics, including their exposure to CLRT-related OTL during their studies (adapted from Ehmke & Lemmrich, 2018).

4.3.1. Video-based assessment: Pre-service teachers' awareness and responsiveness

To capture pre-service teachers' awareness and responsiveness, we used a video-based assessment tool that measured participants' responses to video stimuli showing culturally and linguistically relevant classroom situations (Lemmrich et al., 2020). The adequacy and authenticity of the instrument's videos were validated by university experts and school teachers (Lemmrich et al., 2020). We selected three staged videos (1–3 min) of classroom situations in which the teachers acted in a culturally and linguistically non-responsive manner. Each video was based on natural teaching situations in school (Lemmrich & Ehmke, 2024) and had the potential to provoke authentic responses from participants, demonstrating different levels of awareness and responsiveness along our coding manual (see 4.4.1).

“Foreigner” video: The video shows students discussing the exclusion of a classmate as a “foreigner.” The teacher does not challenge the categorization but reinforces it by questioning the learners about their diverse backgrounds, except for one student named Mohammed. Participants' reactions to this video indicate whether they recognize the teacher's bias, reflect critically on it, and would address the term “foreigner” in class.

“Label” video: A teacher discusses the students' use of a discriminatory label for “sunflower seeds,” but introduces further derogatory terms instead of addressing the problem with the class. Participants' responses indicate whether they recognize this perpetuation of stereotyping and whether they would reflect with the students on the term and the underlying discrimination against minorities.

“Plantain” video: In domestic science class, a student questions why their classmate Khaled labeled a banana as a vegetable. Participants' reactions indicate whether they understand that categorizations vary across cultural contexts and whether they would use the comment to reflect on cultural diversity in class and adapt their teaching to diverse students' backgrounds.

Participants viewed these videos and responded in writing to two items: a) “What do you perceive?” and b) “How would you act in this situation if you were the teacher?” (Lemmrich et al., 2020). The item asking participants about their perception measured their awareness, while the item on their intended professional actions assessed their responsiveness.

4.3.2. Questionnaire: Pre-service teachers' beliefs about multilingualism

To evaluate participants' beliefs about multilingualism, we used a quantitative questionnaire (Fischer & Ehmke, 2020) with 21 items on the three scales ($\alpha_1 = 0.81$, $\alpha_2 = 0.788$): (1) “Valuing family languages other than German”, (2) “Feeling responsible for language teaching”, and (3) “Valuing multilingualism in class”. Participants rated

corresponding statements about multilingualism on a four-point Likert scale to indicate their level of (dis-)approval: (1) strongly disagree, (2) rather disagree, (3) rather agree, and (4) strongly agree.

The scales reflect three of Fischer's (2018) dimensions: (1) epistemological beliefs about students' home languages, (2) beliefs about teachers' professional roles and responsibilities, and (3) beliefs about teaching and learning in linguistically diverse classrooms.

The initial scale (1) “Valuing family languages other than German” comprised five items on epistemological beliefs about multilingual language use in students' homes. The rating was preceded by a description of a learner who speaks a non-German family language. The statements imply the student's language development in a multilingual home, like “It is better if parents communicate with their children in German rather than their family language.”

The second scale (2) “Feeling responsible for language teaching” included nine items assessing participants' beliefs about teachers' responsibilities for language facilitation. This was introduced by a fictional dialogue in an online forum in which a teacher requested advice on supporting “children who spoke practically no German.” The statements constituted imagined answers and represented statements, such as “Language support is not a task of the content class.”

The third scale (3) “Valuing multilingualism in class” comprised seven items concerning participants' beliefs about multilingualism in the teaching and learning process. An exemplary statement is “When children in the classroom speak other languages besides German, it negatively affects the class atmosphere.”

4.3.3. Participants' personal and academic characteristics

Finally, we assessed participants' age, gender, multilingual background, study level, teacher education programs, teaching subjects, LRT experience (e.g., tutoring, remedial teaching for students with German as a second language), experience with CLRT-related OTL, and engagement in the intervention.

Participants' experiences with practice-oriented CLRT-related OTL such as seminars or lectures were measured through ratings of eight items ($\alpha = 0.84$) such as, “During your university studies, how often did you test your own teaching materials for linguistically responsive lessons or language support?” on a five-point Likert scale: (1) never, (2) in one session, (3) in several sessions, (4) in a complete course, and (5) in several complete courses (Ehmke & Lemmrich, 2018).

Participants in the intervention group were also asked to self-assess their engagement in the CLRT workshop. They rated six items on behavioral, affective, and cognitive engagement (selected from Fütterer et al., 2024), using a four-point Likert scale: (1) strongly disagree, (2) rather disagree, (3) rather agree, and (4) strongly agree.

4.4. Data analysis

In the present study, a quantitative-qualitative content analysis was conducted to quantify participants' responses from the video-based assessment into awareness and responsiveness levels. The analysis is based on a coding manual, which is explained in the following subsection.

4.4.1. Coding manual

To quantify participants' awareness and responsiveness, we conducted quantitative-qualitative content analysis based on three video-specific coding manuals, using a four-stage scale that reflects different levels of awareness and responsiveness. In the coding guidelines, these distinct levels of awareness and responsiveness were each assigned general labels, which are consistent across all video-specific manuals. An overview of these labels is provided in Table 2. Each level was further specified by multiple video-specific subcategories, defined through descriptions and illustrated with exemplary quotations. In developing these coding guidelines inductively, the Cultural Proficiency Continuum (Lindsey et al., 2018) served as a conceptual framework. It was

Table 2
Standardized coding manual for different levels of awareness and responsiveness.

	Level	Label
CCMA	3	Recognizing the cultural-linguistic situation in its entirety, valuing diversity, and critically reflecting on stereotypes, categorization, or discrimination
	2	Recognizing the cultural-linguistic situation and valuing diversity
	1	Perceiving other methodic or pedagogical aspects (no relevance to the cultural-linguistic situation)
	0	Assessing the cultural-linguistic situation negatively or minimizing it
CCMR	3	Indicating a concrete, culturally and linguistically responsive (re) action to the cultural-linguistic situation that values diversity, deconstructs stereotypes, categorization, or discrimination, and promotes inclusivity
	2	Indicating a (re)action to the cultural-linguistic situation that values diversity
	1	Indicating other methodic or pedagogical practices (no relevance to the cultural-linguistic situation)
	0	Indicating a non-valuing (re)action that maintains or reinforces the cultural-linguistic stereotypes, categorization, or discrimination

Notes: CCMA = Critical cultural and multilingual awareness; CCMR = Critical cultural and multilingual responsiveness.

operationalized following Cormier (2021), who applied a Q-sort procedure in which participants assigned vignettes to specific stages of the continuum. In the present study, participants' written responses to video vignettes were coded on a four-level scale (levels 0–3) derived from the continuum.

Level 3 indicates a comprehensive and critical reflection on the cultural-linguistic situation for awareness, and concrete culturally and linguistically responsive intended (re-)actions for responsiveness. Aligning with the highest end of the continuum, cultural proficiency (Cormier, 2021; Lindsey et al., 2018), level 3 is characterized by valuing diversity, recognizing and challenging discrimination, and fostering inclusion. Participants who scored level 2 demonstrated cultural (pre-) competence (Cormier, 2021; Lindsey et al., 2018) by recognizing the cultural-linguistic context and expressing a general intent to respond and value diversity, but their perceptions and proposed actions were more superficial and lacked critical elements. Level 1 was assigned when responses were not relevant to the cultural-linguistic situation, but to general teaching methods or pedagogy. Participants who dismissed and minimized the cultural-linguistic issues (e.g., colorblindness) or described non-valuing actions scored level 0, reflecting cultural incapacity or blindness (Cormier, 2021; Lindsey et al., 2018).

Two independent raters double-coded all responses, discussed ambiguous cases, and adjusted the manuals when needed. Cohen's k values for the different items and measurement points varied between 0.574 and 0.962 ($M = 0.8$), indicating overall substantial interrater reliability (Landis & Koch, 1977). The final manuals contain detailed descriptions and examples. The highest level was coded in each case; only context-irrelevant responses (level 1) were rated lower if they also included elements of level 0.

4.4.2. Statistical analyses

Data entry and analysis were conducted using SPSS Version 29.0.

To address Research Question 1, descriptive statistics and pre-post comparisons were conducted separately for the intervention and control groups for participants' beliefs, awareness, and responsiveness. Paired-samples t -tests were used for the pre-post comparisons within each group, and Wilcoxon signed-rank tests were applied when normality assumptions were violated. Effect sizes were reported as Hedges' g for parametric tests (Lakens, 2013) and as r for non-parametric tests (Fritz et al., 2012).

To investigate Research Question 2, pre-post change scores were compared between the intervention and the control group. As normality

assumptions were violated for these variables, Mann-Whitney U tests were conducted. Depending on whether normality was met, additional independent t -tests and Mann-Whitney U tests were applied on the mean pre-test scores to ensure there were no significant differences between groups at the first measurement point.

Regarding Research Question 3, correlations and regression analyses were conducted to explore associations between pre-service teachers' personal and academic characteristics and their beliefs, awareness, and responsiveness. Participation in the intervention was included as a predictor in the regression models, controlling for pre-test scores and selected background variables. Given the small sample size, it was not possible to include all assessed characteristics in the regression models. Therefore, backward elimination in SPSS was applied to identify a maximum of four relevant predictors, minimizing the risk of overfitting. To further assess the contribution of each predictor to the explained variance, we additionally conducted Relative Weight Analysis (Mizumoto, 2023).

5. Findings

5.1. Research question 1: Levels and changeability of pre-service teachers' awareness, responsiveness, and beliefs about multilingualism

To answer Research Question 1, "What are the pre- and post-test levels of pre-service teachers' awareness, responsiveness, and beliefs about multilingualism in the intervention and control groups?", pre- and post-test mean scores were calculated for participants' awareness, responsiveness, and their beliefs about multilingualism.

Table 3 shows the mean values of pre-service teachers' awareness and responsiveness in the pre- and post-tests for the control and intervention groups, as well as the results of t -tests and Wilcoxon signed-rank tests for statistically significant differences between the two measurement points (t_1 and t_2).

With average awareness scores of 1.24 ($SD = 0.51$) in the control group and 1.21 ($SD = 0.42$) in the intervention group, both groups started at rather low pre-test levels. However, they increased significantly to 1.44 ($SD = 0.43$) and 1.51 ($SD = 0.58$) during post-testing. Given a maximum possible score of 3, these post-test values are low to moderate. Responsiveness pre-test scores were similarly low and increased to moderate post-test levels in both the control group ($t_1: M = 1.42, SD = 0.57; t_2: M = 1.6, SD = 0.57$) and the intervention group ($t_1: M = 1.24, SD = 0.5; t_2: M = 1.68, SD = 0.62$). In line with our expectations, the intervention group showed significant improvements in awareness ($r = 0.52$) and responsiveness ($g = 0.56$), indicating substantial effects. Awareness and responsiveness also increased significantly in the control group, although effect sizes were small (awareness: $g = 0.35$, responsiveness: $g = 0.29$).

In the following, exemplary responses from participants of the intervention group are presented, whose levels of awareness or responsiveness improved after attending the workshop.¹ Regarding the "Label" video, the following responses to the question "How would you act in this situation if you were the teacher?" show an increase in responsiveness from level 0 to level 3. "I would emphasize the correct term but not elaborate on it". This avoidance of a discussion about the terms and the underlying issue in the pre-test develops into a reflection on the discriminatory terms in the post-test: "Rather than simply banning terms, I would make clear their potentially discriminatory effect and encourage reflection on this. I would avoid using other examples, such as "potato chips," as they tend to make the situation seem ridiculous."

¹ The translations of participants' responses from German to English were carried out by the authors, aiming for semantic accuracy and natural English expression. Minor linguistic adjustments were made to enhance readability, without changing the original meaning.

Table 3

Awareness and responsiveness: Means, standard deviations, and changes from pre-to post-test for control ($n = 15$) and intervention group ($n = 25$).

		Pre-test		Post-test		t-test		Wilcoxon	
	Group	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	ΔM	<i>g</i>	<i>r</i>	<i>p</i>
CCMA	Cont	1.24	0.51	1.44	0.43	0.18	0.35*	0.52**	0.033
	Interv	1.21	0.42	1.51	0.58	0.3			0.005
CCMR	Cont	1.42	0.57	1.6	0.57	0.18	0.29*		0.027
	Interv	1.24	0.5	1.68	0.62	0.44	0.56***		<0.001

Notes: CCMA = Critical cultural and multilingual awareness; CCMR = Critical cultural and multilingual responsiveness Cont = Control group; Interv = Intervention group; *M* = Mean; *SD* = Standard deviation; ΔM = Mean difference; *g* = Hedges' *g*; *r* = Wilcoxon effect size; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

In relation to the "Foreigner" video, the responses to the question "What do you perceive?" illustrate a positive shift in awareness from level 0 to level 3, beginning with a trivialization of the issue in the pre-test. "It seems that the students have realized that, except for one student, everyone at the table has a migration background. This also affects the formation of groups for them, though perhaps not entirely seriously". After attending the workshop, the participant reflects on students' Othering within existing power structures in the classroom and recognizes the teacher's doubts about students' identification with their backgrounds:

The students are supposed to form groups, but they are unsure how to do so. They realize that there is a difference among them based on their migration background, whether it exists or not. One student suggests dividing according to this. He is clearly categorizing according to "us" and "others." [...]. It seems as if a form of Othering is taking place. Unlike the typical situation in Germany, the students with a migrant background are in the majority group here and may be using an approach with which they are familiar from their experience as part of a minority group. The teacher then says that many of the students are not actually foreigners, even though they have identified as such.

Concerning the "Foreigner" video, one participant improved their responsiveness from level 0 to level 3. "I would ask what the migration background has to do with the task". This pre-test statement shows that the participant prioritizes the students' group work and prevents a discussion about the category "foreigner." In the post-test, this participant suggests a joint reflection on the categorization as "foreigners" and aims to reduce bias and colorblindness, and value diversity instead:

I would discourage students from forming groups based on their migration backgrounds. You could also reflect together on why such divisions occur and break down prejudices. Additionally, color blindness can be avoided by addressing the origins of these divisions and valuing diversity.

Regarding the "Plantain" video, one participant's responsiveness started at level 1 with the statement "I would add pronunciation guides to the words," and later improved to level 3. The pre-test option for action, which refers only to the pronunciation of the words and not to the categories of fruit and vegetables, develops into the post-test suggestion to discuss and reflect on culturally determined classifications of fruit and vegetables: "I would provide more supporting material, highlight cultural differences regarding fruit and vegetable varieties, and reflect on these differences".

However, some participants in the intervention group demonstrated low levels of awareness or responsiveness both before and after the workshop. In terms of the "Label" video, the following answers show that the participants remained at level 0 of responsiveness, as they would have acted in the same way as the teacher in the video, even after attending the workshop:

I think the behavior is good. I wouldn't do it any differently. But to be honest, I wouldn't say it as harshly as the teacher (pre-test). I would act the same way, but I'm not such a forceful type, and so I would be a little friendlier in my speech (post-test).

Other examples are the following responses regarding the "Foreigner" video:

As a teacher, if I knew there were problems with the groupings, I would divide the groups myself. If this discussion came up, I wouldn't get involved in what the students say (pre-test). To avoid such situations, the teacher can divide the groups right from the start. [...] It can be discussed whether it is relevant to the task of which country the students come from (post-test).

Both before and after attending the workshop, the participant would ignore the incident or act colorblindly and thus trivialize the discrimination.

As hypothesized, participants' beliefs about multilingualism increased in the intervention group across all three scales and the total score. In contrast, all pre-test scores of the control group decreased (see Table 4). Comparisons within the intervention group suggested the most significant improvement for the scale "valuing family languages other than German", indicating a small effect ($g = 0.36$) and the greatest significant decrease within the control group for "feeling responsible for language teaching", revealing a large effect ($r = -0.88$). The general beliefs of the intervention group, meaning the average values for the total number of items, increased significantly from 3.34 ($SD = 0.33$) in the pre-test to 3.45 ($SD = 0.3$) in the post-test, whereas the control group's values decreased significantly from 3.44 ($SD = 0.25$) to 2.89 ($SD = 0.11$). Hedges' *g* values were 0.18 for the intervention group and -0.25 for the control group, indicating small effects.

5.2. Research question 2: Differences in pre-post changes in awareness, responsiveness, and beliefs between the intervention and the control group

In response to Research Question 2, "To what extent are changes in awareness, responsiveness, and beliefs about multilingualism associated with participation in a practice-oriented, (self-)reflexive intervention on CLRT compared to a control group?", Table 5 illustrates a comparison of changes in participants' awareness, responsiveness, and beliefs about multilingualism from pre-to post-tests between the control and the intervention group. As independent t-tests and Mann-Whitney U tests did not reveal any significant differences for awareness, responsiveness, and beliefs in the pre-test (all $p > 0.05$), it was possible to perform the calculations with the change variables.

As assumed, the intervention group showed significantly larger pre-post increases in responsiveness ($\Delta M = 0.26$) and in beliefs ($\Delta M = 0.66$) than the control group. The Wilcoxon effect sizes were 0.3 and 0.83, indicating a moderate effect for the between-group difference in responsiveness-change and a large effect for the change in beliefs. In contrast, the awareness increase was not significantly higher in the intervention group than in the control group ($\Delta M = 0.11$).

5.3. Research question 3: Associations between pre-service teachers' personal and academic characteristics and their awareness, responsiveness, and beliefs about multilingualism

To answer Research Question 3, "How are pre-service teachers' personal and academic characteristics associated with their post-test

Table 4

Beliefs about multilingualism: Means, standard deviations, and changes from pre-to post-test for control (*n* = 15) and intervention group (*n* = 25).

	Group	Pre-test		Post-test		ΔM	<i>t</i> -test	Wilcoxon	<i>p</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Scale Valuing family languages other than German	Cont	3.01	0.45	2.91	0.27	-0.1	0.36**	n.s.	n.s.
	Interv	2.93	0.51	3.14	0.51	0.21			
Feeling responsible for language teaching	Cont	3.56	0.33	2.43	0.2	-1.13	0.04	-0.88***	<0.001
	Interv	3.51	0.36	3.55	0.3	0.04			
Valuing multilingualism in class	Cont	3.61	0.35	3.46	0.31	-0.15	0.27*	-0.59*	0.023
	Interv	3.42	0.41	3.53	0.36	0.11			
Total beliefs	Cont	3.44	0.25	2.89	0.11	-0.55	0.18**	-0.25***	<0.001
	Interv	3.34	0.33	3.45	0.3	0.11			

Notes: Cont = Control group; Interv = Intervention group; *M* = Mean; *SD* = Standard deviation; ΔM = Mean difference; *g* = Hedges' *g*; n.s. = not significant; **p* < 0.05; ***p* < 0.01; ****p* < 0.001.

Table 5

Comparison of changes in awareness, responsiveness, and beliefs about multilingualism from pre-to post-test between the control (*n* = 15) and intervention group (*n* = 25).

	Control group		Intervention group		ΔM	<i>r</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Changes in CCMA	0.18	0.31	0.29	0.51	0.11	n.s.	n.s.
Changes in CCMR	0.18	0.28	0.44	0.54	0.26	0.3*	0.033
Changes in beliefs	-0.56	0.24	0.1	0.17	0.66	0.83***	<0.001

Notes: CCMA = Critical cultural and multilingual awareness; CCMR = Critical cultural and multilingual responsiveness; *M* = Mean; *SD* = Standard deviation; ΔM = Mean difference; MWU = Mann-Whitney *U* test; *r* = Wilcoxon effect size; n.s. = not significant; **p* < 0.05; ****p* < 0.001.

levels of awareness, responsiveness, and beliefs about multilingualism, controlling for initial scores?"; we conducted correlation and regression analyses for participants' post-test awareness (Table 6), post-test responsiveness (Table 7) and post-test beliefs (Table 8). Four variables were included in each regression model: (1) language teaching subjects, (2) pre-test beliefs, (3) pre-test awareness, and (4) the intervention for participants' post-test awareness; (1) gender, (2) pre-test beliefs, (3) pre-test responsiveness, and the (4) intervention for participants' post-test responsiveness; and (1) teacher education program, (2) language teaching subjects, (3) pre-test beliefs, and (4) the intervention for participants' post-test beliefs. We conducted additional correlation analyses, including all assessed characteristics.

As we expected, certain personal and academic characteristics were

Table 6

Correlations and regressions between pre-service teachers' post-test awareness and their personal and academic backgrounds.

	Correlation		Regression		Relative weight analysis		
	<i>r</i>	<i>p</i>	<i>Beta</i>	<i>p</i>	<i>Raw</i>	%	<i>Rank</i>
Gender (0 = male, 1 = female)	0.061	n.s.	-	-	-	-	-
Multilingual background	0.134	n.s.	-	-	-	-	-
Study level (0 = Bachelor, 1 = Master)	0.186	n.s.	-	-	-	-	-
Teacher education program (0 = Primary school, 1 = Secondary school)	-0.032	n.s.	-	-	-	-	-
Language teaching subjects	0.161	n.s.	0.177	n.s.	0.029	5.691	3
LRT-relevant experience	-0.059	n.s.	-	-	-	-	-
CLRT-relevant OTL	0.229	n.s.	-	-	-	-	-
Beliefs (t1)	0.421**	0.007	0.352**	0.007	0.149	29.676	2
Awareness (t1)	0.581***	<0.001	0.552***	<0.001	0.318	63.342	1
Intervention	0.058	n.s.	0.072	n.s.	0.006	1.291	4
Engagement in intervention	0.057	n.s.	-	-	-	-	-
R²			44.5%		50.2%		

Notes: LRT = Linguistically responsive teaching; CLRT = Culturally and linguistically responsive teaching; OTL = Opportunities to learn; n.s. = not significant; ***p* < 0.01; ****p* < 0.001; t1 = first point of measurement.

associated with participants' awareness, responsiveness, and beliefs about multilingualism. Analyses indicated significant positive correlations between participants' post-test awareness and their positive pre-test beliefs about multilingualism, as well as between pre-test and post-test awareness (see Table 6). Regarding participants' post-test responsiveness, analyses suggested significant positive correlations with their study level, practice-oriented CLRT-relevant OTL, positive pre-test beliefs, and pre-test responsiveness (see Table 7).

A regression analysis for participants' post-test awareness indicated that positive pre-test beliefs and pre-test awareness were significant positive predictors. A Relative Weight Analysis suggested that the initial level of awareness had the highest impact on predicting participants' post-test awareness. Regarding participants' post-test responsiveness, we identified female gender, positive pre-test beliefs about multilingualism, pre-test responsiveness, and attendance at the intervention to be significant positive predictors. Relative Weight Analysis indicated that participants' initial responsiveness and positive pre-test beliefs were the most relevant factors in predicting post-test responsiveness.

In line with our expectations, pre-service teachers' post-test beliefs about multilingualism were associated positively with participants' enrollment in a primary teacher education program, studying at least one language subject, experience with practice-oriented CLRT-relevant OTL, holding positive pre-test beliefs, and participating in the intervention. In contrast, participants' post-test beliefs did not correlate significantly with their initial levels of awareness or responsiveness. Neither for participants' beliefs nor for their awareness or responsiveness in the post-test were significant associations detected with participants' level of engagement in the workshop.

A regression analysis for participants' post-test beliefs indicated that attendance at the intervention, positive pre-test beliefs, and studying at

Table 7

Correlations and regressions between pre-service teachers' post-test responsiveness and their personal and academic backgrounds.

	Correlation		Regression		Relative weight analysis		
	<i>r</i>	<i>p</i>	<i>Beta</i>	<i>p</i>	Raw	%	Rank
Gender (0 = male, 1 = female)	0.075	n.s.	0.236*	0.033	0.028	4.597	3
Multilingual background	0.097	n.s.	–	–	–	–	–
Study level (0 = Bachelor, 1 = Master)	0.412**	0.008	–	–	–	–	–
Teacher education program (0 = Primary school, 1 = Secondary school)	–0.267	n.s.	–	–	–	–	–
Language teaching subjects	–0.057	n.s.	–	–	–	–	–
LRT-relevant experience	0.1	n.s.	–	–	–	–	–
CLRT-relevant OTL	0.464**	0.003	–	–	–	–	–
Beliefs (t1)	0.539***	<0.001	0.399**	0.001	0.216	34.858	2
Responsiveness (t1)	0.649***	<0.001	0.572***	<0.001	0.349	56.463	1
Intervention	0.066	n.s.	0.225*	0.042	0.025	4.082	4
Engagement in intervention	0.245	n.s.	–	–	–	–	–
R²			57.6%		61.9%		

Notes: LRT = Linguistically responsive teaching; CLRT = Culturally and linguistically responsive teaching; OTL = Opportunities to learn; n.s. = not significant; **p* < 0.05; ***p* < 0.01; ****p* < 0.001; t1 = first point of measurement.

Table 8

Correlations and regressions between pre-service teachers' post-test beliefs about multilingualism and their personal and academic backgrounds.

	Correlation		Regression		Relative weight analysis		
	<i>r</i>	<i>p</i>	<i>Beta</i>	<i>p</i>	Raw	%	Rank
Gender (0 = male, 1 = female)	0.007	n.s.	–	–	–	–	–
Multilingual background	0.012	n.s.	–	–	–	–	–
Study level (0 = Bachelor, 1 = Master)	0.128	n.s.	–	–	–	–	–
Teacher education program (0 = Primary school, 1 = Secondary school)	–0.365*	0.02	–0.132	n.s.	0.072	8.504	4
Language teaching subjects	0.44**	0.004	0.161*	0.031	0.108	12.693	3
LRT-relevant experience	0.214	n.s.	–	–	–	–	–
CLRT-relevant OTL	0.328*	0.039	–	–	–	–	–
Beliefs (t1)	0.371*	0.018	0.477***	<0.001	0.177	20.899	2
Awareness (t1)	0.001	n.s.	–	–	–	–	–
Responsiveness (t1)	0.075	n.s.	–	–	–	–	–
Intervention	0.749***	<0.001	0.737***	<0.001	0.491	57.903	1
Engagement in intervention	0.286	n.s.	–	–	–	–	–
R²			83%		84.8%		

Notes: LRT = Linguistically responsive teaching; CLRT = Culturally and linguistically responsive teaching; OTL = Opportunities to learn; n.s. = not significant; **p* < 0.05; ***p* < 0.01; ****p* < 0.001; t1 = first point of measurement.

least one language subject were significant positive predictors. Relative Weight Analysis suggested that participation in the intervention had the greatest impact on predicting participants' post-test beliefs about multilingualism.

6. Discussion

The present study contributes to educational research on (pre-service) teachers' professionalization regarding cultural and linguistic diversity in school. It extends previous research by examining not only pre-service teachers' beliefs about multilingualism, but also their critical cultural and multilingual awareness and responsiveness, using a video-based assessment alongside traditional questionnaires. Within the limits of a small sample, this quantitatively driven mixed-methods approach provides more differentiated insights into the levels, changeability, and predictors of pre-service teachers' beliefs, awareness, and responsiveness within teacher education. In the following section, we discuss the scientific relevance of the findings, their limitations, and implications for future research and practice.

6.1. Scientific significance of the study

This section focuses on interpreting empirical findings with respect to the three research questions and their scientific significance.

Consistent with our expectations for Research Question 1, participants' beliefs about multilingualism were rather positive when compared to studies that used similar instruments (Fischer et al., 2018; Kardel et al., 2024; Schroedler et al., 2022). In line with previous longitudinal studies (e.g., Fischer & Lahmann, 2020; Kardel et al., 2024), the results indicate significant pre-post improvements with small effects in the intervention group's overall beliefs, as well as in their beliefs about valuing family languages other than German and valuing multilingualism in class. On the other hand, no significant change was observed for beliefs about feeling responsible for language teaching. This differentiated pattern within the intervention group suggests that beliefs about multilingualism may differ in their degree of changeability, with some appearing more malleable and others remaining comparatively stable. This interpretation corresponds with the conceptualization of teachers' beliefs as existing along a continuum of stability, as proposed by Fives and Buehl (2012), rather than as a uniform construct. Thus, the study contributes a more nuanced perspective on which dimensions of beliefs about multilingualism appear more susceptible to

short-term interventions. In the control group, our findings indicate no significant improvements but significant decreases in participants' overall beliefs and selected subscales. This unexpected decline in the control group's beliefs about multilingualism could tentatively be related to intensified political debates on migration during the 2024/25 national election period in Germany, which were influenced by right-wing populist media and parties. Although causal conclusions cannot be drawn, this decline extends previous research by illustrating that beliefs may not remain stable even over short periods and may be sensitive to contextual influences.

Despite participants' generally positive beliefs, our results indicate rather low levels of awareness and responsiveness, which are consistent with prior research revealing discrepancies in teachers' positive beliefs and (reported) practices (e.g., Liang & Yu, 2023; Lorenz et al., 2021). By using a performance-oriented video-based assessment that reduced the influence of self-report bias, the present study provides additional empirical support for this discrepancy under situational conditions. Measuring pre-service teachers' awareness and responsiveness before assessing their beliefs may have limited participants' ability to describe perceptions and actions that align with socially desirable beliefs during the video-based assessment.

Within the intervention group, our findings suggest significant improvements from pre-to post-test regarding participants' awareness and responsiveness. These results corroborate previous studies that also documented the development of awareness or responsiveness among (pre-service) teachers after targeted training (e.g., Finkbeiner et al., 2024; Fu et al., 2023; Shepard-Carey & Gopalakrishnan, 2021). Small, significant improvements also emerged in the control group, which may reflect a learning effect from repeated video-based assessments over the three-week pre-post measurement interval. This pattern underscores the importance of including control groups when examining change processes in teacher education.

As expected for Research Question 2, the findings indicate significantly greater increases in the intervention group's beliefs about multilingualism than in the control group, aligning with Mahalingappa et al. (2025). However, given the decrease observed in the control group, the group difference appears to be driven not only by gains in the intervention group but also by declines in the control group. Therefore, rather than indicating the formation of entirely new beliefs, the findings suggest that participation in the intervention may be associated with the stabilization of pre-existing positive beliefs. In this sense, the workshop may function as a preventive OTL, helping to maintain positive beliefs in potentially volatile sociopolitical contexts. This stabilization effect contributes to existing literature, which has predominantly focused on belief changes rather than belief maintenance.

Regarding responsiveness, the results indicate significantly greater improvements in the intervention group than in the control group. These findings are consistent with a prior intervention study that trained critical thinking skills (Yaprak & Özmen, 2021). Within the constraints of the small sample, our results provide preliminary controlled evidence that structured (self-) reflection, peer exchange, and practice-oriented engagement may be associated with gains in responsiveness. In contrast, no significant group differences were found for participants' awareness. This divergence between awareness and responsiveness adds conceptual differentiation to the field by suggesting that recognizing and critically interpreting culturally and linguistically relevant classroom situations may not develop in the same way as generating culturally and linguistically responsive actions. The structure of the intervention design and the video-based assessment could have also differentially supported these dimensions. Since the practice-oriented workshop included input on CLRT and collaborative video analysis of classroom situations, it may have particularly encouraged participants to critically reflect on how to act in such situations. Additionally, the item assessing responsiveness ("How would you act in this situation if you were the teacher?") may inherently prompt deeper reflection and critical evaluation. In contrast, the awareness item ("What do you

perceive?") could be answered in a more neutral, observational manner.

Our findings on Research Question 3 indicate that participation in the intervention is a significant predictor of post-test beliefs about multilingualism, even after controlling for participants' initial beliefs. While this association should be interpreted cautiously, given the limited sample size and the decline in the control group, it suggests that structured OTL may be associated with differences in belief development. Moreover, the results indicate that participants' initial beliefs and studying at least one language subject are significant predictors of their positive post-test beliefs. In addition, CLRT-relevant OTL, initial positive beliefs, and enrollment in a primary teacher education program are positively associated with participants' post-test beliefs. These findings corroborate our assumptions and prior studies that identified (pre-service) teachers' language school subjects (e.g., Kardel et al., 2024; Schroedler et al., 2022), experience with CLRT-relevant OTL (e.g., Fischer & Ehmke, 2019; Schneider et al., 2025), and their enrollment in a primary teacher education program (Kardel et al., 2024) to associate with participants' positive beliefs about multilingualism. Working with younger students who have not yet developed reading and writing skills may sensitize pre-service teachers to CLRT. Similarly, studying language subjects may offer more CLRT-relevant input within teacher education or reflect an existing interest in culture and language that may interact with structured interventions. By examining these associations within a controlled pre-post design, the study adds quantitative evidence to research that has often relied on cross-sectional analyses. Overall, these findings indicate the relevance of considering both participants' characteristics and targeted OTL when examining belief development over time.

For awareness, our findings indicate that initial belief and awareness levels were positively associated with participants' post-test awareness, confirming our assumption. Regarding participants' responsiveness, higher study levels and CLRT-relevant OTL are associated positively with post-test scores. Although the results indicate that participation in the intervention is a significant positive predictor of participants' post-test responsiveness, its overall impact remains small, suggesting that this positive association may vary by individual characteristics. In this context, our findings suggest that female gender is a significant positive predictor of participants' post-test responsiveness, after controlling for initial levels. This may indicate that female participants benefit more from the workshop. Moreover, initial responsiveness and belief levels emerged as significant positive predictors of participants' post-test responsiveness, indicating that participants' beliefs about multilingualism could serve as a foundation for developing responsiveness during the workshop. However, no reciprocal association was found between post-test beliefs and initial responsiveness. Within the limits of the present study, this asymmetry contributes to ongoing debates about the relationship between beliefs and (reported) classroom practices by suggesting a directional link from beliefs to awareness and responsiveness rather than a bidirectional relationship.

Overall, given the limits of a small quasi-experimental sample, the study offers three main contributions. First, it provides controlled, quantitative evidence on the levels and short-term changes in pre-service teachers' awareness, responsiveness, and beliefs. Second, the study differentiates between development and stabilization of beliefs, highlighting that maintaining positive beliefs may be a meaningful outcome of structured interventions. Third, the study shows the value of combining questionnaire data with video-based responses to capture discrepancies between reported beliefs and situationally grounded awareness and responsiveness. While the findings require replications with larger samples and follow-up measurements, they contribute to a more differentiated and methodologically informed understanding of how pre-service teachers' professional beliefs about multilingualism, as well as their critical cultural and multilingual awareness and responsiveness, may be promoted within teacher education.

6.2. Limitations and further research

Despite its contributions, the study has certain limitations, from which implications for further research can be derived. First, all results must be considered in light of the small sample consisting of pre-service teachers from a single university in northern Germany who were not randomly assigned to the intervention or control group. As a result, regression results and effect sizes need to be interpreted with caution and can only be generalized to a limited extent. The low statistical power limits further regression analyses and the identification of differential intervention effects by individual characteristics. We suggest future experiments using randomized designs with larger sample sizes across multiple sites to test moderation or path models. Second, participants' measured awareness, responsiveness, and beliefs primarily reflect intended or reported actions rather than actual teaching behavior. Therefore, observational or video studies before and after interventions are recommended. Third, t-tests, correlations, and regressions do not allow causal statements. Path models could clarify whether beliefs about multilingualism mediate effects on awareness or responsiveness. Fourth, since the intervention was only a 60-min workshop, improvements may be short-term. Follow-up studies could examine sustainability. Finally, not all participants benefited from the workshop, so further approaches need to be evaluated to reach (pre-service) teachers who are difficult to access through practice-oriented and (self-) reflective approaches.

6.3. Implications for practice

Finally, practical conclusions can be drawn. Given the greater improvements in responsiveness and beliefs about multilingualism in the intervention group, we recommend systematically implementing CLRT-relevant OTL in teacher education to promote these outcomes. (Self-) Reflexive and interactive elements can help (pre-service) teachers recognize their own cultural and linguistic backgrounds and critically question biases and power structures. Practice-oriented content, such as CLRT materials or video analysis of classroom situations, can further strengthen awareness and responsiveness. Since the control group showed a decrease in beliefs about multilingualism, such offerings could also help stabilize positive beliefs about multilingualism. In summary, the mandatory implementation of CLRT-relevant OTL is recommended for (pre-service) teachers of all subjects and across teacher education programs, rather than as an add-on offering. Considering our findings on possible associations, the question arises of how to reach male pre-service teachers, prospective secondary school teachers, or future non-language teachers. When designing CLRT-relevant OTL, educators may consider participants' personal and academic backgrounds and test different approaches. Overall, structured compulsory modules and targeted training could sustainably foster positive beliefs about multilingualism and promote awareness and responsiveness among (pre-service) teachers.

CRedit authorship contribution statement

Lotta Kardel: Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Timo Ehmke:** Writing – review & editing, Validation, Supervision, Methodology, Investigation, Conceptualization.

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Declaration of competing interest

The authors report there are no competing interests to declare.

Data availability

The authors are unable or have chosen not to specify which data has been used.

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