

Digital Learning for Civic and Identity Development in Higher Education: A Systematic Scoping Review

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DOI: <https://doi.org/10.47772/IJRISS.2026.100800826>

Received: 3 September 2026; Accepted: 9 September 2026; Published: 18 September 2026

ABSTRACT

Background: Digital learning increasingly mediates how university students encounter public issues, participate in dialogue, evaluate information, and negotiate cultural belonging. However, evidence concerning civic and identity development remains dispersed across digital-citizenship, virtual-exchange, intercultural-learning, and cultural-identity literatures. **Objective:** This review mapped forms of digital learning used in higher education, associated outcomes and mechanisms, and evidence gaps relevant to future research on Chinese national awareness. **Methods:** Following JBI guidance, PRISMA-ScR, PRISMA 2020, and PRISMA-S, OpenAlex, ERIC, and Crossref were searched on 20 August 2026 for English-language, DOI-verifiable records published from 2020 to the search date. The search identified 2,994 database records, and citation checking identified one additional record. After removal of 475 duplicates and 2,360 records through rule-based preliminary triage, 160 titles and abstracts and 45 full texts were manually screened. Eligible studies were charted and narratively synthesized. **Results:** Thirty-seven studies were included. Evidence clustered into structured civic and digital-citizenship instruction, virtual exchange and dialogic learning, digital narrative and cultural-identity work, and enabling capabilities and institutional conditions. Structured inquiry, source evaluation, guided reflection, sustained dialogue, and student production were associated with stronger civic knowledge, digital responsibility, intercultural perspective-taking, cultural confidence, or identity articulation. Affective and durable identity outcomes were less consistently demonstrated than knowledge and skills. **Conclusion:** Pedagogy, rather than technology access alone, was the principal developmental mechanism. Evidence remains limited by heterogeneous measures, short interventions, self-report designs, uneven geographic coverage, ranked-result retrieval, and few controlled or longitudinal studies. Future research should distinguish technology use from pedagogical transformation, preserve boundaries among national, cultural, digital, and global identities, and test longer-term outcomes with context-sensitive measures.

Keywords: digital learning, civic education, cultural identity, higher education, scoping review

INTRODUCTION

Digital tools now structure much of higher education through learning management systems, mobile applications, virtual exchange, social media, digital storytelling and artificial intelligence. They can expand access and expression, but can also reproduce passive teaching, shallow interaction and unequal participation. The educational issue is therefore not whether universities use technology, but how digital affordances are organized into learning experiences.

Civic and identity development involve knowledge, values, emotion, participation and belonging. Distributing civic content does not show that students have evaluated information, reflected on public issues or developed attachment. Online civic learning and expression have been linked to engagement (Hsu et al., 2021), lateral-reading instruction improved source evaluation (Brodsky et al., 2021), and virtual-exchange outcomes varied with course design (O'Dowd, 2021). Together, these findings identify pedagogy as the link between technology and outcomes.

The field is conceptually fragmented. Digital citizenship concerns safe, ethical, critical and participatory online behavior; virtual exchange often targets global citizenship and intercultural competence; digital identity concerns self-representation; and cultural or national identity concerns collective memory, belonging and attachment. These constructs overlap but are not interchangeable. Intercultural openness is not national awareness, and technical competence is not civic responsibility.

Nevertheless, these areas share a mechanism: digitally mediated participation exposes students to narratives, public issues and opportunities for self-representation. Chinese students who created native-culture digital stories reported stronger cultural awareness and confidence as cultural ambassadors (Liang et al., 2026), while rural migrant learners used digital literacies to challenge marginalized identities (Liu, 2025). By contrast, few conventional Blackboard courses produced higher-level identity change (Kwon et al., 2021), suggesting that participation and design matter more than platform presence. For Chinese national-awareness research, adjacent studies offer tested pedagogies, including civic projects, guided dialogue, source evaluation, digital storytelling and collaborative reflection. However, few higher-education studies directly measure national identity or national-cultural awareness. Such outcomes cannot be inferred from digital citizenship or intercultural competence without a clear theoretical and measurement bridge. A scoping review is suitable because the evidence spans surveys, quasi-experiments, mixed methods, ethnographies and practice reports. It maps concepts, designs and mechanisms rather than estimating a pooled effect. The 2020 starting point reflects the expansion of digitally mediated higher education during and after COVID-19.

This review asks three questions:

What forms of digital learning have been studied in relation to civic and identity-related outcomes in higher education?

What outcomes, mechanisms, and boundary conditions are reported across the evidence?

What gaps are most relevant to future research on Chinese national awareness and pedagogical transformation?

The review contributes a structured evidence map and a design-oriented interpretation while defining the limits of claims that can be made before participant-based research in Chinese universities.

Methods

Review design and reporting

The review used a systematic scoping design informed by JBI guidance (Peters et al., 2020). Reporting followed PRISMA-ScR (Tricco et al., 2018), the PRISMA 2020 flow structure (Page et al., 2021) and PRISMA-S principles (Rethlefsen et al., 2021). The protocol was not prospectively registered. The complete evidence chart, search record, full-text exclusions, and completed PRISMA-ScR checklist appear in Supplementary Files 1 and 2.

Eligibility framework

Eligibility was defined through Population, Concept and Context (PCC). Peer-reviewed empirical studies and evidence-bearing practice reports were eligible because scoping reviews map diverse and early-stage evidence as well as conventional quantitative studies.

Table 1: PCC Framework and Eligibility Criteria

PCC Element	Included	Excluded
Population	Higher-education students, teacher candidates, or staff when the study examined a student-facing learning environment.	Primary or secondary school populations; professional populations without a higher-education learning context.

Concept	Intentional digital pedagogy or educationally situated digital activity linked to civic, national, cultural, digital, collective, or global identity; citizenship; civic competence or engagement; intercultural competence; or belonging.	Generic technology acceptance, academic performance, or professional identity without a civic or identity-related learning outcome.
Context	Universities, colleges, and comparable tertiary institutions in any country; formal, non-formal, or course-connected settings.	Non-educational social-media studies with no learning connection; school-only settings.
Evidence	Peer-reviewed empirical article or evidence-bearing practice report, English-language record, publication date 2020 to 20 August 2026, and verifiable DOI.	Review, editorial, opinion, protocol, purely conceptual paper, preliminary research-in-progress report, unverifiable DOI/title match, or insufficient outcome evidence.

Information sources and search strategy

OpenAlex, ERIC and Crossref were searched on 20 August 2026. Ten concept strings combined a digital mode, educational setting, higher-education population and civic or identity outcome. The full strings are provided in Supplementary File 2.

The search covered 1 January 2020 to 20 August 2026. OpenAlex and Crossref returned the first 100 ranked records per string; ERIC returned up to 200 before the date limit. The sources yielded 2,994 records. Citation checking added one study directly examining ICT-based civic learning and nationalism (Sarbaini et al., 2026). Ranked open-index retrieval is treated as a limitation, not as equivalent to unrestricted subscription-database searching.

Record management and selection

Records were normalized and deduplicated by DOI or, when absent, normalized title, removing 475 duplicates. Rule-based preliminary triage required a usable abstract, DOI, digital component, higher-education and educational terms, a civic or identity outcome, and an empirical indicator. The rules initially set aside 2,369 records; targeted checks reinstated nine for manual review, leaving 2,360 records excluded and 160 records for manual screening. All records retained after triage were manually screened, but the triage stage remains a source of selection risk.

Of 160 title/abstract records screened, 45 reports underwent full-text assessment. Eight were excluded: three were non-empirical, two lacked student-level outcomes, one was preliminary, one used a school population and one DOI resolved to an unrelated article. Thirty-seven studies were included after checks against publisher pages, accessible full text and DOI metadata.

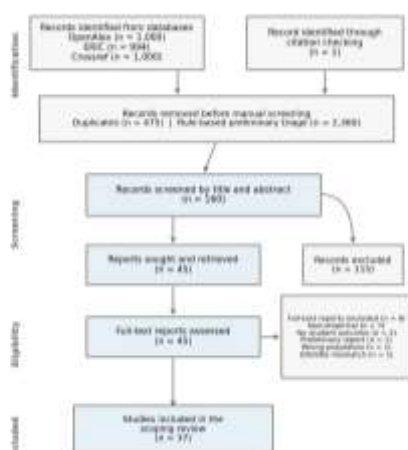


Figure 1: PRISMA Flow Diagram for Study Selection

Note. Rule-based preliminary triage applied explicit eligibility terms; all retained records then underwent manual screening and source verification.

Data charting and synthesis

A structured chart recorded author, year, setting, design, sample, digital environment, target outcome and main finding. Sample sizes were not summed because several reports were incomplete and two Ghanaian studies appeared to use an overlapping cohort (Arkorful et al., 2024; Salifu et al., 2025).

Narrative synthesis was used because interventions, measures and outcomes were heterogeneous. Iterative coding produced four clusters: structured civic instruction; virtual exchange and dialogue; digital narrative and cultural identity; and enabling capabilities and institutional conditions. Controlled or pre-post findings were weighted more strongly than cross-sectional associations or participant perceptions.

Appraisal, verification, and AI-assisted workflow

Consistent with the mapping purpose, no formal risk-of-bias score was used to exclude studies. Design type was recorded, and causal language was avoided for non-experimental evidence. OpenAI ChatGPT (accessed 3 September 2026) was used as an assistive tool for duplicate-record organization, preliminary keyword triage, evidence-chart organization, structural compression, document formatting and English-language editing. It did not independently select sources, determine study eligibility, perform final data extraction, generate research evidence or make interpretive decisions. The authors manually verified all included studies, DOI records, extracted information, references and final wording, and retained responsibility for all methodological and interpretive decisions.

RESULTS

Study selection

The process yielded 37 DOI-verifiable studies. Full-text exclusions are reported in Supplementary File 2, and the included evidence is charted in Supplementary File 1.

Publication pattern and study design

Publication increased overall from three studies in 2020 to six in 2026; the highest annual counts were seven studies in 2021, 2022, and 2024. Evidence covered Asia, Europe, North America, the Middle East, Africa, and transnational projects, with especially visible work in Indonesia, China, Japan, Turkey or Northern Cyprus, and the United States.

Twelve studies were cross-sectional or descriptive quantitative investigations and eight used comparative or pre-post designs. Only three included a control or matched comparison: Chinese native-culture storytelling, United States lateral-reading instruction and Indonesian mobile civic learning (Liang et al., 2026; Brodsky et al., 2021; Japar et al., 2021). Seventeen used qualitative, mixed, ethnographic, course-site, focus-group or practice designs.

Table 2: Distribution of Included Evidence

Publication Year	Studies	Main Emphasis
2020	3	Baseline digital-citizenship knowledge, awareness, and e-learning attitudes
2021	7	Mobile civic learning, fact-checking, virtual exchange, LMS identity, online civic engagement
2022	7	Global citizenship, values, national identity, digital identity, online dialogue
2023	2	Digital-citizenship practices and collective identity in virtual exchange

2024	7	Virtual exchange, digital citizenship courses, civic media, service-learning, and global dialogue
2025	5	AI-supported cultural empathy, digital empowerment, social-media identity, virtual-exchange resistance, and gender disparity
2026	6	Participatory digital civics, augmented reality, digital storytelling, nationalism, intercultural empathy
Design summary	37	12 cross-sectional/descriptive; 8 intervention or pre-post; 17 qualitative, mixed, or practice-based

Cluster 1: structured civic and digital-citizenship instruction

Structured tasks produced the clearest change. Project Citizen Digital improved civic competence among 80 Indonesian undergraduates ($p = .003$, $d = 0.34$), with larger gains in knowledge and participatory skills than dispositions; a Moodle digital-citizenship course also produced positive pre-post change (Dahliyana et al., 2026; Bal & Akcil, 2024). Lateral-reading instruction improved source investigation and credibility judgments, whereas 263 comparison students commonly used weak strategies (Brodsky et al., 2021; Breakstone et al., 2022).

Mobile civic learning yielded higher scores in the experimental than control class (83.25 versus 73.25), and an augmented-reality application supported hoax awareness and civic communication (Japar et al., 2021; Fadhillah et al., 2026). Overall, explicit, guided and assessed activities improved knowledge, source evaluation and participation more reliably than durable dispositions or national attachment.

Cluster 2: virtual exchange and dialogic learning

Virtual exchange was the largest pedagogical family. Across 345 portfolios from 13 exchanges, learners reported reduced stereotypes and greater communicative confidence, but outcomes varied by task design (O'Dowd, 2021). Repeated, facilitated dialogue supported listening and respect, while asynchronous and social-VR exchanges improved several intercultural dimensions (Helm et al., 2024; Chu et al., 2024; Gruber & Wagner, 2024).

Contact alone did not ensure openness. Engagement varied with anxiety, language demand, pacing and expectations; cognitive perspective-taking changed more consistently than affective empathy, and racial identity often required explicit prompting (Sandu, 2025; Taniguchi & Macknish, 2026; van Blommestein & Bellot, 2023). Exchange widened access when participation was supported and relationships had time to develop (Poe, 2022; Dietrich, 2022).

Cluster 3: digital narrative and cultural-identity work

Digital storytelling provided the most direct connection to cultural identity. In a controlled eight-week study of 281 Chinese English majors, native-culture storytelling predicted stronger national-cultural sense ($\beta = .252$) and cultural awareness ($\beta = .328$), with students describing greater confidence as cultural ambassadors (Liang et al., 2026). Vietnamese multimodal storytelling similarly supported reflection, openness, self-exploration and connectedness (Do et al., 2026).

Beyond formal assignments, rural migrant learners used digital literacies to contest marginalized identities, while Black journalism students used media to develop counter-narratives, critical literacy and civic pathways (Liu, 2025; Evans & Ezenna, 2024). Cross-sectional studies linked social media with identity development and perceived national identity but could not establish causality (Astleitner & Schlick, 2025; Hammad & Awed, 2022). Authorship was more educationally meaningful than exposure alone.

Cluster 4: enabling capabilities and institutional conditions

Capabilities and context shaped outcomes. In Ghana, problem solving, collaboration and content creation predicted digital citizenship more strongly than technical safety; a related cohort linked critical perspective and networking agency with political activism (Arkorful et al., 2024; Salifu et al., 2025). Values, cultural empathy,

civic learning and online expression also supported digital participation across Romanian, Israeli and Taiwanese samples (Assante et al., 2022; Finkelstein & Soffer-Vital, 2025; Hsu et al., 2021).

Preparation gaps persisted in source credibility, digital law, safety and academic trace awareness, although sustained workshops improved identity management (Al-Abdullatif & Gameil, 2020; Tangül & Soykan, 2021; Hernández-Orellana et al., 2021; Borrás-Gené et al., 2022). Institutional studies showed that LMS add-ons, fragmented civic programmes and weak coordination rarely produced dialogic, justice-oriented or national learning without deliberate redesign (Kwon et al., 2021; Sarbaini et al., 2026; Aramburuzabala et al., 2024; Pietersen, 2022).

Cross-study synthesis and evidence gaps

Table 3: Synthesis of Mechanisms, Outcomes, and Limitations

Evidence cluster	Main mechanisms	Most common outcomes	Main limitations
Structured civic instruction	Participatory project work, mobile learning, augmented reality, lateral reading, online course	Civic knowledge, fact-checking, communication, participatory skill	Short interventions; few controls; dispositions changed less than skills
Virtual exchange and dialogue	Repeated contact, facilitated discussion, reflection, collaborative tasks	Global citizenship, intercultural competence, empathy, reduced stereotypes	Engagement was uneven; shallow contact, language anxiety, and avoidance of difference limited change
Narrative and identity authorship	Digital storytelling, multimodal production, counter-narrative, autonomous literacies	Cultural awareness, identity confidence, belonging, voice, national-cultural sense	Small or local samples; ethical and privacy concerns; limited longitudinal evidence
Capabilities and conditions	Critical literacy, values, empathy, social agency, teacher readiness, institutional coordination	Digital citizenship, civic engagement, collaborative self-efficacy	Mostly cross-sectional; technical skill often confused with civic development

Only a small group of studies directly measured national identity, nationalism or national-cultural awareness (Hammad & Awed, 2022; Liang et al., 2026; Sarbaini et al., 2026). Their designs were too different for a common effect estimate. No included study used longitudinal, multi-university data to test pedagogical transformation as a mediator between digital tools and national awareness.

DISCUSSION

Central finding: pedagogy is the mechanism

Digital tools did not produce civic or identity development by themselves. They provided access, representation, interaction and feedback, while pedagogy determined whether these affordances became learning. Stronger studies required students to investigate, create, deliberate, explain or collaborate; weaker outcomes followed information delivery or unguided exposure. The mechanism therefore has three layers: a digital affordance, a pedagogical process involving structure, facilitation, reflection and assessment, and an outcome in knowledge, skill, emotion, identity or action.

Knowledge and skills change faster than dispositions

Cognitive and practical outcomes changed more readily than affective ones. Fact-checking, civic knowledge,

communication and identity management responded to short instruction, whereas disposition, affective empathy, belonging and national attachment were less consistent (Dahliana et al., 2026; Taniguchi & Macknish, 2026). National-awareness studies should therefore separate cognitive, affective and behavioral dimensions and include delayed follow-up where feasible.

National and intercultural identity should not be collapsed

National, cultural, digital, global and intercultural outcomes may share educational mechanisms but should not form one undifferentiated scale. National awareness concerns understanding of and attachment to a national community; intercultural competence concerns engagement across difference; and digital citizenship concerns responsible participation in digital society. Digital storytelling shows that students can communicate local or national culture while developing intercultural openness, provided that tasks require reflective comparison and responsible representation (Do et al., 2026; Liang et al., 2026).

Design principles for higher education

Six design principles recur:

Anchor digital activity in a meaningful civic issue, cultural narrative, community or public problem.

Require active inquiry or production through stories, source checks, policy tasks or collaborative outputs.

Use guided reflection to connect experience with identity, values and assumptions.

Sustain facilitated dialogue long enough for relationships and affective learning to develop.

Teach source evaluation, ethical participation and digital responsibility explicitly.

Design for inclusion through access, language support, privacy, teacher readiness and coordination.

Implications for future Chinese empirical research

Future Chinese research should measure digital-tool access and use separately from pedagogical transformation, which should capture active learning, dialogue, cultural relevance, reflection, feedback and student authorship. National awareness should be measured across cognitive, affective and behavioral dimensions. This separation supports a testable mediation model in which digital tools enable changed pedagogy and changed pedagogy influences national awareness. Multi-university, time-lagged designs, bias controls and explanatory interviews or artifacts would provide stronger evidence than a single cross-sectional survey.

LIMITATIONS

The review used ranked results from three open indexes rather than unrestricted subscription databases; English-language and DOI rules excluded other evidence. Rule-based triage and single-reviewer screening increased selection risk. Heterogeneous designs were mapped without formal quality scoring, so findings are not pooled effectiveness estimates. Finally, most studies measured digital citizenship, intercultural competence or cultural identity rather than national awareness directly. These constraints limit generalization but define the priorities for subsequent research.

CONCLUSION

Digital learning can support civic and identity development when pedagogy turns technological affordances into structured inquiry, participation, source evaluation, sustained dialogue, storytelling and reflection. Knowledge and practical skills changed more consistently than affective outcomes, and exposure alone was insufficient. For Chinese national-awareness research, the evidence supports a mediated pathway from digital tools through pedagogical transformation to a distinct, directly measured outcome. Longitudinal, multi-university research is

required to test that pathway.

DECLARATIONS

Ethics approval and consent to participate: Not applicable; the review used published literature and no identifiable participant data.

Consent for publication: Not applicable.

Funding: No specific funding was received for this review. Funding of included studies was not charted.

Conflict of interest: The authors declare no conflict of interest.

Data availability: The evidence chart is provided in Supplementary File 1; the search strategy, full-text exclusion reasons, and completed PRISMA-ScR checklist are provided in Supplementary File 2.

Author contributions: **Guilin Li:** Writing – original draft. **Noryati Alias:** Supervision; Writing – review and editing. Both authors reviewed and approved the final manuscript.”

Acknowledgements and Generative AI Disclosure: OpenAI ChatGPT (accessed 3 September 2026) assisted with English-language editing, structural compression, document formatting, preliminary record organization and evidence-chart organization. It was not used as an author, a source of research evidence or a decision-maker. All outputs were critically reviewed and revised by the authors, who independently verified the included studies, extracted data, interpretations and references and accept full responsibility for the accuracy and integrity of the manuscript.

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Supplementary File 1: Evidence Chart of Included Studies

Supplementary material for: Digital Learning for Civic and Identity Development in Higher Education: A Systematic Scoping Review. The chart reports the design and findings relevant to the review and does not replace a formal risk-of-bias assessment. NR indicates that a complete sample size was not reported in the abstract or accessible full-text section used for charting. Full bibliographic details are provided in the article reference list.

Table S1: Evidence chart of included studies

Study and Setting	Design and Sample	Digital Setting and Outcome	Main Findings Relevant to the Review
Sarbaini et al. (2026), Indonesia	Qualitative grounded study; students and lecturers across three departments (at least 40 students plus a full first-year cohort)	ICT-integrated civic education, extracurricular learning, and social media; nationalism	Management was fragmented. Memorization dominated formal teaching, while experiential and interactive uses were more supportive of cognitive, affective, and behavioral nationalism.
Dahliyana et al. (2026), Indonesia	One-group quasi-experiment; 80 undergraduates	Project Citizen Digital; civic knowledge, participatory skills, and dispositions	Overall civic competence improved ($p = .003$, $d = 0.34$). Knowledge and participatory skills changed more than civic dispositions.
Fadhillah et al. (2026), Indonesia	Qualitative case study; 15 communication students	Augmented-reality digital citizenship application; civic communication	Students reported better recognition of digital citizenship, hoax awareness, and opportunities to practice social and cultural literacy through civic communication.
Liang et al. (2026), China	Controlled mixed-method intervention; 281 English majors; eight weeks	Native-culture digital storytelling; cultural confidence and awareness	The intervention predicted stronger national-cultural sense and cultural awareness. Students described a more confident identity as cultural ambassadors.

Table S1 (continued): Evidence chart of included studies

Study and Setting	Design and Sample	Digital Setting and Outcome	Main Findings Relevant to the Review
Do et al. (2026), Vietnam	Exploratory sequential mixed methods; 94 digital stories and 69 survey responses	Microsoft Sway digital storytelling; intercultural awareness and critical reflection	Narrative production supported self-exploration, openness to difference, inclusion, and social connectedness in asynchronous learning.
Taniguchi & Macknish (2026), United States/Japan	Qualitative pre-post study; 34 students	Six-week synchronous virtual exchange with reflection and bilingual support	Students reported moderate gains in cultural self-awareness and cognitive empathy, but limited change in affective empathy, suggesting that brief contact is insufficient for deeper relational change.

Finkelstein & Soffer-Vital (2025), Israel	Cross-sectional quantitative study; 258 bachelor's and master's students	AI-supported computer-supported collaborative learning; cultural empathy	Cultural empathy mediated the links from social competence and emotional stability to self-efficacy for collaborative digital learning.
Liu (2025), China	Connective ethnography; two rural migrant EFL learners	Autonomous digital literacies beyond the classroom; identity and investment	Digital participation helped learners access symbolic resources, reframe marginalized rural identities, and claim a legitimate right to speak.

Table S1 (continued): Evidence chart of included studies

Study and Setting	Design and Sample	Digital Setting and Outcome	Main Findings Relevant to the Review
Sandu (2025), Japan	Qualitative pre-post questionnaires; 110 students	Eight-week asynchronous virtual exchange; intercultural engagement and resistance	Engagement was not automatic. Five patterns showed that openness, anxiety, language demands, and interaction pace could shift students toward either engagement or resistance.
Salifu et al. (2025), Ghana	Cross-sectional survey; 247 economics students	Digital citizenship; gender and internet political activism	Digital citizenship was moderate. Men reported higher internet political activism, while critical perspective and networking agency predicted activism across the sample.
Astleitner & Schlick (2025), higher education context	Exploratory survey and model development; 230 students	Social media use during class; identity development and learning support	Identity development involved impression management, comparison, and self-concept clarification. Learning support and distracting parallel use coexisted.
Arkorful et al. (2024), Ghana	PLS-SEM survey; 247 students (likely overlapping with Salifu et al.)	Digital competencies and digital citizenship	Problem solving, communication/collaboration, and content creation positively predicted digital citizenship. Technical safety alone was not sufficient.

Table S1 (continued): Evidence chart of included studies

Study and Setting	Design and Sample	Digital Setting and Outcome	Main Findings Relevant to the Review
Gruber & Wagner (2024), United States/Germany	Mixed preliminary study; 15 university learners	Six-week social-VR virtual exchange on sustainability; intercultural citizenship	Participants developed intercultural competence and critical language awareness and valued VR for relationship building, but the small sample limits inference.

Chu et al. (2024), Japan/Taiwan	Mixed pre-post study; effective sample about 32	Five-week asynchronous video exchange on sustainable tourism	Post-test scores increased in four of five intercultural-competence dimensions; reflections emphasized communication, culture, and interpersonal learning.
Bal & Akcil (2024), Northern Cyprus	Parallel mixed-method quasi-experiment; 39 teacher candidates	Moodle-based digital citizenship course	Digital citizenship behavior and attitudes increased from pretest to posttest with a large reported effect; participants evaluated the course positively.
Aramburuzabala et al. (2024), European higher education	Qualitative focus groups with students, faculty, and community partners	Digital service-learning and empowerment	Participants saw transformative potential when digital empowerment was tied to social purpose, but access, readiness, coordination, and community partnership were necessary conditions.

Table S1 (continued): Evidence chart of included studies

Study and Setting	Design and Sample	Digital Setting and Outcome	Main Findings Relevant to the Review
Evans & Ezenna (2024), United States	Interviews; 28 Black journalism students	Popular and social media as connected civic learning	Students used media discourse, community obligation, and online activism to build critical media literacy, civic pathways, and counter-narratives of Black identity.
Helm et al. (2024; online 2023), Europe/Southern Mediterranean	Mixed analysis; 1,127 open-survey responses plus focus groups	Facilitated online dialogue for global citizenship	Students emphasized active listening, respect for different views, and learning through encounters. Sustained facilitation produced stronger outcomes than shallow exchange.
Gu et al. (2023), Hong Kong	Qualitative study of bilingual university students; interviews and digital-practice examples	Translingual social-media practices; digital citizenship	Digital citizenship was constructed through social, cultural, educational, and professional practices, with learner agency across languages and modes.
van Blommestein & Bellot (2023), United States/Spain	Practice report; 100 enrolled, 94 pre-surveys and 78 post-surveys	COIL literary course on culture, ethnicity, race, and identity	Students articulated individual and collective identities, but racial cognizance often disappeared in group representations, showing the need for explicit intersectional prompts.

Table S1 (continued): Evidence chart of included studies

Study and Setting	Design and Sample	Digital Setting and Outcome	Main Findings Relevant to the Review
Poe (2022), United States	Mixed qualitative design; survey of 42 students plus interviews and field notes	International virtual exchange; global citizenship and inclusion	Underrepresented students reported bias reduction, equality in digital space, and connections beyond class, suggesting a lower-cost route to international learning.

Assante et al. (2022), Romania	Cross-sectional SEM; 536 students	Personal values, critical dispositions, and digital citizenship	Universalism and learning orientation positively predicted digital citizenship. Technical participation was therefore linked to values and critical orientation, not skill alone.
Hammad & Awed (2022), Saudi Arabia	Cross-sectional survey; 283 university students	Everyday social media use; national identity	Students reported that social media strengthened national identity, but the design did not establish a causal pedagogical effect.
Borrás-Gené et al. (2022), Spain	Four-year pre-post workshop evaluation; 209 respondents from 222 attendees	Professional and academic digital-identity workshop	Post-workshop responses improved on most identity-management items, especially reflection on public profiles and professional digital presence.

Table S1 (continued): Evidence chart of included studies

Study and Setting	Design and Sample	Digital Setting and Outcome	Main Findings Relevant to the Review
Breakstone et al. (2022), United States	Performance assessment; 263 college students	Evaluation of online sources about public-policy issues	Most students used weak strategies for judging credibility, indicating that common university advice did not adequately prepare them for civic online reasoning.
Pietersen (2022), South Africa	Qualitative questionnaire; 30 lecturers	LMS-based dialogical pedagogy; inclusion and active citizenship	Critical dialogue and justice-oriented participation were weakly cultivated. The study called for online spaces that position students as cared-for and active contributors.
Dietrich (2022), United States/Afghanistan	Qualitative reflection study; 18 TESOL graduate students paired with Afghan learners	Ten-session synchronous virtual exchange	Reflections showed shifts in cultural knowledge, assumptions, and asset-based teaching, although outcomes were reported only by the graduate-student side.
O'Dowd (2021), Spain/international partners	Qualitative content analysis; 345 learner portfolios from 13 exchanges	Course-integrated virtual exchange	Students reported reduced stereotypes and greater confidence. Comparison across exchange models showed that task design shaped learning outcomes.

Table S1 (continued): Evidence chart of included studies

Study and Setting	Design and Sample	Digital Setting and Outcome	Main Findings Relevant to the Review
Hsu et al. (2021), Taiwan	Cross-sectional survey with SEM; sample size not reported in the abstract	Online civic learning and expression; civic engagement	Online civic learning and online civic expression fully mediated the relationship between civic responsibility and online civic engagement.

Brodsky et al. (2021), United States	Matched-course quasi-experiment; 136 intervention and 94 control students	Lateral-reading curriculum in a general-education civics course	Intervention students were more likely to read laterally and correctly evaluate source trustworthiness than controls.
Kwon et al. (2021), United States	Course-site analysis; 53 Blackboard sites and 41 course evaluations	Online learning community; learner, instructor, and LMS identity	Few courses reached higher levels of identity change. Authentic online learning required the LMS to function as a community and teachers and learners to act as co-participants.
Tangül & Soykan (2021), Northern Cyprus	Qualitative case study; 38 teachers and 27 teacher candidates	Digital citizenship education readiness	Teachers showed stronger digital-citizenship understanding than final-year candidates, who expressed a clear need for explicit preparation.

Table S1 (continued): Evidence chart of included studies

Study and Setting	Design and Sample	Digital Setting and Outcome	Main Findings Relevant to the Review
Hernández-Orellana et al. (2021), Chile	Mixed descriptive survey; 509 students	Personal learning environments and academic digital identity	Students displayed hybrid academic identities and low awareness of their traceability online, with formal and informal tools combined for learning.
Japar et al. (2021), Indonesia	Development study with control and experimental classes; 80 students	Mobile learning for social tolerance in civic education	The experimental class achieved higher learning scores than the control class (83.25 vs. 73.25), supporting the value of structured mobile materials.
Akcil & Bastas (2021), Northern Cyprus	Relational survey; 88 valid responses	E-learning attitudes and digital citizenship	Digital citizenship behavior was positively related to attitudes toward e-learning, while pandemic anxiety complicated the learning experience.
Al-Abdullatif & Gameil (2020), Saudi Arabia	Descriptive survey; 204 undergraduate women	Knowledge and practice of digital citizenship	Students showed limited knowledge of several digital-citizenship elements, especially source credibility, law, safety, and responsible reporting.

Table S1 (continued): Evidence chart of included studies

Study and Setting	Design and Sample	Digital Setting and Outcome	Main Findings Relevant to the Review
Yildiz et al. (2020), Turkey	Relational survey; 253 vocational higher-education students	Digital citizenship awareness	Students reported awareness across communication, rights and responsibilities, critical thinking, participation, security, skills, ethics, and commerce, but the design did not test instruction.



Supplementary File 2: Search Strategy, Full-Text Exclusions, and PRISMA-ScR Checklist

Supplementary material for: Digital Learning for Civic and Identity Development in Higher Education: A Systematic Scoping Review. This file reports the search strings, ranked-result limits, rule-based preliminary triage, full-text exclusions, and the completed PRISMA-ScR checklist. Full bibliographic details are provided in the article reference list.

Search date, limits, and sources

Search date: 20 August 2026. Publication range: 1 January 2020 to 20 August 2026. Sources: OpenAlex, ERIC, and Crossref. Language: English. Record rule: DOI required at eligibility stage. OpenAlex and Crossref returned the first 100 ranked records per string; ERIC returned up to 200 ranked records before the date rule was applied. Ranked open-index retrieval is reported as a limitation and should not be interpreted as equivalent to an unrestricted subscription-database search.

Search strings

1. digital civic learning higher education
2. online civic education university students
3. digital pedagogy civic competence university
4. digital learning national identity university students
5. social media national identity university students education
6. digital storytelling cultural identity higher education
7. virtual exchange civic identity higher education
8. technology enhanced learning civic engagement university
9. online learning collective identity university students
10. digital citizenship education higher education students

Rule-based preliminary triage

A record advanced when its title and abstract contained: (a) at least one digital term, (b) at least one higher-education term, (c) at least one educational term, (d) at least one civic or identity-related outcome term, and (e) at least one empirical indicator. Records also required a DOI and a usable abstract. The rules initially set aside 2,369 records; targeted checks reinstated nine for manual review, leaving 2,360 records excluded and 160 records for manual screening. All records retained after triage were manually screened, but the triage stage remains a source of selection risk.

Full-text reports excluded (n = 8)

Table S2: Full-text reports excluded at eligibility assessment (n = 8)

Report title	DOI	Reason for exclusion
Building undergraduate students' cultural identity through digital storytelling	10.1080/17404622.2022.2127820	Pedagogical practice description without an empirical student evaluation

Virtual exchange contributions to the development of intercultural competence: A Brazilian higher education institutions' perspective	10.15517/ai.e.v22i1.47481	Administrator perspectives; no direct student-level outcome data
Internationalizing the curricula through COIL in Japanese higher education	10.21827/jve.7.41033	Institutional policy and educator focus; no direct student learning outcome
Student perspectives of global citizenship within a virtual exchange	10.32674/jcihe.v15i5(s).5567	Research-in-progress report with preliminary evidence
Digital learning and higher education in Brazil: A multicultural analysis	10.32674/jcihe.v16i2.5846	Conceptual and policy analysis; not empirical
Digital storytelling and the pedagogy of belonging	10.3389/fcomm.2025.1630596	Opinion article; not empirical
The effectiveness of information and communication technology in civic education learning	10.35940/ijrte.a1563.059120	Senior-high-school population
Civic identity formation through digital citizenship learning in higher education	10.55927/sospolbud.v5i1.16152	Indexed title and DOI metadata resolved to an unrelated botanical-insecticide article

PRISMA-ScR checklist

The checklist below maps all 22 PRISMA-ScR reporting items to the manuscript and supplementary files. Item 16 is not applicable because no formal critical appraisal was undertaken.

Table S3: PRISMA-ScR checklist

Section and item	Checklist requirement	Location in submission
TITLE - 1. Title	Identify the report as a scoping review.	Main manuscript title
ABSTRACT - 2. Structured summary	Summarize background, objective, eligibility and sources, charting and synthesis, results, and conclusions.	Main manuscript: Abstract
INTRODUCTION - 3. Rationale	Explain the rationale in light of existing knowledge and why a scoping approach is appropriate.	Main manuscript: Introduction
INTRODUCTION - 4. Objectives	State the review questions with reference to the key eligibility elements.	Main manuscript: Introduction, three review questions
METHODS - 5. Protocol and registration	State whether a protocol exists and provide registration information when available.	Main manuscript: Methods / Review design and reporting; protocol not prospectively registered
METHODS - 6. Eligibility criteria	Specify eligible evidence, years, language, and other limits, with a rationale.	Main manuscript: Methods / Eligibility framework and Table 1

Table S3 (continued): PRISMA-ScR checklist

Section and item	Checklist requirement	Location in submission
METHODS - 7. Information sources	Describe all information sources and the date of the final search.	Main manuscript: Methods / Information sources and search strategy; Supplementary File 2
METHODS - 8. Search	Present the search approach so its scope and limits are transparent.	Main manuscript: Methods / Information sources and search strategy; Supplementary File 2 / Search strings
METHODS - 9. Selection of evidence	Describe screening and eligibility decisions.	Main manuscript: Methods / Record management and selection
METHODS - 10. Data charting	Describe the charting form, process, and data confirmation.	Main manuscript: Methods / Data charting and synthesis; Methods / Appraisal, verification, and AI-assisted workflow
METHODS - 11. Data items	List the variables sought and any assumptions or simplifications.	Main manuscript: Methods / Data charting and synthesis; Supplementary File 1
METHODS - 12. Critical appraisal	If appraisal was performed, explain its rationale and method.	Main manuscript: Methods / Appraisal, verification, and AI-assisted workflow; no formal score used

Table S3 (continued): PRISMA-ScR checklist

Section and item	Checklist requirement	Location in submission
METHODS - 13. Synthesis	Describe how charted information was handled and summarized.	Main manuscript: Methods / Data charting and synthesis
RESULTS - 14. Selection of evidence	Report screening results and reasons for full-text exclusion, ideally with a flow diagram.	Main manuscript: Results / Study selection and Figure 1; Supplementary File 2 / Table S2
RESULTS - 15. Evidence characteristics	For each source, present relevant characteristics and citation information.	Main manuscript: Results / Publication pattern and Table 2; Supplementary File 1 / Table S1
RESULTS - 16. Critical appraisal	If appraisal was performed, report the results.	Not applicable: no formal critical appraisal was undertaken
RESULTS - 17. Individual evidence	Present relevant charted information for each included source.	Main manuscript: Results, evidence clusters; Supplementary File 1 / Table S1
RESULTS - 18. Synthesis	Summarize the charted evidence in relation to the review questions.	Main manuscript: Results / Cross-study synthesis and Table 3

Table S3 (continued): PRISMA-ScR checklist

Section and item	Checklist requirement	Location in submission
DISCUSSION - 19. Summary of evidence	Summarize principal findings, link them to the objectives, and consider their relevance.	Main manuscript: Discussion



DISCUSSION - 20. Limitations	Discuss limitations of the review process.	Main manuscript: Limitations
DISCUSSION - 21. Conclusions	Give a general interpretation and implications or next steps.	Main manuscript: Conclusion
FUNDING - 22. Funding	Describe funding for the included evidence and for the review, including the funder's role.	Main manuscript: Declarations / Funding; funding of included studies was not charted