

## Co-Creation in Higher Education: A Systematic Review of the Missed Opportunity for Educator Development

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### Abstract

Student–staff co-creation, particularly involving the development of e-learning materials and digital environments, is increasingly recognised as a driver of student engagement, curriculum relevance, and professional development in higher education. Parallel to this trend, the Digital Competence of Educators (DigCompEdu) framework has become the reference point for describing and assessing teachers' technology-related capabilities. Building on earlier work, this systematic review synthesises 29 peer-reviewed publications published between January 2018 and March 2025 that intersect technology-enhanced student co-creation and educator digital competence. Employing a methodological three-phase coding protocol adapted from Rienties et al. (2023) and a double-coder reliability of  $\kappa = 0.87$ , we map how co-creation initiatives relate to DigCompEdu areas, identify three recurrent engagement archetypes (DigCompEdu-Light, Project/Hands-On, and Full DigCompEdu), and expose persistent measurement gaps. Results indicate that technology-supported co-creation is most effective when educators operate at least at the DigCompEdu Integrator level and when co-creation designs deliberately cultivate community, collaboration, and cohesion. The discussion highlights methodological deficits and regional imbalances, while practical recommendations emphasise validated measurement and inclusive capacity building.

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### Practitioner Notes

1. Research on co-creation and educator digital competence has grown rapidly since 2020, but the field is methodologically fragmented and geographically unbalanced.
2. Most studies focus on the technical use of digital tools, while areas such as empowering learners and developing students' digital competence are neglected.
3. Co-creation is rarely designed as a strategy to deliberately build educators' digital skills, even though it offers strong potential for authentic professional development.
4. When teachers have higher digital competence, students are more engaged and achieve better outcomes, while low competence risks exclusion and inequality.
5. Institutions should adopt co-creation models supporting mutual digital growth for staff and students, use validated tools measuring competence, and conduct longitudinal and globally inclusive studies.

### Keywords

digital competence, higher education, student–staff co-creation, systematic review

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## Introduction

Higher education is under pressure to deliver learning experiences that are both personally engaging and societally relevant. In the era of digitalisation, further accelerated by the COVID-19 pandemic, universities worldwide are reimagining teaching and learning to foster graduate attributes such as adaptability, creative problem-solving, and digital fluency (UNESCO, 2022). Within this broader realignment, student–staff co-creation has emerged as a transformative approach, premised on the belief that knowledge is co-constructed rather than transmitted (Bovill, 2023). Evidence suggests that when learners participate in designing curricula, assessments, and learning environments, they report higher levels of motivation, a sense of belonging, and perceived employability (Kahu & Nelson, 2018; Killen & Langer-Crame, 2020).

In parallel, national and supranational policy agendas foreground digital competence as a core professional requirement for academics. The European Commission’s Digital Education Action Plan calls on universities to ‘embed educator digital skills across the career continuum’ (European Commission, 2020, p. 11). Against this policy backdrop, the European Framework for the Digital Competence of Educators (DigCompEdu), with its six distinct areas, has become the de facto reference model for articulating and assessing educators’ digital expertise (Redecker, 2017).

### Conceptual Foundations and Background

Despite their obvious complementarities, the literature on student-staff co-creation and the literature on digital competence have developed in relative isolation. Co-creation, which involves collaborative efforts between students and staff, is recognised for fostering shared responsibility, mutual respect, and enhancing personal development for both parties (Lubicz-Nawrocka, 2018). Its application is increasingly enabled by digital technologies. Studies show that when students co-create e-learning materials, their own digital literacy improves (Nahar & Cross, 2020), and the use of agile methodologies can address power imbalances and improve team dynamics (Owen & Wasiuk, 2021). The concept extends beyond simple collaboration, with some scholars highlighting its role in promoting democratic values (Bergmark & Westman, 2016) and shaping broader educational services where students are key actors in value creation (Cruz et al., 2022).

Simultaneously, the development of educator digital competence is a major focus of institutional and policy-level initiatives, particularly following the pandemic (Stare et al., 2023; Zhao et al., 2021). Student–staff co-creation is often cited as a powerful mechanism for this development. By leveraging students’ digital fluency, educators can gain fresh perspectives and enhance their own skills. For instance, at the University of Adelaide, the Design Thinking Framework was used to facilitate continuous improvement in co-creation, highlighting how iterative co-creation can enhance educators’ digital competence (Snelling et al., 2019). Similarly, at Queen Mary University of London, co-creation initiatives led to curriculum enhancements that shifted institutional culture towards more collaborative and digitally competent practices (Cabral et al., 2023). The Digital Innovation Partnership at the University of Leicester further exemplifies how structured programs can improve digital teaching by integrating student perspectives (Patel et al., 2018). Indeed, systematic reviews confirm that co-creation is a key intervention for improving teachers’ digital competence, particularly in the areas of digital technology use and content creation (Zhang et al., 2024). However, the literature also reveals a reliance on systematic reviews and bibliometric analyses (Basilotta-Gómez-Pablos et al., 2022), often calling for more integrated and holistic

approaches to understanding competence development (Peters et al., 2022).

A critical gap emerges at the intersection of these two fields. Co-creation studies usually highlight the positive results for teamwork but tend to skip over the need for technical know-how to make it last. Conversely, DigCompEdu studies often measure competence in an abstract, disconnected manner, separate from the pedagogical praxis of co-creation. Some new research shows that staff confidence with technology supports co-creation (Tsui et al., 2024), and that co-creation can also build staff skills (Wakerley et al., 2024). However, this connection is not yet strongly established in studies. Most studies emphasise the broad pedagogical benefits of co-creation, but they do not systematically analyse how it contributes to the development of digital competence in line with established frameworks, such as DigCompEdu.

## **Research Aims and Questions**

The existing literature, therefore, leaves a critical question unanswered: To what extent are co-creation initiatives being intentionally designed and evaluated as mechanisms for developing educator digital competence? This review aims to address this gap by systematically mapping and critically appraising the empirical evidence published between 2018 and 2024. Specifically, this review aims to: (a) map and analyse the conceptualisation and operationalisation of co-creation and educator digital competence; (b) assess the use of the DigCompEdu framework in these contexts; and (c) explore the extent to which co-creation initiatives are designed to foster digital skills for both educators and students.

To achieve these aims, this review is guided by four research questions:

**RQ1:** What are the publication trends, geographical distribution, and methodological designs of studies that link co-creation with educator digital competence in higher education?

**RQ2:** How do these studies operationalise and measure educator digital competence, and which DigCompEdu areas are most and least represented?

**RQ3:** To what extent do co-creation initiatives report the deliberate development of (a) teachers' digital skills and (b) students' digital skills?

**RQ4:** What relationships, if any, are reported between the level of educator digital competence and the educational outcomes of co-creation initiatives (e.g., student engagement, sense of belonging, learning performance)?

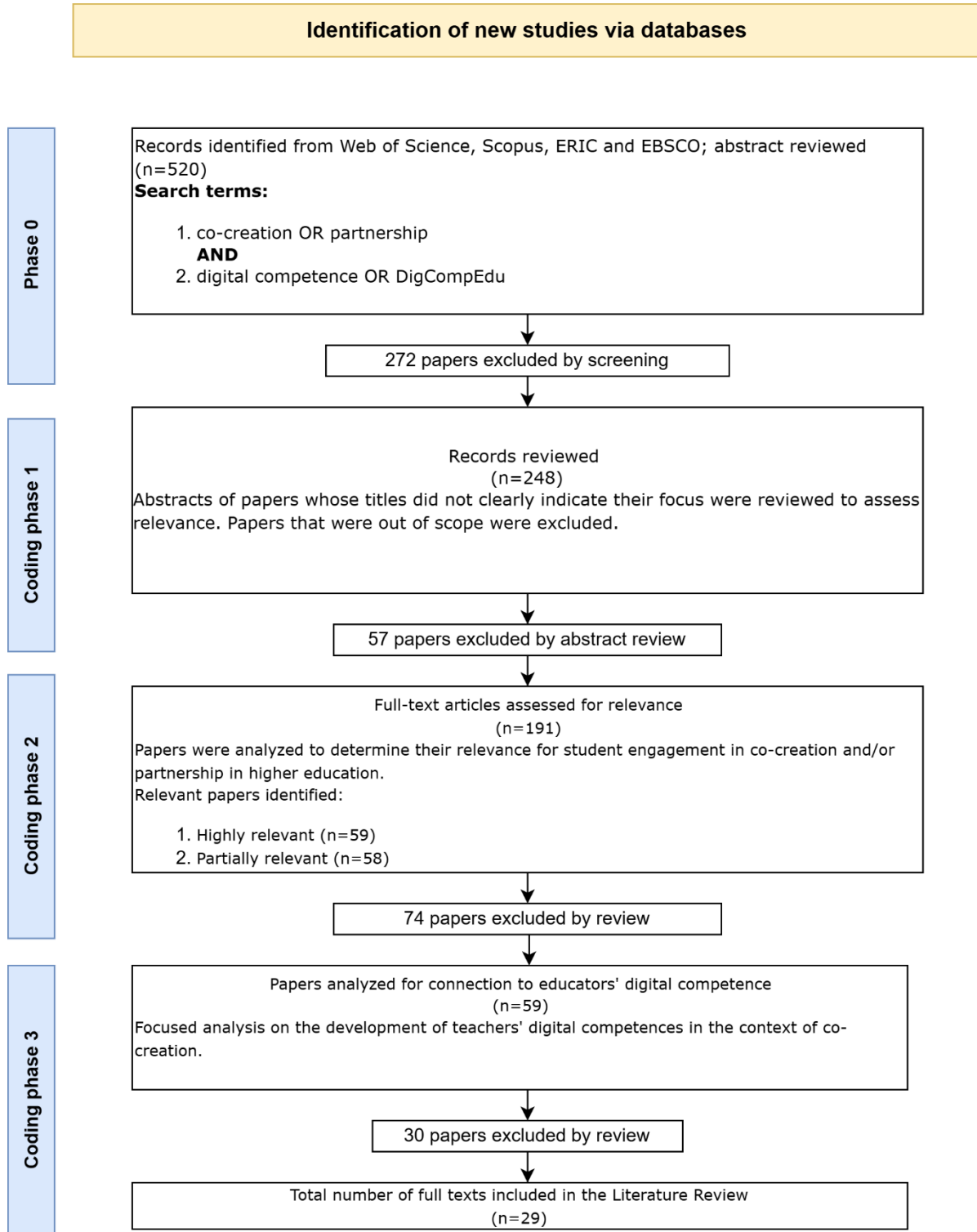
## **Method**

This study employed a structured systematic literature review methodology, adapting the three-phase protocol outlined by Rienties et al. (2023) and adhering to the PRISMA-S (Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Searching) guidelines for reporting (Rethlefsen et al., 2021). The review was conducted in three main phases: (1) search and screening, (2) data extraction and coding, and (3) data analysis and synthesis.

## Search Strategy and Selection Criteria

Figure 1

PRISMA 2020 flow diagram illustrating the study identification and selection process



A systematic search was conducted across four major academic databases: Web of Science, Scopus, ERIC, and EBSCO. The search string combined keywords for collaborative student–staff activities with keywords for digital skills, using the following query: (('student–staff partnership' OR 'student–staff collaboration' OR 'co-creation' OR 'co-design') AND ('digital competence' OR 'digital literacy' OR 'digital skills' OR 'DigCompEdu')). The search was limited to peer-reviewed articles published in English between January 2018 and March 2025. While broad terms like 'partnership' were included in the search to ensure comprehensive coverage, their ambiguity presented a considerable challenge during the coding phase. The term is often applied to a wide and professionally blurry variety of arrangements, making it difficult to systematically categorise and increasing the likelihood that some relevant studies may have been missed. Consequently, we use 'co-creation' throughout this paper as a more precise descriptor for the active, collaborative processes under investigation and strongly advise its adoption in future works to enhance methodological rigour and clarity within the field.

The flow of studies through the review is illustrated in the PRISMA diagram (see Figure 1). The study selection process followed a multi-stage screening protocol:

1. **Identification (Phase 0):** The initial search yielded 520 records. After removing duplicates and initial eligibility screening, 248 records remained.
2. **Screening (Phase 1):** The titles and abstracts of the 248 records were screened for relevance, resulting in the exclusion of 57 records.
3. **Eligibility (Phase 2):** The full texts of the remaining 191 articles were assessed for eligibility. After review, 132 articles were excluded, leaving 59 articles.
4. **Inclusion (Phase 3):** The remaining 59 articles were analysed for their direct connection to educators' digital competence. A further 30 articles were excluded, resulting in a final corpus of 29 studies for in-depth analysis.

### **Data Extraction and Coding**

A detailed coding protocol was developed in an iterative process and piloted on a subset of 15 articles to ensure clarity and consistency. To ensure reliability, each of the 191 included studies was independently coded by two researchers using a structured coding sheet developed in Google Sheets. To systematically interpret the complex qualitative data, this study employed a hybrid inductive-deductive thematic analysis (Fereday & Muir-Cochrane, 2006). A deductive codebook was established a priori based on the six areas of the DigCompEdu framework to ensure theoretical alignment and consistent categorisation across the corpus. Simultaneously, an inductive approach was applied to the open-text data fields to allow for the identification of emergent engagement patterns and student roles that were not captured by the initial theoretical framework. This rigorous process ensured that the analysis remained sensitive to novel co-creation strategies while maintaining the structural consistency required for a systematic review. Any disagreements during the coding process were resolved through discussion with a third researcher to reach a consensus. The inter-coder reliability for the primary coding categories was calculated and found to be high (Cohen's Kappa  $\kappa = 0.87$ ).

The coding sheet was structured to capture the following key variables for each study. First, Study Descriptors: This category encompassed standard bibliographic details (authors, publication year, journal), geographical context (country of first author's institution), and core methodological characteristics, including the overall research approach (e.g., qualitative, quantitative, mixed-

methods), the specific methods employed (e.g., case study, survey), and the reported participant sample size. Second, Nature of Co-creation: To understand the co-creation initiatives themselves, we coded two key dimensions: the thematic focus of the activity (e.g., curriculum design, assessment, resource development) and the participatory depth, which classified the level of student involvement on a scale from consultative (e.g., providing feedback) to active co-design (e.g., functioning as equal partners). Third, Treatment of Digital Competence: This category captured how digital competence was addressed in each study. We coded whether educator digital competence was an explicit variable, the method used for its measurement (e.g., validated instrument, unvalidated self-report, observation), and the stated intentionality of the initiative, that is, whether the development of digital skills for either students or staff was a primary or secondary goal. Fourth, DigCompEdu Framework Mapping: To systematically align the corpus with a standard benchmark, each study was mapped against the six areas of the DigCompEdu framework. A binary code (present/absent) was assigned for each area to quantify its representation across the literature.

## Data Analysis

The data analysis was conducted in two stages to comprehensively address the research questions.

**Stage 1: Descriptive and Thematic Analysis.** To answer RQ1 and RQ2, descriptive statistics (frequencies and percentages) were calculated in R (version 4.3) to summarise publication trends over time, the geographical distribution of studies, and the prevalence of different methodological designs. We also calculated the frequency with which each of the six DigCompEdu areas was addressed across the corpus to identify which competencies were most and least represented. For RQ3 and RQ4, we used thematic analysis to synthesise qualitative data from the studies regarding the intentionality of skill development and the reported relationships between competence and outcomes. To deepen this qualitative synthesis, we employed Atlas.ti to manage the coding process. The software was valuable for systematically developing and applying codes related to the nature of student engagement. Its visual mapping tools were then used to generate a conceptual network diagram (presented in the Findings section) that illustrates the relationships between different forms of co-creation (e.g., active vs. passive participation) and the specific roles students undertake (e.g., as designers, tutors, or feedback providers). This process was instrumental in interpreting how co-creation was approached across studies and how different activities and engagement types were distributed.

**Stage 2: Cluster Analysis for Archetype Identification.** To move beyond simple description and identify underlying patterns of practice in the literature, we performed a k-means cluster analysis. This technique was chosen for its effectiveness in partitioning data into distinct, non-overlapping groups based on shared characteristics. The analysis used key variables from our coding scheme as inputs: the level of student participation (consultative/active), the primary focus of co-creation (curriculum/assessment/resource), and the number of DigCompEdu areas addressed (as a proxy for the breadth of digital engagement). The analysis was conducted in R using the stats package. We evaluated solutions for two ( $k = 2$ ), three ( $k = 3$ ) and four ( $k = 4$ ) clusters. Quantitatively, the three-cluster solution ( $k = 3$ ) yielded the highest average silhouette coefficient ( $s = .59$ ), indicating a reasonable structure with distinct separation between groups. In comparison, the two-cluster solution produced a lower silhouette width ( $s = .46$ ) and offered only

a broad binary classification that obscured critical pedagogical nuances. Similarly, the four-cluster solution ( $s = .51$ ) resulted in negative silhouette values for several cases, suggesting artificial fragmentation of the dataset. Conceptually, the three-cluster solution was additionally retained as it aligns with Bovill and Bulley's (2011) Ladder of Student Participation. The identified archetypes effectively consolidate the ladder's granular levels into three distinct modes of practice: 'DigCompEdu-Light' corresponds to the Consultation rungs (where students provide feedback but staff retain control); 'Project/Hands-On' maps to the Participation rungs (where students act within defined boundaries); and 'Full DigCompEdu' reflects the Partnership rungs (where decision-making power is shared). Such a combination of stable statistical results and theoretical consistency supported the final archetypal mapping.

## Results

This section presents the findings of the systematic review across the final corpus of 29 studies, structured by the research questions.

### **RQ1: What are the publication trends, geographical distribution, and methodological designs of studies that link co-creation with educator digital competence in higher education?**

The findings reveal a research area defined by rapid growth, significant geographical imbalance, and a methodologically fragmented foundation. As plotted in Figure 2, the publication trajectory shows a steep, accelerating ascent, with output quadrupling between 2018 and 2024. These findings, particularly post-2020, suggest a field reacting to the sector-wide crisis of the COVID-19 pandemic, foregrounding the urgency of both student partnership and educator competence (Gourlay et al., 2021; Judd et al., 2021).

**Table 1**

#### *Continental Distribution of the 191 Studies*

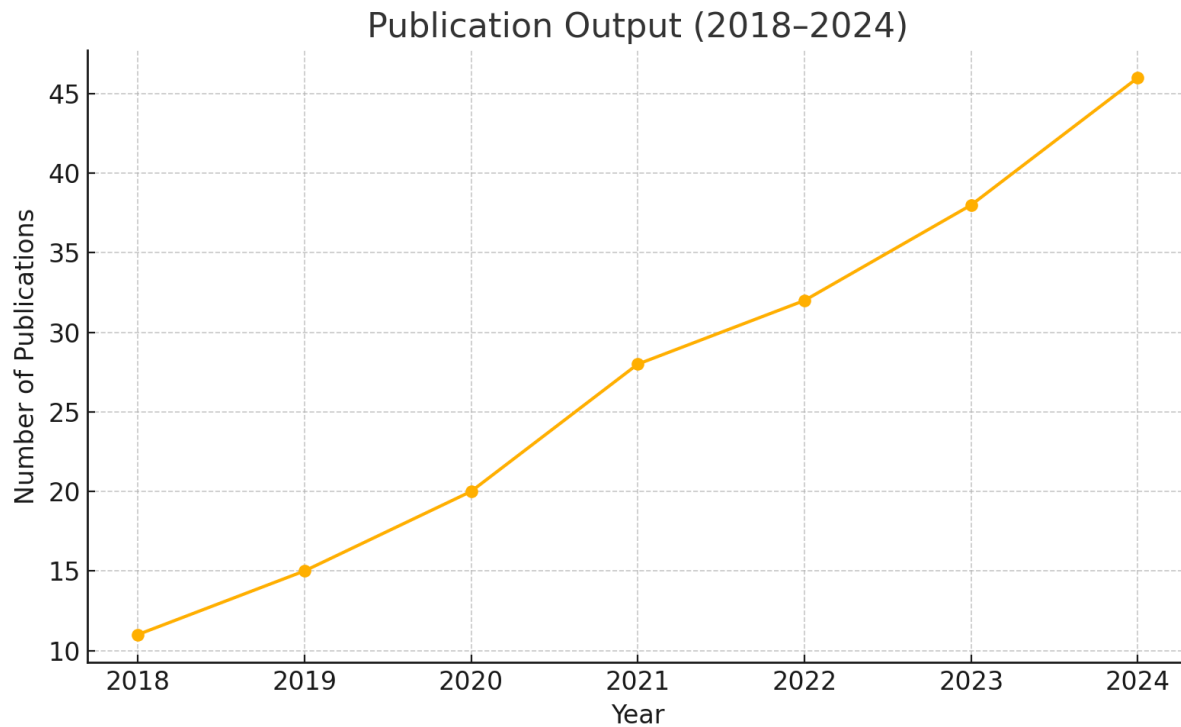
<b>Continent grouping</b>	<b>Raw count (n)</b>	<b>Percentage of corpus</b>
Europe (incl. UK)	92	48.2%
Asia-Pacific	46	24.1%
Americas (North + South)	42	22%
Africa	11	5.8%
<b>Total</b>	<b>191</b>	<b>100%</b>

As detailed in Table 1, the literature is dominated by research from Europe and other Anglophone countries like Australia (Dollinger, 2018; Judd et al., 2021) and Canada (Cho et al., 2020; Marquis et al., 2018), while the Global South remains under-represented (e.g., Africa, 6%). Methodologically, as categorised in Table 2, the corpus is dominated by mixed-methods designs (34.6%) and cross-sectional surveys (30.4%). This heterogeneity is further confirmed by diverse methodologies including qualitative case studies (Cho et al., 2020; Isaeva et al., 2020), quasi-experimental research (Wang & Sun, 2021), and theoretical or conceptual papers (Felten et al., 2019; McIntosh et al., 2020). Widespread issues with reporting were noted, such as the frequent

omission of participant numbers or demographics, which weakens the potential for meta-analysis and obscures equity in participant inclusion.

**Figure 2**

*Publication Output (2018–2025)*



**Table 2**

*Methodological Designs in the Corpus (N=191)*

Methodological Approach	Raw count (n)	Percentage of corpus
Mixed-Methods	66	34.6%
Cross-sectional Survey	58	30.4%
Design-Based Research	20	10.5%
Interventionist/Quasi-Experimental	10	5.2%
Other (e.g., Theoretical)	37	19.4%
<b>Total</b>	<b>191</b>	<b>100%</b>

**RQ2: How do these studies operationalise and measure educator digital competence, and which DigCompEdu areas are most and least represented?**

Analysis reveals a significant measurement gap and a narrow, technocentric conceptualisation of competence. A majority of studies did not employ a validated instrument for measuring digital competence, relying instead on unvalidated self-reports, qualitative feedback (Patel et al., 2018),

or implicit observation (Marquis et al., 2018; Settingington et al., 2023). As shown in Figure 4, the studies exhibit a preoccupation with technology as a tool, corresponding to Area 2 (Digital Resources) and Area 3 (Teaching & Learning) of the DigCompEdu framework. In contrast, there is a systemic neglect of Area 5 (Empowering Learners) and Area 6 (Facilitating Learners' Digital Competence), even though a growing body of theoretical work emphasises student empowerment (Felten et al., 2019; Stoddard et al., 2025).

Our cluster analysis revealed three distinct engagement archetypes (Table 3). The first, 'DigCompEdu-Light', is characterised by superficial, consultative student roles, such as providing feedback on existing resources (Isaeva et al., 2020). The second, 'Project/Hands-On', represents deep engagement where students co-design specific outputs like learning modules or virtual simulations (Cho et al., 2020; Killam & Luctkar-Flude, 2021). Finally, 'Full DigCompEdu' involves sustainable partnerships where students act as co-designers of the entire learning experience, addressing all six areas of the DigCompEdu framework (Felten et al., 2019; McIntosh & May, 2024).

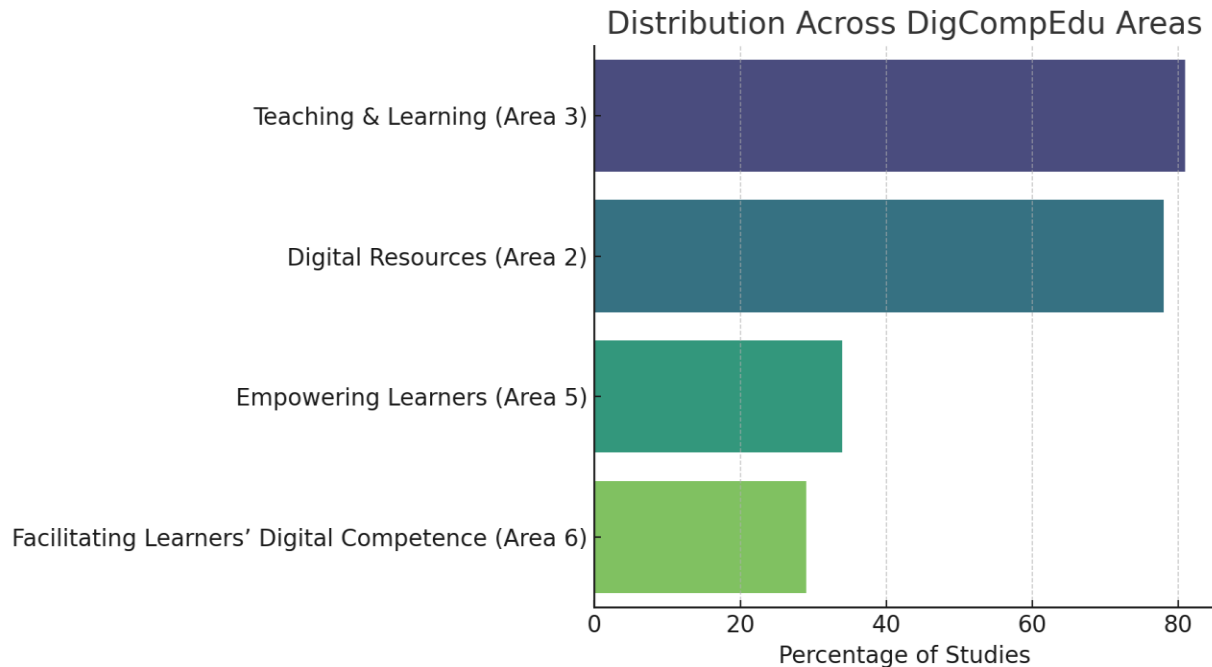
**Table 3**

*Co-Creation Engagement Archetypes Identified in the Corpus (N = 29)*

<b>Archetype</b>	<b>Key Characteristics (Student Role)</b>	<b>Typical Co-Creation Focus</b>	<b>DigCompEdu Area Coverage</b>
DigCompEdu Light	Consultative; students as feedback providers or testers.	Feedback on existing digital resources or course elements.	Narrow: Typically 1-2 areas (e.g. Area 2: Digital Resources).
Project/Hands-On	Active; students as co-producers of a defined output.	Co-design of a specific learning module, assessment, or digital resource.	Moderate: Typically 3-4 areas, focused on creation and teaching.
Full DigCompEdu	Partnership; students as co-designers of the learning experience.	Holistic curriculum design, pedagogical strategy, and assessment methods.	Broad: Touches on all 6 DigCompEdu areas, including empowerment and facilitation.

**Figure 4**

*Distribution Across DigCompEdu Areas (% of Studies)*



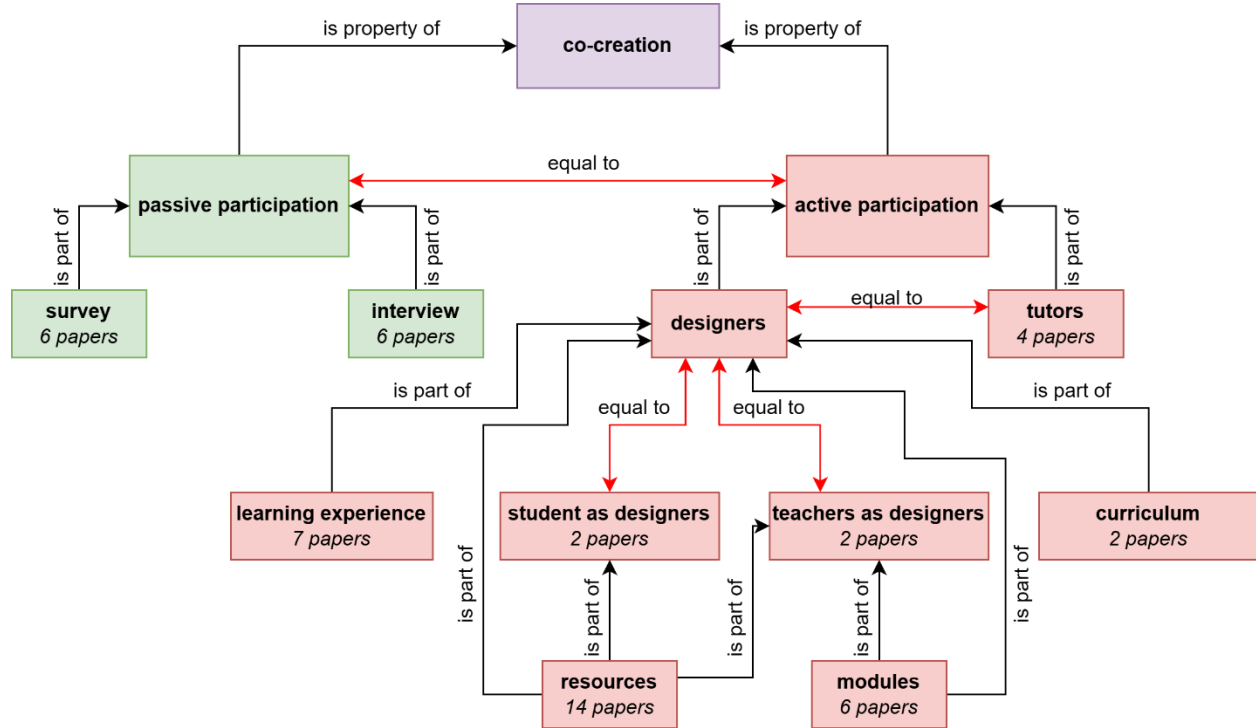
**RQ3: To what extent do co-creation initiatives report the deliberate development of (a) teachers' digital skills and (b) students' digital skills**

Across the final corpus of 29 studies, not a single one identified the systematic development of educators' digital skills as a primary, designed-for objective. Digital competence was consistently framed as a static input, a prerequisite for participation, rather than a dynamic output. While some studies note that staff skills can improve as a result of partnership (Marquis et al., 2018; Wakerley et al., 2024), this is reported as a secondary benefit.

As shown in Figure 5, students take on diverse roles, from giving feedback on online engagement (Gourlay et al., 2021; Judd et al., 2021) to co-designing assessments (Doyle et al., 2018) and creating digital learning resources (Cho et al., 2020). However, students are often seen only as receivers of co-creation, maintaining traditional teacher-student hierarchies instead of building real partnerships where all participants learn (Könings et al., 2020).

**Figure 5**

*Conceptual Network of Co-Creation Engagement Types*



**RQ4: What relationships, if any, are reported between the level of educator digital competence and the educational outcomes of co-creation initiatives (e.g., student engagement, sense of belonging, learning performance)?**

Findings suggest that while co-creation is not being used to build competence, a certain level of competence acts as a crucial prerequisite for success. Studies reporting higher levels of educator digital competence were significantly more likely to report positive outcomes, such as enhanced student engagement and a stronger sense of community (Tsui et al., 2024). Conversely, challenges such as communication breakdowns or 'Zoom fatigue' often point to underlying gaps in the digital capabilities of participants (Judd et al., 2021).

A closer look at the corpus synthesised in Table 4 reveals inconsistent measurement of educator digital competence, ranging from validated surveys in a minority of cases (Armellini et al., 2021; Moreira-Choez et al., 2024) to a complete absence of formal measurement in most studies (Cho et al., 2020; Doyle et al., 2018; Judd et al., 2021). This lack of rigour prevents the field from distinguishing between foundational skills and advanced competencies developed during the co-creation process (Könings et al., 2020; Zeivots et al., 2024).

**Table 4***Characteristics of Co-creation Studies from the Final Corpus of 29 Studies*

<b>Study</b>	<b>Country</b>	<b>Methodological Design</b>	<b>Co-creation Focus</b>	<b>DigCompEdu Areas Addressed</b>	<b>Measurement of Educator Digital Competence</b>	<b>Students Involved</b>
Armellini et al. (2021)	UK	Survey, focus groups	Active blended learning	2, 3, 4, 5	Survey (Self-assessment)	60
Killam & Luctkar-Flude (2021)	Canada	Design-based research	Virtual simulation	2, 3, 6	Observation	n/r
Lee et al. (2020)	Taiwan	Case, survey	Co-design cornerstone course	2, 3, 4	Survey	57
Settingington et al. (2023)	Canada	Design, evaluation	Interactive feedback	3, 4, 5	Implicit	176
Patel et al. (2018)	UK	Case study	Digital innovation partnership	1, 2, 3, 5, 6	Qualitative feedback	n/r
Snelling et al. (2019)	Australia	Case study	Design Thinking Framework	1, 3, 4, 5	Not measured	32+16
Zeivots et al. (2024)	Australia	Case studies / Practitioner inquiry	Collaborative curriculum development	1, 3, 4	Implicit / Reflective	n/r
Suhonen (2024)	Finland	Comparative case study	Using AI chatbots for learning support	3, 5, 6	Survey / Performance data	73
Wakerley et al. (2024)	UK	Case study	Co-creating an academic development course	1, 3	Qualitative feedback	n/r

López-Nuñez et al. (2024)	Spain (Global review)	Systematic Literature Review	Evaluation of digital competence	1, 2, 3, 4, 5, 6	n/a (review of tools)	n/r
Tsui et al. (2024)	Hong Kong	Case study / Mixed-methods	Curriculum co-creation with technology	1, 2, 3, 5	Survey / Observation	298
McIntosh & May (2024)	UK	Theoretical model	Model for co-creation (3 C's)	1, 3, 5	Not measured	n/r
Stoddard et al. (2025)	USA	Theoretical / Observations Article	Curriculum, instruction, and assessment in medical education	1, 3, 4, 5	Not measured (theoretical paper)	n/r
Gourlay et al. (2021)	UK	Mixed-methods (focus groups, survey) in a staff-student research partnership	Student experiences with online engagement during the COVID-19 crisis	2, 3, 5, 6	Not measured (focus on student experience)	55
Jamouli et al. (2022)	Morocco	Systematic Literature Review	Review of co-creation benefits (curriculum, resources, peer learning, research)	1, 2, 3, 4, 5, 6	n/a (review of literature)	n/r
Jost & Divitini (2021)	Norway	Between-subject trial / Design-based research	Co-creating educational games for privacy education	2, 3, 5	Not measured (focus on tool effectiveness)	61
Judd et al. (2021)	Australia	Mixed-methods (survey, focus groups, interviews)	The shift of student-staff partnership practices to an online environment during the pandemic	1, 2, 3	Not measured (focus on perceptions of online partnership)	28
Marquis et al. (2018)	Canada	Qualitative (focus groups, online reflective prompts)	The role of student-staff partnerships in the development of staff teaching practices	1, 2, 3, 5	Not measured (self-reported changes in practice)	n/r
Könings et al. (2020)	Netherlands / USA	AMEE Guide (literature review and practical guidance)	Learner involvement in the co-creation of teaching and learning	1, 2, 3, 5	n/a (guide/review)	n/r

Moreira-Choez et al. (2024)	Ecuador	Descriptive-correlational study (quantitative survey)	None. The study analyses educators' self-perception of their digital competence.	1, 2, 3, 4, 5, 6	Validated Instrument (DigCompEdu Check-In)	n/a (participants were 277 professors)
McIntosh et al. (2020)	UK / USA	Perspectives article / Theoretical model	Using technology ('flipped advising') for co-creation in academic advising and personal tutoring	1, 2, 3, 5	Not measured (theoretical)	n/r
Johnstone & Colantoni (2024)	UK	Co-design / Action Research	Co-design of a tutor induction program for apprenticeships	1, 3, 5	Not measured (focus on process design)	n/a (participants were tutors)
Dollinger (2018)	Australia	Concise Paper / Conceptual	Using technology for the scalability of co-creation with students	2, 3, 5	Not measured (conceptual paper)	n/r
Isaeva et al. (2020)	Estonia / Azerbaijan	Qualitative (semi-structured interviews)	Student engagement and dialogue in the quality assurance process	1, 3, 5	Not measured	27
Evans & Luke (2020)	UK	Mixed-methods (surveys, interviews, analytics) in a staff-student research partnership	Exploring student study practices with lecture capture technology	1, 2, 3	Not measured	n/r
Doyle et al. (2018)	Ireland	Exploratory case study (survey, instructor reflections)	Assessment co-creation (students creating MCQs)	2, 3, 4, 5	Not measured	159
Wang & Sun (2021)	Taiwan	Quasi-experimental research	Real-time virtual reality (VR) co-creation of text structure visualisations	2, 3, 5	Not measured (focus on student engagement)	66 (high school students)
Cho et al. (2020)	Canada	Case study (mixed-methods)	Co-creating supplemental learning resources (videos, practice problems)	1, 2, 3, 5	Not measured	12 + 205
Felten et al. (2019)	International	Perspectives article / Theoretical model	Reimagining the place of students in academic development	1, 3, 5	Not measured (theoretical)	n/r

## Discussion

The results of this review highlight several critical intersections and gaps between co-creation and digital competence. Regarding the publication trends and methodological approaches addressed in RQ1, the steep ascent in publications post-2020 strongly suggests a field reacting to the sector-wide crisis of the COVID-19 pandemic (Gourlay et al., 2021; Judd et al., 2021), which forced a rapid pivot to digital learning. This growth, however, is not globally distributed, creating an imbalance that risks a 'Matthew effect' in educational research. In such a scenario, evidence from well-resourced contexts is amplified, further marginalising alternative models and diverse local needs from the Global South. Methodologically, the heavy reliance on single-point-in-time surveys identified in RQ1 struggles to capture the processual and developmental nature of competence building, limiting the field's ability to track growth over time.

Furthermore, the conceptual barriers and technocentric gaps revealed by RQ2 underscore a lack of methodological rigour, pointing to a systemic failure to treat digital competence as a serious, researchable construct (López-Nuñez et al., 2024). The preoccupation with 'what' and 'how' (Areas 2 and 3) versus the 'why' (Areas 5 and 6) indicates a narrow, technocentric conceptualisation of competence, despite growing theoretical work emphasising student empowerment (Felten et al., 2019; Stoddard et al., 2025). The archetypal mapping associated with RQ2, from 'DigCompEdu-Light' to 'Full DigCompEdu', suggests that even the most advanced forms of co-creation currently stop short of their full potential for educator development. By aligning these archetypes with Bovill and Bulley's (2011) Ladder of Participation, it becomes clear that most initiatives remain consultative rather than truly transformative.

This leads to the missed opportunity for professional development identified in RQ3. The finding that no studies positioned teacher digital competence as an intentional outcome represents a systemic failure to leverage co-creation as a vehicle for professional learning. This problem stems from long-standing habits where professional development is treated as filling a gap, sending teachers to workshops to 'fix' skills, rather than ongoing, everyday learning (Könings et al., 2020). While current initiatives show students actively shaping education with digital tools and fresh perspectives, the failure to use such activities as developmental opportunities for staff leaves the transformative power of partnership unrealised. This prevents institutions from developing a more collaborative and flexible digital culture, as opportunities for mutual mentoring are overlooked.

Finally, the relationship between educator competence and outcomes explored in RQ4 carries a significant implication: if high digital competence is a prerequisite, it functions as a gatekeeper, risking the creation of a two-tiered system. Challenges in online partnerships often point to underlying gaps in digital capabilities (Judd et al., 2021), yet educators who could gain the most from co-creation are the least likely to take part, deepening the very digital gaps the institution wants to reduce. As RQ4 suggests, the link is likely not a simple linear path but a complex, cyclical one, mediated by institutional culture, pedagogical design (Zeivots et al., 2024), and trust (Könings et al., 2020). Without rigorous measurement, the field cannot distinguish between necessary foundational skills and the more advanced competencies developed through the co-creation process itself.

Collectively, these findings reveal a field with large potential that is currently constrained by methodological and conceptual limitations. This leads directly to the central argument of this review: the failure to design, implement, and assess co-creation as an intentional strategy for

professional development constitutes a significant missed opportunity for higher education institutions.

### **Limitations**

This review has several limitations inherent to the systematic review process. First, our search was restricted to peer-reviewed articles published in English, which may have excluded relevant studies from the grey literature or in other languages, potentially reinforcing the Euro-centric bias we identified. Second, the significant methodological heterogeneity and inconsistent reporting standards across the primary studies prevented a quantitative meta-analysis, meaning our conclusions are based on narrative synthesis rather than statistical aggregation. Furthermore, the application of exclusion criteria, reducing the corpus from 191 to 29 core studies serves to ensure methodological quality but acts as a limitation in itself. By prioritising peer-reviewed studies with explicit competence focus, we may have filtered out practice-based reports or emerging scholarship from under-resourced contexts that do not yet fit standard research moulds. This likely adds to the dominance of Global North countries already seen in our results. Finally, this review captures a snapshot of a rapidly evolving field; new research is constantly emerging that may begin to address the gaps highlighted here.

### **Practical Implications**

Despite the limitations, the findings yield clear implications for key stakeholders in higher education.

For university leaders and policymakers, investment in sustained, structured professional development for digital competence is not optional but essential, a point underscored by policy documents and institutional case studies (European Commission, 2020; Stare et al., 2023). Institutions should embed co-creation within institutional strategy not merely as a pedagogical choice, but as a core mechanism for staff development, digital transformation, and fostering inclusive learning communities (Cabral et al., 2023; Wakerley et al., 2024). The consequences of neglecting this development are significant. Recent research underscores that when educators lack the digital fluency to engage meaningfully, it compromises student belonging in remote environments by limiting relational teaching opportunities (Long & McLaren, 2024) and leaves students unguided in navigating ethical complexities such as digital piracy (Day, 2024). Furthermore, without intentional competence building, institutions risk relying on outdated technology acceptance models that prioritise intention over actual use (O'Dea et al., 2024). Addressing these gaps requires a shift from passive technology adoption to active pedagogical empowerment.

For educators and academic developers, co-creation projects should be designed with dual goals: enhancing the student learning experience and developing the digital skills of all participants (McIntosh & May, 2024). This requires moving beyond a narrow focus on content delivery to embrace digital tools and pedagogies that foster collaboration, creativity, and learner agency (Bovill, 2023; Tsui et al., 2024). Validated frameworks like DigCompEdu should be used to guide self-assessment and structure professional learning, addressing the measurement gaps identified in the literature (López-Nuñez et al., 2024; Redecker, 2017).

For students to be genuine partners in digital innovation, they require support. This includes providing training, resources, and clear roles to ensure they can contribute effectively and that

their contributions are recognised and valued (Felten et al., 2019; Patel et al., 2018). We caution against the uncritical export of Euro-centric partnership models to Transnational Education (TNE) or Global South contexts. In settings where high-speed connectivity is not guaranteed, or where cultural norms regarding 'student voice' differ, co-creation should be differentiated. Initiatives in these contexts may need to prioritise mobile-first literacies and community-based partnership models over the resource-intensive digital design often seen in the Global North.

## Conclusion

This systematic review set out to map the intersection of student–staff co-creation and educator digital competence. We found a growing field of research that affirms the critical role of digital skills in enabling successful partnerships. Higher educator competence correlates with better educational outcomes, validating the idea that technology-enhanced co-creation depends on digitally confident staff (Tsui et al., 2024; Wakerley et al., 2024). However, our synthesis exposes a profound and consequential gap: co-creation is almost never intentionally designed as a vehicle for developing educators' digital competence (Moreira-Choez et al., 2024). This blind spot represents a major opportunity. By treating competence as a static prerequisite rather than a dynamic outcome, higher education institutions are failing to leverage one of the most powerful, authentic, and engaging forms of professional learning available.

This is more than a missed pedagogical opportunity; it is a strategic blind spot. In an era where institutional agility and digital transformation are paramount, failing to leverage co-creation as a mechanism for faculty development means universities are neglecting their most valuable, authentic, and sustainable resource for innovation: the symbiotic relationship between educators and learners. This perpetuates a model of top-down, decontextualised professional development that is often ineffective and fails to build the agile, digitally confident faculty required to navigate future educational disruptions.

To move forward, the field must do more than simply acknowledge this gap; it must actively design new models of partnership. Our cluster analysis further revealed three distinct engagement archetypes within the literature: (1) 'DigCompEdu-Light', the most common, marked by superficial student roles and a narrow focus on basic technology use; (2) 'Project/Hands-On', involving active student participation in creating specific outputs and addressing a moderate range of competencies; and (3) 'Full DigCompEdu', the least common but most comprehensive, where students act as co-designers across all six areas of the framework. This typology makes one step forward for understanding how engagement depth shapes competence development and highlights that even advanced models still fall short of realising the full potential of co-creation for educator growth.

In terms of RQ1, on publication trends and methodological approaches, our analysis revealed a rapidly growing field, with publication counts significantly rising since 2020, but marked by geographical skew toward Europe and under-representation of the Global South. The evidence base is methodologically heterogeneous: quasi-experimental trials with controlled digital interventions coexist with surveys and reflective case studies, yet uneven reporting - such as missing participant numbers or demographics - limits equity and transferability. RQ2, on how competence is measured, showed that fewer than 40% of studies use validated DigCompEdu instruments. The literature clusters strongly around Areas 2 (Digital Resources) and 3 (Teaching and Learning), while Areas 5 (Empowering Learners) and 6 (Facilitating Learners' Digital

Competence) are consistently underrepresented, reflecting a more technologically oriented approach. RQ3, on whether digital skills are deliberately developed, revealed that none of the studies positioned teacher digital competence as an intentional outcome of co-creation. Instead, competence is often measured post hoc (López-Nuñez et al., 2024) or assumed as an entry-level prerequisite, a blind spot that risks perpetuating digital divides. Equally concerning, only a minority of studies track student digital literacies, despite growing evidence that such skills predict persistence and employability (Kahu & Nelson, 2018; Killen & Langer-Crame, 2020). RQ4, on the relationship between competence and outcomes, confirmed that higher educator digital competence aligns with stronger student engagement, belonging, and learning gains, particularly in projects enacting the full DigCompEdu framework. Yet there is a lack of strong evidence, as most studies remain cross-sectional, leaving indirect pathways - such as emotional engagement or learning agility - underexplored.

To move forward, the field must embrace a new paradigm that views co-creation as a dual developmental journey. This illuminates a clear agenda for future research, which could deliberately situate reciprocal capacity-building for both staff and students at the heart of partnership design (McIntosh & May, 2024). There is a need for longitudinal, interventionist studies that evaluate such initiatives over time, alongside comparative research to address the current geographical skew (Bovill, 2023). Furthermore, progress depends on the wider adoption of validated instruments to measure digital competence, which would allow for more robust and cumulative findings across the field (López-Nuñez et al., 2024; Redecker, 2017). By pursuing this agenda, we can transform co-creation from a series of isolated projects into a sustainable engine for systemic digital empowerment. The ultimate goal is not merely to prepare for the future, but to foster learning communities with the collective agency to co-create the very future of the university itself - one that is more collaborative, digitally fluent, and profoundly human, in line with the strategic visions of UNESCO (2022) and the European Commission (2020). Ultimately, the 'golden thread' connecting these findings is the paradox of prerequisite competence: while educator digital competence is essential for successful co-creation, co-creation is rarely designed to build it. This review contributes a new typology of engagement, from 'DigCompEdu-Light' to 'Full DigCompEdu' to help educators diagnose and deepen their practice. The primary barrier remains the 'gatekeeper effect', where only digitally confident staff engage in partnership. To overcome this, institutions should shift from viewing co-creation as a privilege for the digitally fluent to utilising it as a capacity-building engine for all.

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