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Portfolio-Based Assessment in Early Childhood Education: A Bibliometric Mapping of Scopus Publications, 2016-2026

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Abstract

Portfolio-based assessment is widely used to document early childhood learning; however, research in this area remains fragmented and has not yet been systematically mapped. This study maps the development and knowledge structure of research on portfolio-based assessment in early childhood education (ECE). A bibliometric analysis was conducted on Scopus-indexed articles published between 2016 and 2026. Following the screening process, 45 articles were analyzed using Bibliometrix (Biblioshiny) in R through performance analysis, keyword co-occurrence network analysis, and thematic mapping. The field has grown at an annual rate of 11.61%, with two to five articles published annually until 2024, followed by seven articles in 2025 and nine in 2026. The articles were distributed across 35 sources and involved 91 authors, with only 4.4% involving international collaboration. The most highly cited articles addressed e-portfolios, digital documentation, parent–teacher communication, and children's participation. Keyword analysis revealed a core cluster linking ECE with assessment and documentation, as well as a second cluster comprising general educational terms centered on portfolios. In the thematic map, portfolio-related and general terms were positioned in the motor themes quadrant, whereas ECE, e-portfolios, and assessment were located in the emerging or declining themes quadrant, indicating the potential for further development in digital assessment. Future research should address data ethics and children's participation in digital portfolios, teachers' assessment literacy and digital competence, and longitudinal evidence. These findings are limited to English-language articles indexed in Scopus.

Keywords: portfolio-based assessment; early childhood education; bibliometric analysis; e-portfolio; pedagogical documentation

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1. Introduction

Assessment is an essential component of Early Childhood Education (ECE), as it serves to understand children's development, identify their learning needs, and provide a basis for planning learning experiences that are appropriate to each child's characteristics (Neumann et al., 2019; Schachter & Piasta, 2021). Unlike learners at higher levels of education, young children's development is dynamic, multidimensional, and not always linear (National Research Council, 2008). Children's cognitive, language, social-emotional, physical-motor, and creative abilities may emerge in different contexts and situations (Syam & Damayanti, 2020). Therefore, assessment in early childhood education should not rely solely on one-time measurements or evaluations focused on final outcomes. Instead, it needs to consider learning processes, interactions, play experiences, and changes in children's abilities over time (Black et al., 2016; Cengiz & Altındag, 2022). Observation, documentation, and developmental assessment should consequently be conducted continuously and reflectively, while remaining responsive to children's developmental, cultural, and linguistic contexts (Neumann et al., 2019; Wright et al., 2024). From this perspective, assessment is not merely an administrative activity for producing developmental reports; rather, it is an integral part of pedagogical decision-making and efforts to improve the quality of learning.

Within this context, portfolio-based assessment represents a relevant approach for documenting children's learning journeys in a more comprehensive manner (Alacam & Olgan, 2025a, 2025b). A portfolio may contain various forms of learning evidence, including children's work samples,

photographs of activities, observation notes, conversation records, documentation of learning experiences, and reflections by both teachers and children (Ball, 2021). These diverse forms of evidence enable educators to examine children's development longitudinally and relate their observations to learning objectives (Ball, 2021; Cengiz & Altındag, 2022). Accordingly, a portfolio should not be regarded merely as a collection of children's work or a set of documents stored at the end of a semester. Instead, it should be understood as a pedagogical process involving the selection of evidence, interpretation of children's development, reflection, and the use of assessment information to inform subsequent learning plans (Alacam & Olgan, 2025b). For example, Yılmaz et al. (2023) suggest that children's portfolios can be conceptualized as a form of assessment as learning, an approach that creates opportunities for children to engage in understanding their own learning experiences and achievements. This perspective extends the function of portfolios beyond developmental documentation to include the promotion of children's agency, reflection, and independence in the learning process.

However, the benefits of portfolio-based assessment do not emerge automatically from the mere collection and storage of learning documentation (Bedel et al., 2024; Pujiarto et al., 2023). Their quality depends on how educators select relevant evidence, interpret developmental information, connect documentation to learning objectives, and involve children and families in the assessment process (Alacam, 2024). Portfolios that serve only as administrative archives risk losing their formative value, whereas portfolios managed reflectively help teachers identify each child's strengths, interests, needs, and individual progress (Beka & Kulinxha, 2021). Research on portfolios therefore needs to consider not only their formats or media but also their assessment functions, documentation practices, and children's participation (Knauf & Lepold, 2021). Electronic and digital portfolios allow documentation to be stored, updated, organized, and shared more flexibly than paper-based portfolios, and can strengthen communication between teachers and families (Bedel et al., 2024; McLean, 2019). Nevertheless, digital transformation needs to be approached critically, as changes in the medium do not necessarily lead to improvements in assessment quality (Cowan & Flewitt, 2023; Knauf & Lepold, 2021). Issues concerning children's participation (Blaisdell et al., 2022), educators' digital competence (Polzl-Stefanec, 2021), data protection, and the accurate interpretation of developmental evidence (Restiglian et al., 2023) also require careful consideration, while social and cultural contexts and educational policies may influence how educators understand and implement portfolio-based assessment.

These considerations indicate that developments in portfolio research need to be examined considering diverse practices, implementation contexts, and the potential shift from conventional documentation towards the use of digital technologies. Although previous studies on portfolio assessment in ECE have addressed various conceptual (Yılmaz et al., 2023) and practical aspects (Alacam & Olgan, 2021), comprehensive understanding of this field requires an approach that can systematically connect these findings (Santovena-Casal & Lopez, 2023). Empirical studies can explain practices within specific contexts, while conceptual studies can provide frameworks for understanding the functions of portfolios. However, these approaches do not necessarily offer an overall picture of publication patterns, scholarly contributions, thematic relationships, and changes in research focus within a particular field. Consequently, a systematic mapping is needed not only to examine individual studies but also to identify how knowledge of portfolio-based assessment in ECE has developed and become interconnected over time (Thao et al., 2026). Bibliometric analysis offers a means of examining publication productivity, citation patterns, contributions by authors and publication sources, and thematic structures through the analysis of keyword relationships (Thao et al., 2026). This approach enables researchers to identify areas of concentrated scholarly attention while also recognizing themes that remain underexplored (Cohaila & Ordonez, 2024).

Against this background, this study aims to map the development and knowledge structure of portfolio-based assessment in early childhood education through a bibliometric analysis of scholarly publications indexed in Scopus. The study is expected to contribute by providing a structured overview of research developments in portfolio assessment, clarifying the relationships among documentation practices, developmental assessment, children's participation, and the use of technology, and offering a foundation for future research agendas. In practical terms, the findings are expected to serve as a reference for ECE researchers and educators in developing portfolio-based assessment practices that are more reflective, context-sensitive, and responsive to children's developmental needs.

2. Methodology

This study employed a bibliometric approach to map the development of publications, knowledge structures, and research directions related to *portfolio-based assessment* in early childhood education. The implementation and interpretation of the bibliometric analysis followed the guidelines proposed by Donthu et al (2021), while the document selection process was presented using a PRISMA flow diagram adapted for bibliometric studies (Page et al., 2021) as illustrated in Figure 1. Data were retrieved from the Scopus database. The search was conducted using the title, abstract, and keyword fields TITLE-ABS-KEY (("portfolio assessment" OR "portfolio-based assessment" OR "assessment portfolio" OR "learning portfolio" OR "student portfolio" OR "children's portfolio" OR "child portfolio" OR "portfolio documentation" OR "documentation of learning" OR "learning documentation" OR "electronic portfolio" OR "digital portfolio" OR "e-portfolio" OR eportfolio) AND ("early childhood education" OR "early childhood" OR preschool* OR "pre-school" OR kindergarten* OR "early years" OR "young children" early childhood teacher*")).

Data selection was conducted on October 8, 2026, following four stages. During the identification stage, the initial search yielded 92 records. In the screening stage, filters were applied based on publication period and document type. The publication period was restricted to 2016–2026, while the document type was limited to research articles. Subsequently, title and abstract screening was conducted to assess the relevance of the retrieved records. Three documents were excluded because they did not substantively address portfolio-based assessment or were not relevant to the context of early childhood education. Consequently, 45 articles were retained for the final analysis. The exported bibliographic metadata were subsequently examined to identify duplicate records and standardize variations in keyword spelling.

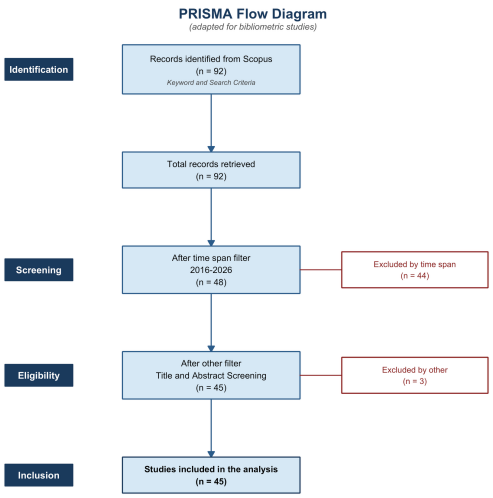


Figure 1
PRISMA Flow Diagram adapted for the bibliometric study

The analysis was conducted using the Bibliometrix package through the Biblioshiny interface in R (Aria & Cuccurullo, 2017). Performance analysis covered general dataset characteristics, annual publication and citation trends, the most highly cited articles (including field-weighted citation impact, based on Scopus data retrieved on October 13, 2026), and authors' publication productivity over time. The intellectual and thematic structures of the research field were examined through word cloud visualization, keyword co-occurrence networks, and thematic mapping. The descriptive findings and network mapping results were integrated to address the following four research questions: RQ1: How has scientific publication on portfolio-based assessment in early childhood education developed over the study period? RQ2: Which authors and scholarly works have made significant contributions to this research field? RQ3: What are the main themes and thematic structures that characterize the research landscape?

3. Results

3.1 Main Information

The bibliometric analysis revealed that the dataset comprised 45 documents published across 35 publication sources during the 2016–2026 period, with an annual growth rate of 11.61%, calculated over 2016–2026 and therefore including the partial data for 2026. This indicates positive growth in scholarly output, although publications are distributed across a relatively large number of journals. The documents were relatively recent, with an average age of 3.87 years and an average of 8.71 citations per document. In terms of content, 159 author keywords were identified, reflecting the diversity of terminology and thematic coverage within the field. The authorship analysis involved 91 authors, with 14 documents being single-authored and an average of 2.24 authors per document. International co-authorship accounted for only 4.4%, suggesting that cross-country research collaboration in this field remains limited.

Regarding publication output, the number of articles increased in the later years of the study period (Figure 2). Between 2016 and 2024, annual publication output remained relatively stable, ranging from two to five articles, with five articles published in 2023 representing the highest output during this period. The number of publications subsequently increased to seven articles in 2025 and reached its highest count in 2026, with nine articles, although the 2026 figure covers only publications indexed up to October 8, 2026. In terms of citations, 2017 recorded the highest number, with 85 citations from three articles, followed by 53 citations in both 2021 and 2023, and 41 citations in both 2019 and 2020. The lowest citation counts were recorded in 2026 (9 citations) and 2018 (11 citations). Although publication output increased in 2025 and 2026, the corresponding citation counts were only 29 and 9, respectively. This suggests that an increase in the number of publications does not necessarily lead to an immediate increase in citations, particularly because recently published articles have had less time to gain academic attention and accumulate citations.

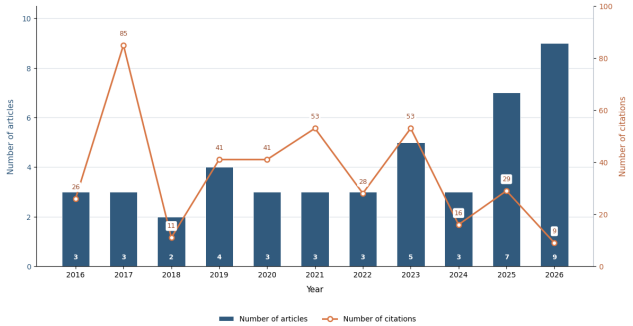


Figure 2
Annual Publication Output and Citation Trends (2016-2026)

Table 1 presents the ten most highly cited publications in the field of portfolio-based assessment. The article by Stratigos and Fenech (2021) ranked first, with 37 citations, whereas Cowan and Flewitt (2023) recorded the highest Field-Weighted Citation Impact (FWCI), at 2.62. This indicates that the latter article received a relative citation impact more than twice the average for its field. The publications primarily address themes related to e-portfolios, digital documentation, assessment for learning, parent–teacher communication, and children's participation in developmental documentation. These findings suggest that research on e-portfolios in early childhood education has an established and growing scholarly foundation, with further opportunities to explore the integration of authentic assessment, digital documentation, and parental involvement in monitoring children's development.

Table 1
Most Highly Cited Publications on Portfolio-Based Assessment

Rank	Title	DOI	Author	TC	FWCI
1	Early childhood education and care in the app generation: Digital documentation, assessment for learning and parent communication	10.1177/1836939120979062	(Stratigos & Fenech, 2021)	37	1.80
2	Documentation as a tool for participation in German early childhood education and care	10.1080/1350293X.2015.1102403	(Knauf, 2017)	30	1.82
3	E-Portfolios: Supporting Collaborative Partnerships in an Early Childhood Centre in Aotearoa/New Zealand	10.1007/s40841-017-0092-1	(Beaumont-Bates, 2017)	29	0.90
4	Moving from paper-based to digital documentation in Early Childhood Education: democratic potentials and challenges	10.1080/09669760.2021.2013171	(Cowan & Flewitt, 2023)	26	2.62
5	What's the story? Exploring parent–teacher communication through ePortfolios	10.23965/AJEC.42.4.02	(Higgins & Cherrington, 2017)	26	0.91
6	Using ePortfolios in early childhood education: Recalling, reconnecting, restarting and learning	10.1177/1476718X19875778	(Hooker, 2019)	23	0.66
7	The children's voice–how do children participate in analog and digital portfolios?	10.1080/1350293X.2021.1906291	(Knauf & Lepold, 2021)	16	0.34
8	Early childhood teachers' relationship with the official curriculum: the mediating role of professional and policy contexts	10.1080/20004508.2019.1687080	(Birbili & Myrovali, 2020)	15	1.15
9	Voices from the field: Integrating e-portfolios in early childhood education	10.1007/s10639-024-12563-9	(Bedel et al., 2024)	13	1.81
10	Impact of e-portfolios on teacher assessment and student performance on learning science concepts in kindergarten	10.1007/s10639-018-9846-8	(Habeeb & Ebrahim, 2019)	12	0.66

Note. TC = total citations; FWCI = Field-Weighted Citation Impact, a Scopus metric retrieved on October 13, 2026.

3.2 Authors' Production over Time

The five most productive authors in the field of portfolio-based assessment in early childhood education are presented in Table 2. Alacam Nur ranks first with five articles and a fractionalized article

count of 2.8, followed by Olgan Refika with four articles and a fractionalized article count of 1.8. Furthermore, **as shown in Figure 3, which presents the authors**' publication output over time, Alacam Nur and Olgan Refika demonstrate relatively long publication periods, spanning 2016 to 2026, with a notable peak in publication activity in 2025. Figure 3 also illustrates that scholarly contributions to this research field exhibit diverse temporal patterns in terms of both publication continuity and the periods during which authors are actively involved. The emergence of several authors in recent years also indicates the continued development of research contributions in this field.

Table 2
The Most Productive Authors in Portfolio-Based Assessment Research (2016–2026)

Author	Articles	Articles Fractionalized
Alaçam Nur	5	2,8
Olgan Refika	4	1,8
Birbili Maria	2	1,5
Knauf Helen	2	1,5
Matsui Gota	2	2

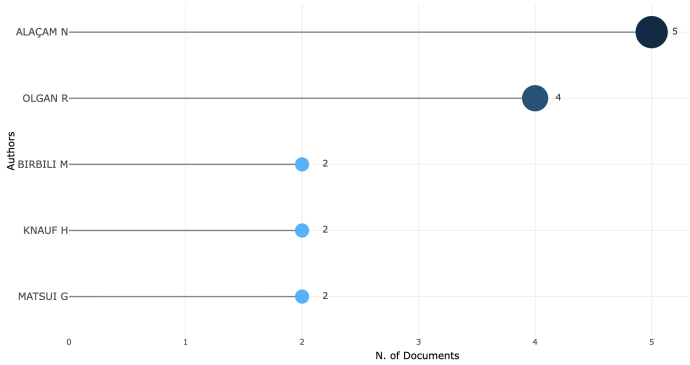


Figure 3
Authors' Production over Time

3.3 Wordcloud and Keyword Co-Occurrence Network

The bibliometric analysis of 45 articles conducted in R generated a word cloud that maps the dominant keywords in the literature. The keyword *early childhood education* appears most prominently, indicating that early childhood education is the central context across all the analyzed articles. The next most frequent keywords are *assessment*, *portfolio assessment*, and *portfolio*, suggesting that portfolio-based assessment is the most widely studied topic. In addition, the presence of terms such as *documentation*, *pedagogical documentation*, *digital documentation*, and *e-portfolio* reflects growing attention to learning documentation, in both conventional and digital forms. Keywords such as *learning stories*, *formative assessment*, *self-reflection*, and *action research* further reveal a tendency toward narrative, continuous, and reflective assessment approaches. The appearance of *New Zealand* also suggests that a portion of the studies originates from that country's educational context, where learning stories are widely implemented. Overall, these findings indicate that research on portfolios in early childhood education focuses on using portfolios as tools for documenting and assessing children's development, with an apparent shift toward digital formats (Figure 4).

The keyword co-occurrence network reveals two main clusters. The red cluster is centered on *early childhood education*, the largest node, which is strongly linked to *assessment*, *portfolio assessment*, *documentation*, *digital documentation*, *pedagogical documentation*, *e-portfolios*, *formative assessment*, and *learning stories*, indicating a focus on assessment and documentation practices. The blue cluster is centered on *portfolios* and includes general terms such as *education*, *learning*, *child*, *childhood*, *human*, *female*, and *teacher*, reflecting the participants and the general educational context

of the studies. The connections between the two clusters, mainly through *early childhood education* and *portfolios*, show that portfolios are the main bridge between early childhood education and assessment-related topics.



Figure 4
Wordcloud

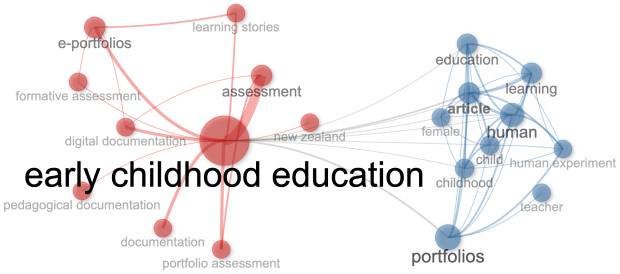


Figure 5
Keyword Co-Occurrence Network

3.4 Thematic Map of Keywords

The thematic map (Figure 6) distributes the research themes across four quadrants based on relevance (centrality) and development (density). The clusters *portfolios, human, article* and *child, childhood, female* are located in the motor themes quadrant, indicating that they are well developed and play an important role in structuring the field. The *portfolios* cluster has the highest centrality, making it the most connected theme. In contrast, the clusters *early childhood education, e-portfolios, assessment* and *kindergarten* fall in the emerging or declining themes quadrant. The *early childhood education, e-portfolios, assessment* cluster has the largest bubble, reflecting high occurrence, yet its internal development remains low. Because it includes *e-portfolios*, this cluster can be interpreted as an emerging theme, which signals opportunities for further research on digital assessment in early childhood education.

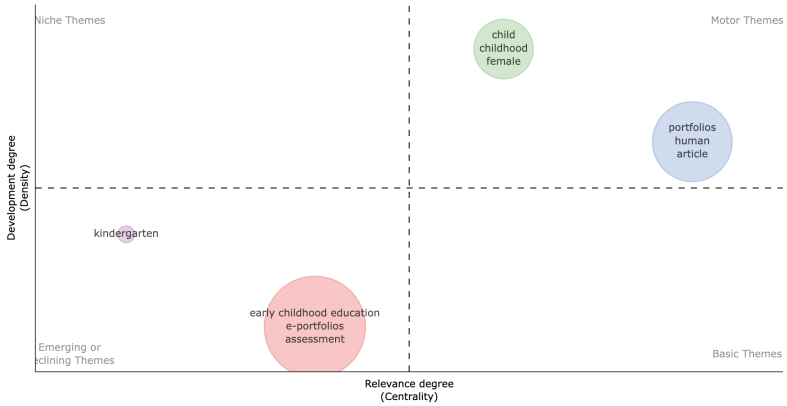


Figure 6
Thematic Map of Keywords

4. Discussion

This study mapped 45 Scopus-indexed articles on portfolio-based assessment in early childhood education (ECE) published between 2016 and 2026. Output is rising from a small base, citation impact is concentrated in a few articles on digital documentation and children's participation, and the research structure is fragmented in authorship, collaboration, and terminology.

4.1 Research Development

An annual growth rate of 11.61% indicates increasing scholarly interest in portfolio-based assessment in early childhood education (ECE), although the overall number of publications remains relatively small. Between 2016 and 2024, annual publication output ranged from two to five articles, while the average document age of 3.87 years suggests that this is a relatively young research field. The increase to seven articles in 2025 and nine in 2026 may be associated with growing attention to digital platform-based pedagogical documentation (Cowan & Flewitt, 2023; Nuttall et al., 2023; Restiglian et al., 2023) and calls for a more purposeful integration of technology into assessment practices in the early years (Neumann et al., 2019). However, the present study did not directly examine this relationship; therefore, it should be interpreted as a plausible explanation rather than an empirical finding. Furthermore, the data were retrieved on October 8, 2026, meaning that the publication count for 2026 is incomplete and may increase by the end of the year.

Citation patterns differ from publication output patterns. The highest annual citation count was recorded in 2017, with 85 citations from three articles, whereas 2025 and 2026, despite having the highest publication outputs, accumulated only 29 and 9 citations, respectively. This is unsurprising, as recently published articles have had less time to attract scholarly attention and accumulate citations. This suggests that the current citation impact of the field, averaging 8.71 citations per document, is largely driven by earlier publications. Whether the recent increase in publication output will translate into a comparable level of scholarly impact remains uncertain.

4.2 Thematic Structure and Portfolio Assessment Practices

The thematic map positions *early childhood education*, *assessment*, and *portfolio assessment* as *basic themes* characterized by low density. These themes serve as connecting points for various research topics but have not yet been developed into distinct theoretical frameworks. This is consistent with the diversity of portfolio functions and practices across different contexts (Alacam, 2024) (The terms *human*, *article*, *child*, *childhood*, and *female*, which appear in the *motor themes* quadrant, are database indexing keywords rather than substantive research concepts (Aria & Cuccurullo, 2017). Therefore, the interpretation should focus on the conceptual themes of assessment, portfolios, documentation, and *learning stories*.

Within these themes, the literature reveals three ways of conceptualizing portfolios. First, portfolios are viewed as assessment tools that provide a basis for pedagogical decision-making (Neumann et al., 2019; Schachter & Piasta, 2021). Second, they are understood as learning narratives learning stories (Cengiz & Altındag, 2022), an approach that also raises ethical questions about who determines the content of documentation (Blaisdell et al., 2022). Third, portfolios are regarded as means of supporting children's participation and learning (Knauf, 2017; Knauf & Lepold, 2021a; Yılmaz et al., 2023). However, these three perspectives have not yet been integrated into a unified framework. In classroom practice, the value of portfolios depends on how teachers use them. Teachers' beliefs do not always align with what they actually assess (Pyle & DeLuca, 2017), therefore, extensive documentation does not automatically result in meaningful assessment (Bedel et al., 2024). These practices are also influenced by institutional factors (Lam, 2020) and cultural responsiveness (Ball, 2021). Accordingly,

the thematic structure should be interpreted as reflecting context-dependent practices rather than standardized technical procedures.

4.3 Digital Transformation in Portfolio Practice

The literature demonstrates that technology offers tangible opportunities. Digital portfolios can strengthen family partnerships and parent–teacher communication (Beaumont-Bates, 2017; Higgins & Cherrington, 2017), support reflection and the reinterpretation of learning experiences (Hooker, 2019), and enable documentation to be developed collaboratively with families (McLean, 2019), However, these opportunities are accompanied by recurring challenges. Digital platforms may shift teachers' work toward labeling and monitoring activities (Nuttall et al., 2023) and introduce professional dilemmas and data-related concerns (Restiglian et al., 2023). The transition to digital media does not automatically transform pedagogical practices, and its democratic potential can only be realized when children and families are genuinely involved (Cowan & Flewitt, 2023; Knauf & Lepold, 2021). Teachers' digital competence and access to professional support are therefore essential prerequisites (Erdogan et al., 2022; Polzl-Stefanec, 2021). Taken together, these findings suggest that assessment quality is determined by how teachers, children, and families use documentation, rather than by the type of medium employed.

4.4 Future Research Directions and Limitations

Based on the identified patterns and gaps in the mapped literature, four directions for future research can be proposed. First, data ethics and children's participation in digital portfolios require empirical investigation, particularly regarding consent, data ownership, and data security. Second, teachers' assessment literacy and digital competence in early childhood education (ECE) should be examined as essential prerequisites for meaningful portfolio-based assessment. Third, longitudinal and intervention studies are needed to investigate the relationships between portfolio practices and children's development and learning experiences. Fourth, greater conceptual and terminological consolidation is needed, for example, through systematic reviews that complement bibliometric mapping (Alacam & Olgan, 2021; Santovena-Casal & Lopez, 2023), alongside efforts to strengthen international research collaboration.

Several limitations of this study should be acknowledged. This study covers only English-language articles indexed in Scopus, with a relatively small dataset comprising 45 articles. Therefore, the findings may not fully represent research published in other languages or indexed in other databases. The 2026 data are also incomplete, and keyword variations may still affect cluster composition. Furthermore, bibliometric mapping describes publication patterns rather than the quality or effectiveness of portfolio-based assessment practices. Future studies could incorporate additional databases, such as Web of Science, to broaden the literature coverage.

5. Conclusion

This study mapped 45 Scopus-indexed articles on portfolio-based assessment in early childhood education (ECE) published between 2016 and 2026. Regarding RQ1, publication output grew at an annual rate of 11.61% and reached its highest count in 2026 with nine articles (a partial year, with data retrieved on October 8, 2026), although the overall volume remained relatively small and was distributed across 35 sources. Citation impact was concentrated in several articles addressing e-portfolios, digital documentation, parent–teacher communication, and children's participation. Regarding RQ2, Alaçam and Olgan were the most productive authors, while international collaboration remained low (4.4%). Regarding RQ3, keyword analysis revealed a core cluster linking ECE with assessment and documentation, while the thematic map positioned ECE, e-portfolios, and assessment

in the *emerging or declining themes* quadrant, suggesting potential for the further development of digital assessment. Overall, research on portfolio-based assessment in ECE is growing but remains fragmented in terms of authorship, collaboration, and terminology. These findings suggest that portfolios should be understood as a pedagogical process for selecting evidence, interpreting children's development, and informing learning, rather than merely as an archive of children's work. Future research should examine data ethics and children's participation in digital portfolios, teachers' assessment literacy and digital competence, as well as the longitudinal relationships between portfolio practices and children's development. Given that this study is limited to English-language articles indexed in Scopus and is based on a relatively small dataset, future research could incorporate additional databases and systematic reviews to broaden the scope of the literature.

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