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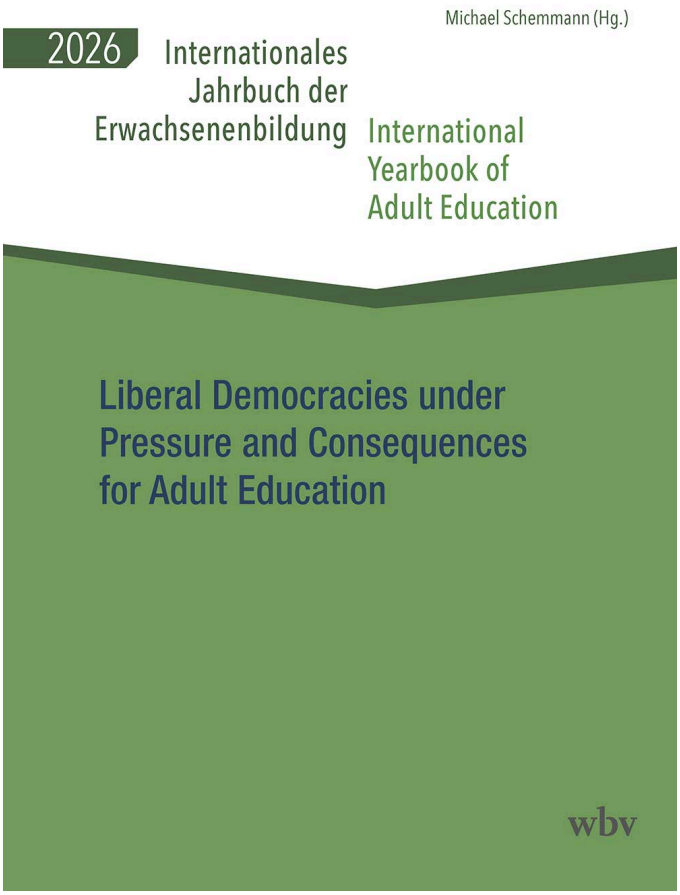
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Professional learning communities (PLCs) are considered a promising approach to collaborative professional development "near the job", yet they have received little empirical attention in adult and continuing education (AE/CE). In AE/CE contexts, regular opportunities for collegial exchange are often limited due to high proportions of part-time employment and fragmented employment structures, suggesting particular potential for structured collaborative formats such as PLCs to support professional learning. The present study examines the implementation of PLCs in AE/CE. Using an exploratory mixed-methods design, qualitative group interviews and quantitative survey data from four newly established PLCs (N = 13) were analysed. Participation was perceived as professionally relevant across formats, particularly due to the combination of collaborative task work and structured reflection on work-related demands. Collaboration was primarily shaped by PLC design features and organisational conditions, with participation during regular working hours and organisational support emerging as central. Perceived effects on personal resources were moderate, indicating the importance of longer implementation periods. The findings provide initial empirical evidence suggesting that PLCs represent an adaptable format for professional learning in AE/CE contexts.

Schlagworte: Professional Learning Communities; Adult and Continuing Education; Implementation; Professional Learning; Professional Resilience
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Collaboration Under Fragmented Conditions: Implementing Professional Learning Communities in Adult and Continuing Education

Dörthe Herbrechter, Amina Burger, Tabea Leibold & Julia Koller

Abstract: Professional learning communities (PLCs) are considered a promising approach to collaborative professional development "near the job", yet they have received little empirical attention in adult and continuing education (AE/CE). In AE/CE contexts, regular opportunities for collegial exchange are often limited due to high proportions of part-time employment and fragmented employment structures, suggesting particular potential for structured collaborative formats such as PLCs to support professional learning. The present study examines the implementation of PLCs in AE/CE. Using an exploratory mixed-methods design, qualitative group interviews and quantitative survey data from four newly established PLCs ($N = 13$) were analysed. Participation was perceived as professionally relevant across formats, particularly due to the combination of collaborative task work and structured reflection on work-related demands. Collaboration was primarily shaped by PLC design features and organisational conditions, with participation during regular working hours and organisational support emerging as central. Perceived effects on personal resources were moderate, indicating the importance of longer implementation periods. The findings provide initial empirical evidence suggesting that PLCs represent an adaptable format for professional learning in AE/CE contexts.

Keywords: Professional Learning Communities; Adult and Continuing Education; Implementation; Professional Learning; Professional Resilience

1 Introduction

The extent to which organised adult and continuing education (AE/CE) can fulfil its overarching goal of enabling adult learning depends not least on the qualifications, competencies, and professional engagement of its staff (Martin & Schrader, 2021). At the same time, the structural conditions under which AE/CE staff work differ markedly from those in many other educational sectors. Employment structures remain highly fragmented across European contexts, particularly in Germany, where heterogeneous qualification pathways, limited career prospects, and a high prevalence of freelance and

part-time employment are characteristic features of the sector (Milana et al., 2018; Martin & Schrader, 2021).

These conditions are reinforced by organisational structures in AE/CE. Educational programmes are typically delivered by relatively small organisations with only a limited number of permanently employed staff and a comparatively large number of freelance or part-time instructors. Adult education organisations employ a median of seven permanent staff members, while programmes are frequently provided by a broad pool of externally contracted teaching personnel (Echarti et al., 2023). Part-time employment constitutes the norm rather than the exception, and secondary employment in teaching is widespread (Schrader, 2019). Such fragmented working arrangements create considerable challenges for everyday organisational collaboration, including establishing sufficient interaction density among staff, coordinating activities across differing working hours, and ensuring consistent educational standards (Schrader & Martin, 2021; Ulich, 2011).

Moreover, many freelance staff work simultaneously for multiple organisations and therefore have limited access to stable collegial structures, regular internal meetings, or professional development opportunities (Autorengruppe wb-personalmonitor, 2016). As a result, developing a shared professional understanding may be difficult despite the diverse qualifications and expertise of teaching staff (Tippelt & Lindemann, 2018). These conditions can increase the risk of professional isolation while reducing opportunities for collegial exchange, mutual support, and collaborative reflection. Such opportunities are widely regarded as important resources for professional practice and coping with work-related demands in educational professions (Anders et al., 2022; Gräsel et al., 2006; Klusmann & Waschke, 2018).

Evidence from school effectiveness and teacher stress research suggests that collegial support and cooperative collaboration can positively influence professionalism, engagement, and professionals' capacity to cope with work-related demands. Although findings are not entirely consistent, several studies indicate that collaboration is positively associated with organisational climate, organisational commitment, and instructional quality (Fussangel & Gräsel, 2014; Kullmann, 2016). Furthermore, sustained forms of collegial collaboration have been shown to reduce perceived stress and strengthen professional resilience (Fussangel & Dizinger, 2014; Muckenthaler et al., 2019; Owen, 2016).

While these findings primarily stem from the school sector, they highlight the potential relevance of collaborative structures for AE/CE contexts characterised by fragmented employment conditions. At the same time, such conditions may be experienced ambivalently. Limited employment security and restricted career opportunities can create uncertainty and strain, whereas flexible employment arrangements may also allow for greater autonomy and self-determination (Hahnrath & Herbrechter, 2022; Jambon, 2015). Against this background, the question arises how collaborative opportunities can be created that provide professional support while remaining compatible with the structural characteristics of the AE/CE context.

One approach that aims to structure collegial collaboration close to everyday professional practice is that of professional learning communities (PLCs). Through recurring interaction and shared reflection among teachers, PLCs are intended to support both individual professional learning and collective knowledge development.

Empirical findings on PLC implementation suggest that contextual and structural conditions, such as organisational composition and interaction format, may shape collaboration processes and participants' experiences, although results remain heterogeneous (Kelchtermans, 2006).

Within adult education research, collaborative formats resembling PLCs have so far received limited empirical attention and have primarily been discussed conceptually (e. g., Biel et al., 2018; Herbrechter et al., 2018; Jenner, 2022; Müller-Naevecke, 2019). Initial evidence suggests that such formats are generally perceived as adaptable and desirable in AE/CE contexts, while cooperation-related beliefs, motivational considerations, and temporal resources have been identified as important conditions for implementation (Hahnrath & Herbrechter, 2022).

However, little is known about how PLCs are perceived when implemented in practice in AE/CE contexts, which conditions facilitate or hinder collaboration, and how participants evaluate potential benefits for their professional work and personal resources relevant for coping with work-related demands. Consequently, empirical evidence on the practical implementation and perceived value of PLCs in adult education remains scarce.

Addressing this gap, the present study investigates the implementation of PLCs in AE/CE and explores how participation is perceived by pedagogical staff involved in teaching within Catholic adult and family education. The focus lies on participants' perceptions of collaboration processes, the conditions shaping these processes, and the perceived benefits for professional practice and personal resources (e. g., professional resilience). Given the limited empirical evidence available, the study adopts an exploratory perspective and combines qualitative and quantitative data to examine participants' experiences across different PLC formats.

The study is guided by the following research questions (RQ):

- RQ1: How do adult education staff perceive participation in PLCs implemented in AE/CE contexts?
- RQ2: Which organisational and interactional conditions are perceived as facilitating or hindering collaboration within these PLCs?
- RQ3: To what extent do participants attribute benefits of PLC participation to their professional practice and personal resources for coping with work-related demands, and how do these perceptions vary across different PLC formats?

To address these questions, the study examines PLC participation from an evaluation perspective focusing on participants' reactions (Kirkpatrick & Kirkpatrick, 2006). From an implementation perspective, analysing participants' reactions represents an important initial step, as research on educational innovation indicates that sustainable adop-

tion is more likely when new approaches are perceived as useful for addressing practical demands and compatible with existing organisational conditions (Hascher & Schmitz, 2010). Investigating participants' experiences in concrete implementation contexts can therefore provide insights into acceptance, perceived usefulness, and contextual conditions relevant for the further development and transfer of collaborative formats in AE/CE.

Accordingly, the study employs a mixed-methods design combining qualitative group interviews with descriptive quantitative survey data to examine participants' perceptions of newly established PLCs. Four PLCs differing in organisational composition and interaction format (face-to-face vs. online; familiar vs. newly formed groups) were implemented, enabling exploratory comparisons across formats.

The following sections first outline the theoretical and conceptual framework, followed by the methodological approach and study design. The findings are then presented and discussed in relation to existing research as well as implications for practice and future research.

2 Theoretical and Conceptual Framework

This section first introduces the concept of professional learning communities (PLCs) as the central framework of the study. It then discusses collaboration as a potential source of personal resources before considering PLCs in the specific context of adult and continuing education.

2.1 Professional Learning Communities: Concept and Core Characteristics

PLCs are widely regarded as a collaborative approach to professional development that combines collegial exchange with situated learning. Originally developed in the context of school improvement research, PLCs are typically described as small groups of educators who meet regularly over an extended period to reflect on professional challenges, jointly develop solutions, provide feedback, exchange pedagogical knowledge, and collaboratively refine teaching practices (Bonsen & Rolff, 2006; Buhren, 2015).

Although definitions vary, common characteristics include shared goals, collaborative learning, reflective dialogue, and structurally supported opportunities for exchange (Herbrechter et al., 2018). A central element is the de-privatisation of professional practice, enabling participants to discuss experiences and challenges openly and to develop new perspectives through collegial feedback (Fussangel, 2008; Warwas & Schadt, 2020).

Theoretically, the PLC concept is rooted in perspectives on situated learning and organisational learning. From a situated learning perspective, professional knowledge develops through participation in social practices and communities of practice rather than through isolated individual learning (Lave & Wenger, 1991). PLCs can therefore be understood as structured opportunities for such situated professional learning. In addition, PLCs are closely related to concepts of the learning organisation, which emphasise collective reflection, shared vision, and continuous improvement through collabo-

rative processes (Senge, 1990). These theoretical perspectives highlight interaction and shared reflection as central mechanisms underlying professional learning within PLCs.

PLCs can differ in organisational composition and interaction format. Groups may consist of members from the same organisation (intra-organisational) or bring together participants from different organisations (inter-organisational; Rolff, 2015), and collaboration may occur face-to-face or online. These structural characteristics may influence collaboration processes in several ways. For example, working with familiar colleagues may facilitate interaction through shared experiences and existing trust, whereas collaboration among previously unknown participants may allow for greater openness and critical reflection by reducing established role expectations (Avila de Lima, 2003; Kelchtermans, 2006; Meyer, 2002; Staessens, 1993). Similarly, online formats may increase accessibility and flexibility, particularly in geographically dispersed professional contexts, while face-to-face interaction may support trust development and more intensive professional exchange (Schuck, 2003). Such variations suggest that contextual and structural conditions play an important role in shaping collaboration processes across different PLC formats (Kansteiner, 2021; Vangrieken et al., 2015).

2.2 Collaboration as a Source of Personal Resources

Research from school contexts indicates that collegial exchange contributes to professional learning, instructional development, and coping with professional demands by providing feedback, knowledge sharing, joint problem solving, and collegial support (Fussangel & Gräsel, 2014; Heider, 2005; Muckenthaler et al., 2019). Research on PLCs extends these findings by linking collaborative participation to professionals' capacity to cope with work-related stress and challenges (Fussangel & Dizinger, 2014; Owen, 2016; Vangrieken et al., 2015).

These relationships are consistent with relational perspectives on resilience, which conceptualise resilience as developing through supportive social interaction and access to professional support (Gu & Day, 2007, 2013; Jordan, 2006). PLCs provide a structured framework for such interaction processes through regular meetings, shared reflection, and collegial support. These processes are theoretically associated with the development of personal resources such as professional resilience (Le Cornu, 2009).

These considerations appear particularly relevant in the AE/CE context, where fragmented employment conditions can limit access to stable collegial networks and informal professional exchange. PLCs therefore represent a structured approach to supporting the development of personal resources for coping with work-related demands in this sector.

2.3 Professional Learning Communities in Adult and Continuing Education

In AE/CE, collaborative professional development formats resembling PLCs have so far received only limited empirical attention and have primarily been discussed at a conceptual level (e. g., Biel et al., 2018; Dimmitt, 2019; Grotlüschen & Pätzold, 2020; Herbrechter et al., 2018; Jenner, 2022; Müller-Naevecke, 2019; Schrader, 2018; Schreiber-Barsch, 2007; Stewart, 2014). At the same time, structural characteristics of

the AE/CE context – such as fragmented employment conditions, heterogeneous qualification profiles, and limited opportunities for stable collegial exchange – suggest a particular relevance of collaborative formats (Müller-Naevecke, 2019). Teaching staff often combine teaching with other professional activities and maintain only loose organisational affiliation, which may restrict access to informal professional learning and increase the risk of professional isolation. Structured opportunities for collaboration may therefore provide important support for professional exchange and development in this sector (Herbrechter et al., 2018).

From an organisational perspective, collaborative formats such as PLCs may also address coordination challenges arising from the heterogeneous and often loosely connected teaching workforce typical of AE/CE. Establishing shared pedagogical standards and a common professional understanding across diverse qualification backgrounds can be difficult, particularly when many teaching staff members are only weakly integrated into organisational structures (Tippelt & Lindemann, 2018). PLCs may therefore support not only individual professional development but also organisational alignment and quality development by fostering exchange and shared reflection across teaching staff while respecting flexible employment arrangements.

Existing empirical evidence in AE/CE mainly focuses on perceptions of feasibility rather than experiences from implemented formats. Hahnrath and Herbrechter (2022) examined implementation conditions and identified cooperation-related beliefs, motivational and economic considerations, temporal resources, and leadership support as central prerequisites for initiating PLCs in AE/CE. However, empirical insights into PLCs implemented in practice in AE/CE contexts remain scarce.

Contextual and structural variations in PLC implementation may be particularly relevant in AE/CE. Digital collaboration formats can expand opportunities for collegial exchange by enabling interaction across organisational boundaries and reducing spatial constraints (Dille & Røkenes, 2021; Zhang et al., 2017). At the same time, differences in organisational composition and interaction formats (e. g., intra- vs. inter-organisational groups; face-to-face vs. online) may influence collaboration processes, trust development, and perceived usefulness of participation, which appear especially important in AE/CE contexts characterised by flexible employment arrangements and heterogeneous organisational affiliations (Vangrieken et al., 2015).

Taken together, PLCs can be understood as structured opportunities for collegial interaction that are theoretically linked to processes supporting professional learning and the development of personal resources for coping with work-related demands. At the same time, existing research suggests that collaboration processes and perceived usefulness depend strongly on contextual and structural characteristics, such as organisational composition and interaction format. Despite the potential relevance of PLCs for AE/CE, little is known about how such formats are perceived when implemented in practice, which conditions facilitate or hinder collaboration, and how participants evaluate potential benefits for their professional practice and personal resources across different implementation formats. The present study addresses this gap by examining participants' experiences in newly established PLCs within AE/CE using a mixed-methods design.

3 Method

3.1 Study Context and Sample

The study was conducted in the context of Catholic adult and family education in Germany as part of a project funded by the Ministry of Culture and Science of the State of North Rhine-Westphalia. Within this project, PLCs were implemented as a personnel development initiative aimed at strengthening collegial exchange and professional reflection among pedagogical staff involved in teaching. All PLCs were newly established and can therefore be considered early-stage groups (Bolam et al., 2005).

Four PLCs were formed, differing with regard to organisational composition and interaction format. Two PLCs consisted of participants from the same organisation who were already familiar with each other and met primarily face-to-face, whereas two PLCs brought together participants from different organisations who had not previously collaborated and interacted exclusively online.

Overall, 13 participants took part in the study, all of whom were professionally active in adult and continuing education (AE/CE). The sample included twelve permanently employed pedagogical staff members responsible for planning, coordinating, and delivering educational programmes – most of whom were also actively involved in teaching – and one freelance educator. Participants were predominantly female (n = 8), and the mean age was 53 years (SD = 9.6; range: 34–69). Educational backgrounds were heterogeneous, ranging from vocational qualifications to doctoral degrees, with most participants holding academic degrees in the social sciences or education. The relatively high proportion of academically qualified staff, the age structure, and the diversity of professional responsibilities reflect common characteristics of the German AE/CE workforce, although permanent employment represents only part of the sector's employment structure, which also includes substantial freelance and part-time work (Autorengruppe Nationaler Bildungsbericht, 2016, 2024).

Participation in the PLCs was voluntary. All participants were informed about the study procedures and provided consent for data collection and analysis. To minimise expectancy effects, information about the broader research interest in potential effects of PLC participation on personal resources was communicated only after data collection had been completed.

3.2 Study Design and Procedure

The study followed an exploratory mixed-methods design combining qualitative and quantitative data to examine participants' perceptions of PLC participation, conditions influencing collaboration, and perceived benefits for professional practice and personal resources.

The implementation of the PLCs began with a kick-off workshop in June 2023, which aimed at networking participants and collecting baseline information via an online survey. Following this workshop, the PLCs collaborated over a period of approximately three months. During the approximately three-month PLC phase, participants engaged in three to four group sessions, each lasting between one and four hours, to

discuss professional challenges, exchange experiences, and jointly develop course concepts for pedagogical practice. Depending on the group, meetings were conducted either face-to-face or online. To document collaboration processes, participants completed brief protocol forms after meetings. These data served process documentation purposes within the broader project but are not part of the analyses presented in this article.

Data collection took place after completion of the PLC phase. Participants completed a post-participation survey assessing perceived usefulness, acceptance, and perceived benefits of PLC participation. In addition, qualitative group interviews were conducted with each PLC to capture participants' experiences and perceptions of collaboration processes in depth.

The combination of qualitative and quantitative data enabled methodological triangulation and provided complementary insights into participants' experiences across different PLC formats. This approach allowed both an in-depth exploration of subjective perspectives and a structured comparison of subjectively perceived outcomes under varying contextual conditions.

3.3 Data Collection

Qualitative Data: Group Interviews

Qualitative data were collected through semi-structured group interviews conducted with each of the four PLCs after completion of the PLC phase. Group interviews were chosen to capture shared experiences and interactional perspectives on collaboration processes, as they allow participants to reflect jointly on collective practices and negotiate meanings within the group context (Kruse, 2014).

A semi-structured interview guide comprising six core questions addressed participants' acceptance of the PLC format, perceived added value, functionality, and overall satisfaction, as well as perceived benefits and challenges of participation. Particular attention was given to experiences related to professional practice and dealing with work-related challenges. The guide allowed for flexible probing to explore emerging topics in greater depth.

All interviews were conducted online via videoconference in German by members of the research team, audio-recorded, and transcribed verbatim according to established transcription rules (Kuckartz, 2010). Transcripts were anonymised prior to analysis. The interviews lasted on average 48 minutes.

Quantitative Data: Survey

Quantitative data were collected using online questionnaires administered before and after the PLC phase via LimeSurvey.

Pre-participation survey

The pre-participation survey captured background information on participants' professional biographies, training activities, and professional tasks (wb-personalmonitor). In addition, baseline indicators of professional resources and collaboration contexts were

assessed to contextualise existing working conditions prior to PLC participation. Professional resilience (as a personal resource) was measured using selected subscales from the AVEM instrument capturing work-related resilience (Schaarschmidt & Fischer, 2008), including distancing ability, resignation tendency, proactive coping, and inner calm/balance. Behavioural reflection and collaboration conditions were assessed using adapted instruments from the VERA framework and the Hessian School Quality Framework (Institut für Qualitätsentwicklung Hessen, 2013). Additional project-specific items captured prior experience in course development and components of course planning.

Post-participation survey

The post-participation survey focused on participants' perceptions of PLC participation. The same AVEM scales were administered to provide exploratory descriptive information on personal resources across the PLC phase. Professional self-efficacy was measured using the BSW-5-Rev scale. Behavioural reflection within the PLC context and collaboration experiences were assessed using adapted VERA (Helmke, 2015) and PISA-based cooperation scales (Frey et al., 2016; also Institut für Qualitätsentwicklung Hessen, 2013).

Project-specific items were developed to assess acceptance, satisfaction, and perceived usefulness of the PLC format, including perceived benefits for course development, reflection on professional challenges, perceived support in dealing with work-related demands, and perceived advantages of different PLC formats. Additional items captured satisfaction with supporting materials. Responses were recorded predominantly on four-point Likert-type scales, although some instruments (e. g., adapted VERA items assessing behavioural reflection) used six-point response formats.

All 13 participants completed both the pre- and post-participation surveys. Given the exploratory character of the study and the small sample size, quantitative data were analysed descriptively and primarily served to complement and contextualise qualitative findings.

3.4 Data Analysis

Qualitative Analysis

Qualitative data were analysed using focused qualitative content analysis following Kuckartz and Rädiker (2021). The analysis proceeded in two stages: an initial deductive basic coding based on the interview guide and research questions, followed by an inductive fine coding to further differentiate categories based on the interview material. The resulting coding system comprised eight main categories with ten subcategories.

Transcripts were coded using MAXQDA. To ensure intersubjective transparency, the coding framework was iteratively developed within the research team through pilot coding, mutual review, and discussion until consensus was reached. Two researchers conducted independent test codings, refined the coding guide, and subsequently coded the interviews separately while resolving discrepancies through discussion. The analy-

sis focused on participants' perceptions of collaboration processes, conditions influencing participation, and perceived benefits of PLC involvement.

Quantitative Analysis

Quantitative data were analysed using descriptive statistics, including means and standard deviations, as well as graphical representations (e. g., boxplots) to explore patterns across different PLC formats. Given the exploratory character of the study and the small sample size, analyses focused on descriptive comparisons rather than inferential statistical testing. Quantitative findings were used to complement and contextualise qualitative results and to provide exploratory insights into participants' perceptions of PLC participation, including acceptance, perceived usefulness, and perceived support for dealing with work-related demands.

4 Results

The results are organised according to the research questions. Qualitative interview data provide the primary basis for analysing participants' perceptions and collaboration processes, while quantitative survey data are used descriptively to contextualise and compare perceived outcomes across PLC formats.

4.1 Baseline Context: Existing Collaboration and Reflection Practices

Baseline data collected in addition to the qualitative interview data, provided contextual information on participants' professional practices prior to PLC participation. Overall, participants reported comparatively well-developed reflective practices related to their professional work. Many indicated that they regularly exchanged ideas with colleagues ($M = 4.08$, $SD = 1.12$), sought support when facing professional difficulties ($M = 4.15$, $SD = 0.90$), and used participant feedback to improve their course concepts ($M = 5.00$, $SD = 0.58$). These findings suggest that reflective engagement was already part of participants' professional routines before entering the PLCs.

At the same time, perceptions of collaboration conditions within existing work contexts were more heterogeneous. While some aspects of collegial cooperation were rated positively, indicators related to structured coordination and conflict management were assessed more moderately (e. g., clear agreements: $M = 2.92$, $SD = 0.49$; conflict management procedures: $M = 2.38$, $SD = 0.65$). This pattern indicates that participants operated in professional environments where opportunities for exchange were present but not necessarily systematically structured.

Taken together, the baseline data suggest that PLC participation did not introduce collaboration into previously isolated professional contexts but rather built upon already existing reflective orientations and collegial interactions while potentially providing more structured opportunities for exchange and coordination. This context is important for interpreting participants' subsequent perceptions of PLC participation.

4.2 Perceptions of PLC Participation (RQ1)

Participants' perceptions of PLC participation were overall positive. Across all PLCs, interview data indicated that participants perceived the structured exchange and collaborative reflection as professionally meaningful for generating new perspectives, refining ideas, and addressing work-related challenges. Regular meetings, a shared goal, and supporting materials were frequently described as contributing to focused and productive collaboration. Descriptive survey data contextualised these perceptions, indicating high perceived benefits for professional practice, particularly regarding course development and reflection on work-related demands and challenges (see Appendix, Table 1). Descriptive differences suggested somewhat stronger perceived benefits for course development in intra-organisational PLCs ($M = 4.86$, $SD = 0.38$) than in inter-organisational groups ($M = 3.83$, $SD = 0.41$), whereas perceived support for reflecting on work-related demands was rated positively in both formats (intra: $M = 4.43$, $SD = 0.54$; inter: $M = 4.17$, $SD = 0.41$). Continuation intentions were also strong, with participants expressing willingness to continue working in the existing constellation ($M = 2.92$, $SD = 0.28$ on a 3-point scale).

Some differences between PLC formats emerged. Participants in inter-organisational PLCs particularly emphasised networking opportunities and exposure to diverse perspectives, whereas participants in intra-organisational PLCs highlighted advantages related to shared organisational knowledge and easier coordination. Format preferences appeared linked to prior experience. Participants from inter-organisational PLCs, who had collaborated exclusively online, evaluated both online and face-to-face continuation options similarly positively, whereas participants from intra-organisational PLCs, who had worked primarily face-to-face, expressed clearer preferences for in-person continuation and more sceptical attitudes toward exclusively digital formats. This pattern corresponded with moderate overall preferences for exclusively online continuation ($M = 1.62$, $SD = 0.77$) compared with somewhat stronger preferences for face-to-face formats ($M = 2.54$, $SD = 0.66$).

Taken together, PLC participation was perceived as beneficial and feasible across implementation formats, while contextual factors such as group composition (intra- vs. inter-organisational) and interaction format (face-to-face vs. online) influenced participants' experiences and preferences.

4.3 Conditions Facilitating and Hindering Collaboration (RQ2)

Interview data identified several conditions influencing collaboration within the PLCs. These conditions could be differentiated into structural features of the PLC design, organisational conditions, implementation format characteristics, and individual engagement.

Participants across groups emphasised that *clearly structured working procedures* facilitated collaboration. In particular, the protocol forms and the shared goal of developing course concepts were perceived as helpful for maintaining focus and organising discussions. Several participants reported that the provided structure supported efficient collaboration and contributed to the quality of outcomes (e. g., PLC3). Small

group size (three to four members) was also described as conducive to participation and coordination. At the same time, variation in the use of structural tools represented a potential hindering condition. One group reported limited engagement with the protocol forms, which was associated with less structured collaboration processes compared to other PLCs (PLC2), indicating that the effectiveness of structural supports depended on participants' uptake.

Organisational support emerged as a central condition influencing collaboration. Participants repeatedly emphasised that sustainable continuation of PLCs would depend on institutional recognition and the possibility of participation during working hours. Descriptive survey data further contextualised this interpretation: participants strongly preferred continuing PLC participation during working time ($M = 2.92$, $SD = 0.28$) and showed very low willingness to continue outside working hours ($M = 1.15$, $SD = 0.38$). Interview statements further highlighted that organisational approval was perceived as essential:

"There would need to be supervisors who know what a professional learning community is… and give the go that you may do it during working hours" (PLC4).

Time constraints related to workload and scheduling were also described as challenges when organisational demands competed with PLC participation (e. g., PLC1). Organisational conditions therefore functioned both as facilitating and hindering factors depending on available time resources and institutional support.

Implementation format also influenced collaboration processes. Participants in inter-organisational PLCs described initial challenges in building familiarity and trust, particularly in digital settings with limited opportunities for informal interaction. At the same time, digital collaboration was perceived as enabling focused work and reducing travel effort (PLC3). Participants in intra-organisational PLCs emphasised advantages related to shared organisational knowledge and easier coordination but reported fewer opportunities for new external perspectives. Overall, format characteristics created different opportunities and constraints rather than uniformly facilitating or hindering collaboration.

Individual engagement and motivation were also described as relevant conditions. Participants noted that sustained collaboration depended on members' commitment and willingness to invest time and effort, particularly beyond project conditions, indicating that personal engagement interacted with organisational support in shaping collaboration feasibility (e. g., PLC1, PLC2).

Overall, collaboration within PLCs was shaped by an interplay of PLC design features, organisational conditions, implementation format characteristics, and individual engagement. Clear working structures and institutional support facilitated collaboration, whereas limited time resources, coordination challenges, and insufficient organisational recognition represented potential barriers.

4.4 Perceived Benefits for Professional Practice and Personal Resources (RQ3)

Qualitative findings indicated that participants perceived PLC participation as beneficial for their professional practice, particularly through the combination of collaborative task work and structured reflection on work-related demands and challenges. Descriptive survey data further contextualised these perceptions, indicating positive evaluations of the protocol materials as supporting meeting structure and reflection (e. g., maintaining focus on goals: $M = 4.23$, $SD = 0.73$; structuring meetings: $M = 4.00$, $SD = 0.71$).

Interview data further illustrated that working on a shared, practice-relevant task – developing course concepts intended for actual programme implementation – was experienced as motivating and meaningful. At the same time, the structured reflection component of the PLC meetings encouraged participants to jointly examine professional challenges and established routines. Several participants described that this reflective dimension represented a particularly valuable impulse that they intended to integrate into their everyday professional practice beyond the PLC meetings (e. g., PLC3, PLC4). The combination of joint product-oriented work and systematic reflection was therefore perceived as supporting reconsideration of existing practices and the development of new approaches relevant to participants' professional work.

Regarding personal resources, quantitative indicators suggested moderate perceived effects. Participants reported moderate agreement that PLC participation strengthened their professional resilience ($M = 2.77$, $SD = 0.73$ on a 4-point scale). Descriptive post-measures of work-related resilience and self-efficacy were generally at comparatively high levels (e. g., self-efficacy: $M = 3.31$, $SD = 0.40$ on a 4-point scale), with no consistent differences across PLC formats. Interview data suggested that more substantial effects on personal resources might require longer collaboration periods, as some participants noted that the relatively short PLC phase limited the extent to which changes in coping capacity could emerge. Given the exploratory design and absence of pre–post analyses, these findings should therefore be interpreted cautiously and primarily reflect participants' subjective perceptions rather than measurable change.

Taken together, the results suggest that PLC participation was perceived as particularly beneficial for professional practice through structured collaborative reflection processes, while perceived effects on personal resources such as professional resilience appeared more moderate within the comparatively short implementation period.

5 Discussion

The findings indicate that PLC participation was perceived positively and as professionally meaningful across different implementation formats. Collaboration processes were shaped by an interplay of PLC design features, organisational conditions, implementation characteristics, and individual engagement, highlighting that the perceived

effectiveness of collaborative professional learning depends not only on the format itself but also on how it is embedded in participants' work contexts.

Although the study was situated within Catholic adult and family education in Germany, several identified conditions – such as fragmented employment structures, limited opportunities for collegial exchange, and heterogeneous organisational affiliations – correspond to broader characteristics of the AE/CE sector. At the same time, the specific denominational and organisational context may have shaped participants' experiences, for example through existing organisational cultures, cooperation routines, or support structures. The findings should therefore be understood as context-sensitive exploratory evidence rather than as directly generalisable results.

The positive evaluations suggest that PLCs represent a transferable collaborative format for AE/CE despite structural differences from school contexts. Previous adult education research has primarily addressed PLCs conceptually and identified organisational and motivational prerequisites for implementation (Hahnrath & Herbrechter, 2022). The present findings extend this literature by providing initial empirical insights from implemented PLCs and indicate that structured collaboration can be perceived as both feasible and professionally meaningful in AE/CE practice.

Several findings correspond closely with conditions identified in school-based PLC research. First, structural features – such as small group size, clear working procedures, and shared task orientation – were perceived as facilitating collaboration. This aligns with evidence emphasising the importance of transparent processes, task-related goals, and stable team structures for effective PLC functioning (Bonsen et al., 2013; Buhren, 2015; Verbiest, 2011). Second, organisational conditions emerged as critical, particularly the availability of time resources and participation during working hours. This finding corresponds with research identifying infrastructural support as a key prerequisite for collaborative professional learning (Bolam et al., 2005; Zhang et al., 2017) and reinforces conclusions that institutional embedding strongly influences collaboration sustainability (Fussangel & Gräsel, 2014; Hahnrath & Herbrechter, 2022). The strong preference for participation during working time suggests that collaboration is perceived as an organisationally supported professional activity rather than an individual responsibility.

With regard to implementation formats, only minor differences in perceived benefits emerged. Participants across both intra- and inter-organisational PLCs reported comparable advantages related to collaboration and reflection, with only a slight overall preference for face-to-face interaction. Preferences appeared linked to participants' prior experience with specific formats rather than indicating superiority of one mode. This pattern suggests that the PLC approach is flexible across digital and face-to-face settings as well as within and across organisational boundaries, consistent with the diversity of formats examined in previous PLC research (Vangrieken et al., 2015).

At the same time, the findings indicate that PLC composition may influence the functional emphasis of collaboration. In intra-organisational PLCs, collaboration was more closely connected to shared organisational contexts and routines, suggesting benefits for both individual and organisational learning processes, consistent with theoreti-

cal perspectives on learning organisations (Senge, 1990). Inter-organisational PLCs, by contrast, were more strongly associated with networking opportunities and exposure to diverse perspectives, which may be particularly relevant in AE/CE contexts characterised by fragmented employment structures and limited opportunities for stable collegial networks. Across both constellations collaborative task work and structured reflection were perceived as equally important, indicating that reflection represents a core mechanism of PLC functioning independent of organisational composition.

A central contribution of the present study concerns the perceived benefits for professional practice. Participants described the combination of collaborative task work and structured reflection on work-related demands as particularly meaningful. Working on a shared, practice-relevant task while simultaneously engaging in guided reflection was perceived as motivating and supporting for reconsidering established routines. This pattern is consistent with theoretical perspectives on situated and organisational learning, which emphasise practice-related activity and collective reflection as mechanisms of professional learning (Lave & Wenger, 1991; Senge, 1990). The intention to transfer reflective practices into everyday work suggests that PLC participation may contribute to longer-term changes in professional routines beyond the immediate collaboration context.

At the same time, the findings indicate that PLCs may function not only as formats for collaborative professional learning but also as protected spaces of collegial reflection that temporarily counteract the fragmentation associated with dispersed professional interaction in AE/CE contexts (Koller, 2026). In this sense, PLCs create structured and institutionally legitimised opportunities for interaction that reduce coordination uncertainty and enable focused engagement with professional issues.

Perceived effects on personal resources related to coping with work-related demands were more moderate. This finding may reflect both the relatively short duration of the PLC phase and the comparatively high baseline levels of reflective engagement within the sample. From a relational perspective on resilience, however, qualitative data indicate that collaborative reflection and collegial support were perceived as potentially relevant for strengthening coping capacities, suggesting that more substantial developments may require longer implementation periods (Gu & Day, 2007; Le Cornu, 2009).

Limitations

Several limitations should be considered when interpreting the findings. First, the small sample size limits generalisability and precludes inferential statistical analyses. The exploratory design therefore provides initial insights into participants' perceptions rather than evidence of causal effects. Second, participation was voluntary, and baseline data indicated comparatively well-developed reflective practices among participants, suggesting a possible selection bias toward individuals already inclined toward collaborative and reflective professional learning. Third, the PLC phase covered a relatively short period, which may have constrained more substantial developments, particularly regarding personal resources for coping with work-related demands. Relational

perspectives on professional learning and resilience suggest that such developments typically unfold over longer periods of collaborative interaction, indicating the need for longitudinal research designs. Fourth, the sample consisted predominantly of permanently employed pedagogical staff, whereas freelancers and part-time instructors represent a substantial proportion of the AE/CE workforce. Teaching staff with loose organisational affiliation often lack stable collegial structures that provide regular opportunities for professional exchange and reflection. Collaborative formats such as PLCs may therefore be particularly relevant for these groups. Future studies should examine PLC implementation more systematically with samples that include a larger proportion of freelance and marginally employed teaching staff. Finally, the study focused on participants' subjective perceptions rather than objective changes in professional practice or organisational outcomes. Future research should therefore combine longitudinal and multi-method approaches to examine behavioural and organisational effects of PLC participation more comprehensively.

Implications

The findings have several implications for future research and professional practice in AE/CE. From a research perspective, the results suggest that PLC implementation in AE/CE represents a promising field for further investigation, particularly with regard to contextual and organisational conditions. Future studies should examine longer implementation periods, larger and more diverse samples – including freelance and loosely affiliated teaching staff – and potential outcome indicators beyond self-reported perceptions, such as behavioural changes and organisational developments. Given the importance of institutional support identified in the present study, multi-level designs that consider both individual and organisational factors may provide deeper insights into the mechanisms and sustainability of collaborative professional learning in AE/CE contexts. From a practice perspective, the findings indicate that PLCs may represent a feasible approach for strengthening collegial exchange, professional reflection, and networking opportunities in AE/CE, particularly when structural conditions such as protected time and organisational recognition are ensured. At the same time, the results suggest that successful implementation depends not only on participants' engagement but also on organisational readiness to integrate collaborative formats into existing working conditions. This appears especially relevant in AE/CE contexts characterised by heterogeneous employment arrangements and limited opportunities for stable collegial interaction. The flexibility of the PLC framework across organisational compositions and interaction formats indicates that collaborative structures can be adapted to diverse institutional contexts, provided that sufficient organisational support and resources are available.

6 Conclusion

This exploratory study provides initial empirical insights into the implementation of PLCs in AE/CE contexts. The findings suggest that PLC participation is perceived as feasible and professionally meaningful across different organisational compositions and interaction formats when supported by clear working structures and institutional conditions. In particular, the combination of joint task-oriented work and structured reflection on work-related demands emerged as a central mechanism supporting professional practice. At the same time, the results highlight the importance of organisational embedding, as sustainable collaboration appeared closely linked to time resources, institutional recognition, and opportunities for collegial exchange in fragmented employment contexts. Overall, the study indicates that PLCs represent a promising but context-dependent approach to strengthening collaborative professional learning in AE/CE.

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Appendix

Table 1: Perceived usefulness and continuation intentions of PLC participation

Variable	*Total Sample* (*N* = 13) *M* (*SD*)	*Intra-organisational PLCs* (n = 7) *M* (*SD*)	*Inter-organisational PLCs* (n = 6) *M* (*SD*)	*Scale*
Perceived benefit for course development		4.86 (0.38)	3.83 (0.41)	1–5
Perceived benefit for reflection on work-related demands and challenges	4.43 (0.54) / 4.17 (0.41)	4.43 (0.54)	4.17 (0.41)	1–5
Continuation in same constellation	2.92 (0.28)	2.86 (0.38)	3.00 (0.00)	1–3
Continuation in another constellation	2.38 (0.77)	2.43 (0.79)	2.33 (0.82)	1–3
Continuation during working time	2.92 (0.28)	2.86 (0.38)	3.00 (0.00)	1–3
Continuation outside working time	1.15 (0.38)	1.29 (0.49)	1.00 (0.00)	1–3
Preference online only	1.62 (0.77)	1.14 (0.38)	2.17 (0.75)	1–3
Preference face-to-face only	2.54 (0.66)	2.86 (0.38)	2.17 (0.75)	1–3

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