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Communities of practice, teacher professional development and open educational resources in primary education (grades 1–6): a systematic review of the literature

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 19 October 2026 and was last updated on 19 October 2026.

INTRODUCTION

Review question / Objective Main question. How is participation in communities of practice related to the professional development of teachers at ISCED level 1, or international equivalents, and to what extent and in what ways are open educational resources (OER) present in these communities?

Secondary questions:

1. How are the communities of practice under study characterised (origin, purpose, members, mode, duration, facilitation and activities)?
2. What processes of collaboration and professional learning are described (for example, negotiation of meaning, joint enterprise, shared repertoire, reflection on practice and inquiry into practice)?
3. What changes in teachers' knowledge, beliefs, professional identity and pedagogical practices are

reported, and what types of evidence do they rest on?

4. Which individual, community, organisational and education-system conditions facilitate or hinder participation and professional development?

5. In what proportion of the included studies are OER documented, with what status and through what practices of creation, adaptation, sharing or use?

Objective. To identify, critically appraise and synthesise qualitative, quantitative and mixed-methods empirical evidence on the relationship between the participation of ISCED level 1 teachers in communities of practice and their professional development, and to analyse the place of OER in these communities.

Framework. The question follows the PICOS framework adapted to educational research: Population (practising teachers of grades 1 to 6); phenomenon of Interest/exposure (participation in

communities of practice); Comparator (not required); Outcomes (processes and outcomes of teacher professional development); Study design (qualitative, quantitative and mixed-methods empirical studies). Details are given in the sections “Participants/population”, “Intervention”, “Comparator”, “Study designs to be included” and “Eligibility criteria”.

Rationale Teacher professional development tends to have greater impact when it is sustained, active, coherent with teachers’ work and collective (Desimone, 2009). Communities of practice theory (Lave & Wenger, 1991; Wenger, 1998) frames professional learning as participation in a shared practice and has been widely used to study teacher collaboration.

Existing reviews address related topics but with different scopes: the impact of professional learning communities across levels of schooling (Vescio et al., 2008), teacher collaboration in general (Vangrieken et al., 2015), informal online communities and networks (Macià & García, 2016) and twenty years of online teacher communities (Lantz-Andersson et al., 2018).

Searches carried out in INPLASY (16 searches), OSF Registries and ERIC in October 2026 did not identify any completed or ongoing systematic review that brings together communities of practice of teachers in the first six years of schooling, professional development and open educational resources (OER).

Among related work, Olmo-Extremera et al. (2024) carried out a systematic review of the leadership characteristics that support the sustainability of professional learning communities in elementary education. Sadruddin (2022), in a semi-systematic review, examined the opportunities and challenges of OER in learning communities, including collaboration, accessibility and open educational practices. Although they address relevant dimensions, neither review focuses on the relationship between the participation of teachers in the first six years of schooling in communities of practice, their professional development and the use of OER.

This review therefore differs in four respects: it uses the concept of community of practice, it is limited to ISCED level 1 (grades 1 to 6), it includes qualitative, quantitative and mixed-methods studies, and it analyses the presence and use of OER.

ISCED level 1 (International Standard Classification of Education), corresponding to primary education, covers a fundamental stage of schooling whose duration and pedagogical organisation vary across education systems (UNESCO Institute for Statistics, 2012). Different ways of organising

teachers’ work, notably the predominance of generalist teachers or the distribution of teaching by subject area, may influence opportunities for collaboration, curricular articulation and the development of communities of practice. In this context, analysing communities of practice of ISCED 1 teachers makes it possible to consider different educational realities from an international perspective. The review is part of a doctoral project on hybrid sharing communities and will inform its conceptual and methodological choices. Open educational resources (OER) are teaching, learning and research materials, in any format and medium, that are in the public domain or released under an open licence that allows free access, reuse, adaptation and redistribution (UNESCO, 2019). The UNESCO Recommendation frames OER within a perspective of sharing and collaboration, while communities of practice, in Wenger’s (1998) conceptualisation, develop a shared repertoire of resources. It is not known, however, to what extent research on communities of practice of ISCED 1 teachers documents the use, creation, adaptation or sharing of explicitly open resources. The review therefore does not require the presence of OER as an inclusion criterion but codes their presence in the included studies, which makes it possible to characterize how they are represented in this literature and to identify possible research gaps.

Condition being studied Community of practice. Communities of practice are groups of people who share a concern, a set of problems or enthusiasm for a subject and who build their knowledge and skills in that area through sustained interaction (Wenger et al., 2002, p. 4). They are structured around three elements: domain, community and practice (Wenger, 1998).

Operational definition. A group of practising teachers will be considered a community of practice when it:

- (a) shares a common professional domain;
- (b) interacts regularly over time, beyond an isolated event. Continuity will be assessed from the duration, frequency and regularity of the reported activities, distinguishing communities with sustained activity from isolated training events; the criteria used in this assessment will be recorded explicitly; and
- (c) develops a shared practice or repertoire (for example, lesson plans, strategies, case discussions, materials).

Groups described by the authors as communities of practice will be included, as well as groups with other designations (professional learning communities, teacher networks, online

communities, lesson study or collaborative inquiry groups) that meet the three criteria.

Teacher professional development. Processes and outcomes of teachers' professional learning, analysed through the Interconnected Model of Professional Growth (Clarke & Hollingsworth, 2002): personal domain (knowledge, beliefs, attitudes), domain of practice (professional experimentation), domain of consequence (salient outcomes, including student learning when reported) and external domain (sources of information and stimulus).

Open educational resources. The UNESCO (2019) definition is followed. A resource will be coded as OER only when the study identifies it as such or indicates an open licence or public domain status; resources that are free or shared without this information will be coded separately. Practices with OER will be described through the 5R activities: retain, reuse, revise, remix and redistribute (Wiley, 2014).

METHODS

Search strategy Strategy. The main search combines four blocks with AND: (1) communities of practice and related designations; (2) teachers; (3) professional development/learning and practice; (4) primary education level. OER are not a block of the main search, so that their absence from this literature can be observed. A supplementary search combines OER terms with terms for communities, teachers and education level, so that communities related to OER are not missed. Results will be pooled and deduplicated. Terms are searched in title, abstract and keywords, and ERIC descriptors are searched automatically in ERIC. Before execution, the strategy will be checked for its ability to retrieve a test set made up of key studies identified in similar reviews, comparing results with and without blocks 3 and 4. Strategies, dates and records will be reported according to PRISMA-S (Rethlefsen et al., 2021).

Scopus:

TITLE-ABS-KEY("community of practice" OR "professional learning community" OR "teacher community" OR "online community" OR "virtual community" OR "hybrid community" OR "blended community" OR "learning community" OR "teacher network" OR "collaborative inquiry")

AND TITLE-ABS-KEY(teacher OR educator OR "teaching staff")

AND TITLE-ABS-KEY("professional development" OR "professional learning" OR "teacher learning" OR "teacher development" OR "teacher growth" OR "teacher change" OR "teaching practice" OR "instructional practice" OR "pedagogical practice" OR "classroom practice" OR "teacher identity")

AND TITLE-ABS-KEY("primary school" OR "primary education" OR "primary teacher" OR "primary level" OR "elementary school" OR "elementary education" OR "elementary teacher" OR "basic education" OR "ISCED 1" OR "grade 1" OR "grade 2" OR "grade 3" OR "grade 4" OR "grade 5" OR "grade 6" OR "first grade" OR "second grade" OR "third grade" OR "fourth grade" OR "fifth grade" OR "sixth grade" OR "K-6" OR "upper primary" OR "lower primary")

AND PUBYEAR > 2014 AND (LIMIT-TO(DOCTYPE,"ar")) AND (LIMIT-TO(LANGUAGE,"English") OR LIMIT-TO(LANGUAGE,"Portuguese") OR LIMIT-TO(LANGUAGE,"Spanish") OR LIMIT-TO(LANGUAGE,"French"))

ERIC (eric.ed.gov; truncation is not available, so singular and plural forms are given; terms without a field specification search title, abstract, descriptors, author and source):

("community of practice" OR "communities of practice" OR "professional learning community" OR "professional learning communities" OR "teacher community" OR "teacher communities" OR "online community" OR "online communities" OR "virtual community" OR "virtual communities" OR "hybrid community" OR "blended community" OR "learning community" OR "learning communities" OR "teacher networks" OR "collaborative inquiry")

AND ("professional development" OR "professional learning" OR "teacher learning" OR "teacher development" OR "teacher change" OR "faculty development" OR "teaching practice" OR "teaching practices" OR "pedagogical practice" OR "pedagogical practices")

AND ("primary school" OR "primary schools" OR "primary teacher" OR "primary teachers" OR "primary education" OR "elementary school" OR "elementary schools" OR "elementary teacher" OR "elementary teachers" OR "elementary education" OR "basic education" OR "intermediate grades" OR "grade 1" OR "grade 2" OR "grade 3" OR "grade 4" OR "grade 5" OR "grade 6" OR "first grade" OR "second grade" OR "third grade" OR "fourth grade" OR "fifth grade" OR "sixth grade" OR "K-6")

Filters: peer-reviewed only; publication type: journal articles; publication date: from 2007, with records published before 2015 removed manually and their number reported.

Supplementary OER search (Scopus; adapted to the other databases):

TITLE-ABS-KEY("open educational resource" OR "open educational practice" OR "open content" OR "openly licensed" OR "creative commons" OR "recursos educativos abiertos" OR "recursos educativos abiertos") AND TITLE-ABS-

KEY("community of practice" OR "professional learning community" OR "teacher community" OR "online community" OR "learning community" OR "teacher network" OR collaboration OR sharing) AND TITLE-ABS-KEY(teacher OR educator) AND TITLE-ABS-KEY("primary school" OR "primary education" OR "primary teacher" OR "elementary school" OR "elementary education" OR "elementary teacher" OR "basic education" OR "K-12" OR "K-6" OR "school education") AND PUBYEAR > 2014 AND (LIMIT-TO(DOCTYPE,"ar")) AND (LIMIT-TO(LANGUAGE,"English") OR LIMIT-TO(LANGUAGE,"Portuguese") OR LIMIT-TO(LANGUAGE,"Spanish") OR LIMIT-TO(LANGUAGE,"French"))

The inclusion and exclusion criteria for studies centered on OER are set out in the section "Eligibility criteria".

Participant or population Practising teachers (generalist or subject teachers) in the first six years of formal schooling: grades 1 to 6, corresponding to the first and second cycles of basic education in Portugal (ISCED 1; Eurydice, 2026; UNESCO Institute for Statistics, 2021), or to equivalent levels in other education systems, usually covering pupils aged 6 to 12.

International equivalence. Equivalence will be determined by years of schooling and pupils' ages, and not only by the name of the level ("primary", "elementary", "basic"). Studies with teachers of grades 1 to 6 are eligible, including grade 6 teachers when this grade belongs administratively to another level (for example, middle school). Pre-primary education (kindergarten) is not eligible. For each study, the country, the name of the level, the grades covered and the corresponding ISCED level will be recorded. In case of doubt, the UNESCO ISCED mappings will be consulted and the reasoning for the decision documented. When grades are not reported, studies described as primary or elementary will be included if there is no indication of teachers from grade 7 onwards, and will be coded as "grades not reported".

Mixed samples. Studies with teachers from several levels will be included if the data for grade 1 to 6 teachers can be identified; this also applies to samples that include early childhood educators. Other participants (school leaders, coordinators, teacher educators, researchers) may be part of the community, but only data on teachers will be extracted.

- Exclusions. Studies exclusively with pre-service teachers in initial teacher education or with teachers from levels other than ISCED 1, namely pre-primary education (ISCED 0), secondary education or higher education. Studies with participants from different educational levels will be

excluded when the results for ISCED 1 teachers cannot be identified.

- Studies centred exclusively on open educational resources (OER), namely on their production, provision, use, licensing or organisation in repositories, with no explicit link to communities of practice and teacher professional development.

- Works without an empirical dimension, namely theoretical essays, opinion articles, editorials, conceptual texts and literature reviews that do not present original empirical data.

- Publications in languages other than Portuguese, English, Spanish or French.

Intervention The phenomenon of interest is teachers' participation in communities of practice that meet the operational definition in the section "Condition being studied". A standardised intervention is not required.

Communities of any origin are eligible: formally organised by schools, school clusters, universities, teacher training centres or education authorities, or informal and initiated by teachers themselves. They may be face-to-face, online or hybrid, in any curricular area, and must last longer than an isolated event.

Professional development programmes that include a community component (for example, accredited training with an online community, or professional coaching combined with collaborative groups) are eligible, provided that this component can be identified and is analysed in the study.

Comparator Not applicable. The review does not assess the comparative effectiveness of an intervention, so a comparator is not required. Studies with a comparison group (for example, teachers who do not take part in a community, or professional development without a community component) will be included if they meet all other criteria, and the comparator will be recorded.

Study designs to be included Primary empirical studies with systematic data collection and analysis: qualitative (case study, ethnography, phenomenology, action research, participatory action research, design-based research), quantitative (experimental, quasi-experimental, pre-post, cross-sectional survey, social network analysis) and mixed methods. Excluded: theoretical texts, editorials, opinion articles, practice accounts without systematic data, protocols and reviews (reviews used only to check reference lists).

Eligibility criteria Inclusion criteria (PICOS):

Population: practising teachers of grades 1 to 6 (first and second cycles of basic education in

Portugal, ISCED 1 and international equivalents; section “Participants/population”).

Phenomenon of interest/exposure: participation in communities of practice that meet the operational definition (section “Condition being studied”), face-to-face, online or hybrid, formal or informal (section “Intervention”). Studies centred on OER are eligible when they meet the operational definition of a community of practice and analyse professional development.

Comparator: not required; recorded when present (section “Comparator”).

Outcomes: processes and/or outcomes of teacher professional development (section “Main outcome(s)").

Study design: qualitative, quantitative or mixed-methods empirical studies (section “Study designs to be included”).

Exclusion criteria:

Population: only pre-service teachers in initial teacher education; only pre-primary teachers; only teachers from grade 7 onwards; mixed samples without separable data.

Phenomenon: isolated training events; collaboration without continuity, shared domain or shared practice; studies only on repositories, licensing or production of OER, without analysis of the community or of professional development.

Outcomes: studies that only describe platforms, materials or participation, without analysing learning or professional development.

Design: theoretical texts, editorials, opinion articles, practice accounts without systematic data collection, protocols and reviews.

Additional criteria:

Period: published from 1 January 2015 to the date of the search. Justification: the last decade, a period of expansion of online and hybrid teacher communities, and feasibility for a small team.

Languages: Portuguese, English, Spanish and French (section “Language restriction”).

Publication type: only articles published in peer-reviewed journals, as a first level of scientific scrutiny and for reasons of feasibility; theses, conference proceedings and abstracts are excluded.

Full text: lack of immediate access to the full text is not a reason for exclusion. Texts not available through b-on or in open access will be requested from the university library through the interlibrary loan service, in a single batch, immediately after title and abstract screening. Articles not obtained by 30 November 2026 will be recorded as “not retrieved”, listed separately and shown in the PRISMA flow diagram. Study authors will not be contacted.

Multiple publications and overlapping samples. Publications from the same study will be grouped

and treated as a single study; the most complete report will be the main source and the others will complement data extraction. Overlapping samples will be identified by authors, context, dates and sample size, to avoid double counting.

Uncertain eligibility. Doubtful records will be marked as “maybe” and reassessed at full-text reading. If doubt persists after full-text reading and any supplementary material, the study will be excluded and the reason recorded. Any change to the criteria after screening has started will be dated, justified and reported as a protocol amendment.

Information sources Electronic databases and rationale:

1. Scopus: a large multidisciplinary database with broad international coverage of peer-reviewed education journals, including journals published outside the English-speaking world.
2. ERIC (eric.ed.gov): the main database specialised in education, with a controlled vocabulary (ERIC descriptors) and a peer-review filter; access is free, which supports reproducibility of the search.

Web of Science was not included because of its high overlap with Scopus for education journals.

Complementary search: retrospective citation searching in the reference lists of the included studies and of the relevant reviews identified at screening or cited in the section “Rationale”. Prospective citation searching will not be carried out.

Coverage: from 1 January 2015 to the date of the search. Searches are planned for the end of October 2026, after registration; the exact date of each search will be reported. Searches will be repeated before publication only if more than 12 months have passed since they were run.

Excluded sources: study authors will not be contacted. Grey literature, trial registers and handsearching of journals will not be included, since only peer-reviewed journal articles are eligible (section “Eligibility criteria”).

Records from all sources will be exported to Zotero, where duplicates, including repository and journal versions of the same article, will be identified and merged before screening (section “Data management”).

Main outcome(s) The main outcomes correspond to secondary questions 2, 3 and 5 and are organized in three dimensions:

1. Professional learning processes in the community: forms of collaboration, negotiation of meaning, reflection, experimentation and inquiry into practice, construction of a shared repertoire and trajectories of participation.

2. Professional development outcomes, coded according to the domains of the Interconnected Model of Professional Growth (Clarke & Hollingsworth, 2002): (a) personal domain: knowledge, beliefs, attitudes, self-efficacy and professional identity; (b) domain of practice: changes in pedagogical practices; (c) domain of consequence: reported outcomes, including student learning, when available. Relationships between domains reported by the studies will also be recorded.

3. Resources and open educational resources (OER): characterisation of the resources created, used or shared in the communities, considering:

(a) types of resources;

(b) status of the resources: OER explicitly identified or with an open licence; free resources with no licence stated; closed or proprietary resources; not reported;

(c) 5R practices identified: retain, reuse, revise, remix and redistribute (Wiley, 2014);

(d) platforms or repositories used;

(e) reported relationships between OER and teacher professional development.

The category “not reported” applies to resources that are mentioned without information on access or licensing, and its frequency will be considered in the synthesis.

Data to be extracted. For qualitative studies: the authors’ findings and interpretations (themes, categories) and the participant quotations that support them, with page numbers. For quantitative studies: the outcome measure, the effect measure reported by the authors, its direction and, when reported, statistical significance; effect sizes will not be calculated, as no meta-analysis is planned. For each outcome, the following will also be recorded: type of evidence (for example, self-report or observation), instrument and time of data collection (during participation, at the end or at follow-up, with the interval indicated).

Additional outcome(s) The additional outcomes correspond to secondary questions 1 and 4:

1. Characteristics of the communities (question 1): origin (formal or teacher-initiated), purpose, composition (generalist or subject teachers, grades covered, other members), size, mode (face-to-face, online, hybrid), technologies used, duration and frequency of interaction.

2. Facilitation and leadership: the role of facilitators, coordinators, teacher educators or researchers, and the distribution of leadership among members.

3. Enabling conditions and barriers (question 4) at four levels: individual (for example, motivation, time, digital skills), community (for example, trust, shared goals), organisational (school or cluster

leadership, timetables, resources) and education system (policies, recognition of professional development, career incentives).

4. Sustainability of the community after the end of the project or funding, when reported.

Data management Team and roles. Searches, screening, data extraction and quality assessment will be carried out by the first author (ASC). The co-authors will supervise the review and revise the final manuscript. Because all selection, extraction and assessment decisions will be made by a single reviewer, this will be reported as a limitation; the verification procedures below are intended to reduce this risk.

Reference management. Records from each database will be exported to Zotero, where duplicates will be identified and merged, and then exported to a structured Excel file with unique identifiers and predefined decision categories for screening.

Study selection. The eligibility criteria will be tested in a pilot with 25 records. Title and abstract screening will be carried out in Excel using predefined decision columns (“include”, “exclude” or “maybe”), and uncertain records will be kept for full-text assessment. All potentially eligible studies will move on to full-text reading. Reasons for exclusion after full-text reading will be recorded in a fixed order (population, phenomenon, outcomes, study design, publication type, language, period), and the process will be shown in a PRISMA 2020 flow diagram (Page et al., 2021).

Data extraction. A predefined Excel form, tested on three studies, will collect study characteristics (authors, year, country, grades, design, sample) and the data described in the sections “Main outcome(s)” and “Additional outcome(s)”. At the end, ASC will check a random sample of 20% of the studies again against the original articles and correct any discrepancies.

Missing information. Study authors will not be contacted; only published information and supplementary material will be used. Missing information will be coded as “not reported”. For OER, missing information is in itself a finding (section “Strategy for data synthesis”).

Decision log. All decisions, doubtful cases and amendments will be recorded in a dated log.

Storage and sharing. Data will be stored in Universidade Aberta’s institutional space, with a backup copy. After publication, the executed search strategies, the extraction form, the extracted data and the list of excluded studies will be shared in open access on Zenodo, with a DOI.

Artificial intelligence. AI tools may be used only for language editing, with verification by the authors, and their use will be declared in the article.

Quality assessment / Risk of bias analysis

Assessment tool. The methodological quality of the included studies will be assessed with the Mixed Methods Appraisal Tool (MMAT), version 2018 (Hong et al., 2018). For each study, the two screening questions will be answered (studies rated “no” on either will be reassessed for eligibility) and the five criteria of the relevant methodological category will be rated “yes”, “no” or “can’t tell”. For mixed-methods studies, the relevant qualitative and quantitative criteria will also be applied to each component, as recommended by the MMAT.

Procedure. The assessment will be carried out by the first author after a pilot with three studies. To check consistency, a random sample of 20% of the studies will be reassessed by the same reviewer at least two weeks later, without consulting the previous ratings; discrepancies will be discussed and justified in the decision log.

Use of the results. Following MMAT guidance, no overall quality score will be calculated; results will be presented criterion by criterion for each study. Quality will not be a reason for exclusion but will be taken into account when interpreting the results. For the sensitivity analysis (section “Sensitivity analysis”), a study will be flagged as having important methodological limitations if it is rated “no” on a criterion defined, before assessment, as critical for its category: qualitative, 1.3 (findings adequately derived from the data) or 1.4 (interpretation sufficiently substantiated by the data); randomised controlled trials, 2.1 (randomisation appropriately performed); non-randomised, 3.4 (confounders accounted for in the design and analysis); quantitative descriptive, 4.3 (appropriate measurements); mixed methods, 5.5 (components adhere to the quality criteria of each tradition) or a critical criterion of its qualitative or quantitative component. Ratings of “can’t tell” will not trigger this flag but will be reported.

Confidence in the evidence. Confidence in the review’s conclusions will be assessed descriptively, considering the number of studies supporting each conclusion, their methodological limitations (MMAT), the coherence of results across studies and the type of evidence. Conclusions based mainly on participants’ perceptions will be distinguished from those supported by observation, document analysis or other sources. A formal grading system (for example, GRADE-CERQual) will not be used, for reasons of feasibility.

Publication and selection bias. Including only articles from peer-reviewed journals and restricting languages to Portuguese, English, Spanish and French may introduce publication and selection bias. These limitations will be taken into account

when interpreting the results and discussed in the review.

Strategy of data synthesis The synthesis will follow the segregated convergent approach for mixed-methods systematic reviews (Stern et al., 2020): qualitative and quantitative evidence will be synthesised separately and then integrated. It has five components, carried out in Excel, Word and MAXQDA.

1. Descriptive overview. The characteristics of the included studies (country, grades, design, community characteristics, MMAT ratings) will be summarised in tables and simple counts.

2. Qualitative synthesis. Thematic synthesis (Thomas & Harden, 2008) in three stages: (a) coding of each study’s findings; (b) grouping of codes into descriptive themes; (c) development of analytical themes that answer the review questions. Coding will start from the three elements of communities of practice (Wenger, 1998) and the domains of the Interconnected Model of Professional Growth (Clarke & Hollingsworth, 2002), while allowing new codes to emerge. The code list and coding decisions will be recorded in the log. Changes documented by more than one source of evidence will carry greater weight in the synthesis, without excluding evidence based on perceptions.

3. Quantitative synthesis. Structured narrative synthesis following the applicable items of SWiM (Campbell et al., 2020). Studies will be grouped by outcome domain (section “Main outcome(s)”) and presented in tables with design, measure and direction of the reported effect. When effect measures are not comparable, results will be summarised by vote counting based on direction of effect, as permitted by SWiM, without inferring the magnitude of effects. No meta-analysis is planned, given the expected heterogeneity of designs, communities and measures.

4. OER synthesis. (a) Number and percentage of included studies in each resource status category (section “Main outcome(s)”), overall and by community mode, with the distribution of studies by year of publication; (b) thematic synthesis of the relationships between OER and professional development in the studies that document them. If few studies, or none, explicitly identify OER, this will be interpreted as a possible gap in the documentation or study of these resources in communities of practice, and not as evidence that OER are absent from teachers’ practices or have no effect on professional development.

5. Integration. The qualitative and quantitative syntheses will be juxtaposed in an integration matrix organised by review question, identifying where findings converge, complement each other

or diverge. Divergences will be analysed in light of study design, community characteristics and methodological quality.

Subgroup analysis If the data allow, a descriptive and exploratory comparison will be made by community mode (face-to-face, online, hybrid), as coded in the section “Additional outcome(s)”. For each mode, it will be examined whether the themes from the qualitative synthesis and the direction of the quantitative results are similar or different. Studies that combine modes over time will be coded as hybrid. If any mode has fewer than three studies, the comparison will not be made for that group, and this will be reported. The comparison will not be interpreted as a test of causal effects and no statistical subgroup analysis will be carried out, as no meta-analysis is planned.

Sensitivity analysis If at least three studies remain after exclusion, two sensitivity analyses will be carried out to check whether the main conclusions hold when the following are removed:

(a) studies flagged as having important methodological limitations, that is, rated “no” on a critical MMAT criterion for their category (section “Quality assessment/risk of bias analysis”);

(b) studies whose evidence of professional development rests exclusively on self-reports or participants’ perceptions.

For each analysis, it will be reported whether the themes, the direction of the quantitative results and the conclusions of the integration hold, change or are weakened. If fewer than three studies remain, the analysis will not be carried out and this will be reported.

Language restriction Yes. Only studies in English, Portuguese, French or Spanish will be included; exclusions by language will be reported.

Country(ies) involved There will be no selection of countries involved – the aim is to cover an international sample of studies.

Other relevant information Reporting. This protocol follows PRISMA-P 2015 (Moher et al., 2015; Shamseer et al., 2015). The review will be reported according to PRISMA 2020 (Page et al., 2021) and PRISMA-S (Rethlefsen et al., 2021).

Context. The review is part of the first author’s doctoral project, “Hybrid sharing community and open educational resources in the first cycle of basic education: an instrumental case study”, in the Doctoral Programme in Distance Education and eLearning (Universidade Aberta and Universidade do Minho), and corresponds to the first article planned in the thesis plan.

Timeline. Registration and searches: end of October 2026; screening: November 2026; data extraction and quality assessment: December 2026; synthesis and writing: December 2026–January 2027.

Amendments. Any amendment to the protocol will be submitted through the INPLASY update system, stating the section changed, the date, the stage of the review and the reason, and will be reported in the review.

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Keywords communities of practice; teacher professional development; professional learning; open educational resources; primary school teachers; mixed-methods systematic review.

Dissemination plans The results will be submitted as an article to a peer-reviewed journal, preferably open access, and incorporated into the first author's doctoral thesis. They may also be presented at education conferences and in a

summary in Portuguese aimed at teachers and school leaders. The article will state the INPLASY registration number and any deviations from the protocol. The executed search strategies, the extraction form, the extracted data and the list of excluded studies will be shared in open access on Zenodo (section “Data management”).

Contributions of each author

Author 1 - Ana Sofia Cabrita - Conceptualization, methodology, search strategy, study selection, data extraction, quality assessment, formal analysis, and writing – original draft. Approved the final version.

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