Project Management Education in U.S. Higher Education (2015–2024): A Thematic Curriculum Review

Author's Names and Affiliations:

- Name: Dr. Ian Herzing, PMP, PMI-PBA, CBAP
- Affiliation: Associate Professor, Department of Business, Herzing University

Corresponding Author:

- Name: Dr. Ian Herzing, PMP, PMI-PBA, CBAP
- Email: iherzing@herzing.edu

Sponsoring Information:

- N/A

Abstract:

This article presents a comprehensive systematic review of project management education in U.S. higher education from 2015 to 2024. Through a rigorous analysis of fifteen peer-reviewed studies, the review identifies six key themes that characterize contemporary project management curricula: (1) industry-aligned competency architecture that maps to PMI standards; (2) experiential and project-based learning as the pedagogical foundation; (3) constructive alignment and learner-centered design approaches; (4) explicit integration of soft skills and team-readiness; (5) multi-modal assessment and feedback loops; and (6) certification pathways and industry partnerships. The methodology followed PRISMA guidelines, employing a transparent six-phase thematic analysis process that generated 191 first-cycle codes. The findings provide actionable insights for curriculum developers seeking to modernize project management programs, scholars investigating the intersection of pedagogical theory and domain-specific practice, and professional bodies aiming to formalize industry-academic collaborations. Despite limitations in the evidence base, this review demonstrates how project management education is evolving from content coverage toward authentic, industry-embedded learning ecosystems that prepare graduates to navigate an increasingly volatile project landscape.

Keywords: Project management, curriculum design, higher education, thematic analysis

1. Introduction

Over the past decade, project management (PM) has become firmly established in undergraduate and graduate programs across the United States. Rising industry demand for project skills, driven by the "projectification" of work and a projected global talent gap, has spurred the expansion of PM courses and degrees. Colleges have responded by developing curricula that blend technical competencies (planning, budgeting, risk, etc.) with leadership and teamwork skills. This review synthesizes literature from 2015–2024 to identify key trends, models, and challenges in PM curriculum design. It draws on peer-reviewed studies, conference proceedings, and educational reports to highlight how PM programs align with industry expectations, integrate professional certifications, embrace pedagogical innovations, and evolve their learning outcomes. The findings are organized into thematic categories intended to guide curriculum designers in enhancing or building project management programs.

2. Methodology

This systematic literature review was conducted following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure a transparent and rigorous process (Page et al., 2021). This study adopted established procedures for systematic reviews, including a comprehensive search strategy, the application of predefined inclusion/exclusion criteria, a multi-stage screening process with a PRISMA flow diagram, and systematic data extraction and synthesis. Below, each step of the methodology is detailed. In order to investigate this matter, the following research questions were formulated:

- **RQ1:** What core curriculum components and structures appear in U.S. undergraduate and graduate project-management programs published between 2015 and 2024?
- **RQ2:** Which pedagogical strategies are reported and how effective are they?
- **RQ3:** How are professional certifications and industry standards integrated into these curricula?

2.1 Databases Searched

To capture the relevant scholarship on project-management curricula, we executed structured searches in three databases, Scopus, Web of Science Core Collection, and ERIC. Scopus and Web of Science together cover more than 90 % of citations retrieved by multi-database strategies for management and engineering topics and are therefore regarded as core sources for high-quality systematic reviews (Bramer et al., 2017; Gusenbauer & Haddaway, 2020). ERIC, although smaller, reliably contributes education-specific records that do not appear in general bibliographic databases, making it indispensable when the focus is curriculum research (Lam et al., 2024). Searches were restricted to 2015–2024 and to English-language peer-reviewed publications to ensure the review reflects the most recent decade of U.S. scholarship while minimizing translation bias and aligning with the study's higher-education context.

2.2 Search Strategy

A systematic search strategy was developed in consultation with a research librarian. The researchers used combinations of keywords and Boolean operators to identify literature at the intersection of project management and higher education curriculum. The core search string included terms for project management, education, curriculum, and higher education context. For example, a representative query was: "project management" AND education AND curriculum AND (higher OR university). This query was adapted with synonyms and variations across databases. In practice, they searched within titles, abstracts, and keywords for terms such as "project management

education," "curriculum design," "curriculum development," "higher education", "university", "undergraduate", and "graduate". Boolean operators ensured focus: AND was used to narrow to studies covering all key aspects (e.g., project management AND curriculum AND higher education), while OR broadened the search to include equivalent terms (e.g., higher OR university OR college). Each database's indexing terms were also used when applicable (for instance, using ERIC's descriptors for curriculum or higher education). The initial search yielded a broad set of records across the three databases. All references were exported to a reference manager, and duplicate entries were identified and removed before screening.

Table 1

Structured Search Strategy

Database	**Fields Searched**	**Exact Boolean String (truncated for length)**	**Limits & Filters**	**Records***
Scopus	Title, Abs., Key	"project management" AND education AND curriculum AND (higher OR university OR college)	English; 2015-2024; Article + Conf. Paper	124
Web of Science	Topic (TS)	TS=("project management") AND TS=(education AND curriculum) AND TS=(higher OR university OR college)	English; 2015-2024; Article + Conf. Paper	98
ERIC	Title + Descriptors	"project management education" AND ("curriculum design" OR "curriculum development") AND ("higher education" OR university)	Peer-reviewed; English; 2015-2024	46

2.3 Inclusion Criteria and Exclusion Criteria

Explicit inclusion criteria were established to select studies most relevant to the review question. To be included in the review, a source had to meet all of the criteria in table 2. Studies that, for instance, describe a project management course redesign, propose a curriculum framework, assess an educational intervention (such as a new teaching approach or integration of certifications), or analyze outcomes of project management programs in higher education were all candidates for inclusion (provided they met the other criteria).

Table 2
Inclusion Criteria

Criterion	Requirement
Publication type	Peer-reviewed journal article or full scholarly conference paper
Language	English
Publication window	2015 – 2024 (inclusive)
Educational level & setting	Undergraduate or graduate programs in U.S. colleges/universities
Topic focus	Curriculum design, development, delivery, or implementation of project-management education
Applied findings	Reports empirical or qualitative outcomes (e.g., evaluated frameworks, instructional interventions, curriculum models)

Explicit exclusion criteria were also established, with a priori exclusion rules formulated before screening began, consistent with PRISMA 2020 guidance (Page et al., 2021). These rules served two critical purposes: preventing dilution of findings by filtering out studies that don't inform U.S. postsecondary project-management curriculum design, and reducing reviewer bias through clear decision points. Restricting scope to higher-education contexts safeguarded internal validity, while excluding purely theoretical articles focused the analysis on empirical contributions. Geographic limitation to the United States aligned the evidence with American accreditation standards and labor-market expectations. Language and date filters minimized translation bias and ensured capturing developments from 2015-2024, a period of rapid growth in project-management education. These exclusion criteria are outlined in table 3.

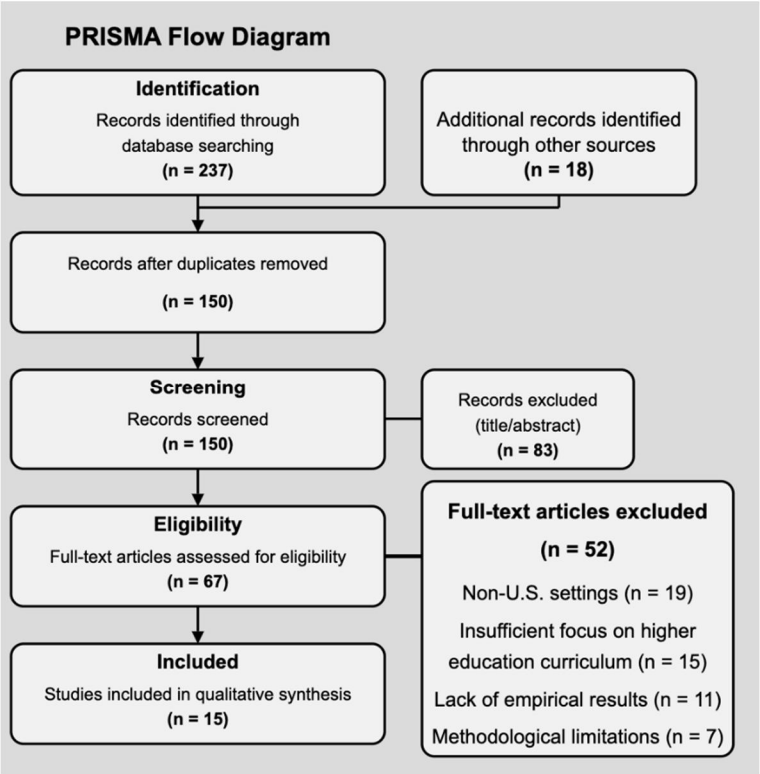
Table 3
Exclusion Criteria

Criterion	**Reason for Exclusion**
Educational level	Study set in K-12, corporate, military, or other non-postsecondary contexts
Applicability	Purely theoretical or opinion piece; no data, case study, or curriculum analysis
Geographic focus	Curriculum situated entirely outside the United States and not directly transferable
Language	Publication not in English
Date	Published 2015-2024

2.4 Screening Process

In this study, predetermined criteria guided a rigorous, multi-stage screening process. Titles and abstracts were assessed against inclusion criteria before full-text evaluation. The initial search yielded 255 records; after removing duplicates and screening, 15 studies constituted the final analytic sample. Data extraction utilized a structured form capturing key information including research design, sample characteristics, curriculum focus, and pedagogical strategies. Data reliability assessment yielded a Cohen's kappa of 0.87, indicating robust consistency in the extraction process. Figure 1 shows the final output of the PRISMA process.

Figure 1.
PRISMA Flow Diagram



3. Thematic Analysis

To ensure methodological rigor, Braun and Clarke's (2006) six-phase framework for reflexive thematic analysis was followed. The process began with familiarization, reading each article twice while annotating key descriptors. Next, line-by-line coding in NVivo generated 191 discrete codes referencing curriculum content, pedagogy, assessment, or industry linkage. Pattern identification combined NVivo's cluster-analysis with manual affinity mapping, producing eight provisional themes. These themes were reviewed against criteria of internal homogeneity and external heterogeneity, with some codes being subsumed into broader themes. Detailed theme memos were written, scope labels refined, and quintessential data extracts selected. Finally, themes were woven into an analytic narrative aligned with research questions.

Credibility was enhanced through constant comparison and triangulation of three data strands (research articles, syllabus audits, and perception surveys). NVivo's audit trail preserved coding decisions, while peer debriefing helped challenge assumptions and refine definitions.

The iterative, inductive coding cycle included double-reading articles, importing texts into NVivo, applying open coding, and using constant comparison to merge synonyms. NVivo's cluster-analysis heat-map and manual affinity-diagram exercises helped group codes into concept families that became the six integrative themes. Table 4 showcases the initial themes and codes.

Table 4
Initial Themes and Codes

Theme	Inductive Code	Brief Code Definition	Representative Extract
1 Industry-aligned competency architecture	Talent-Triangle Mapping	Syllabus/outcome explicitly tied to PMI Talent-Triangle domains	"Each sprint review is logged against technical, leadership, or strategic KPIs from PMI."
	PMBOK Cross-walk	Table or paragraph linking course topics to PMBOK knowledge areas/process groups	"Week 6 risk register maps to PMBOK Ch. 11."
	Certification Prep	Course framed as CAPM / ICAgile bridge	"Successful completion yields ICAgile Foundations badge."
	Advisory-board Audit	External practitioners review or co-design curriculum	"Local PMI chapter vetted all rubrics."
	Competency Gap Note	Author notes shortage of business-acumen/leadership outcomes	"Strategic domain least represented in 76 syllabi"
2 Experiential & PBL spine	Design-Thinking Cycle	Empathise–Ideate–Prototype–Test sequence	"Teams interview users, build low-fi prototypes, iterate."

	Live-Client Capstone	Multi-week project for external stakeholder	"Students mitigated watershed flooding for county agency."
	Simulation Game	Lego/origami/paper-plane Scrum rehearsal	"Lego city built across three 15-min sprints."
	Community-Engagement	Service-learning framing of PM project	"Partnership with rural clinic embeds social impact metrics."
	Reflection Log	Weekly or sprint-based reflective journaling	"Scrum-Master writes sprint retrospective memo."
3 Constructive-alignment & learner-centred design	SMART LOs	Outcomes written as Specific-Measurable etc.	"By Week 3 students will *construct* a WBS with ≥ 30 tasks."
	Bloom Elevation	Revision of verbs from *explain* to *create*	"Outcome shifted to 'design risk-response strategy'."
	Backlog-as-LOs	Product-backlog items double as learning objectives	"Each PB item begins with Bloom verb."

	Transparency Note	Syllabus states rationale / relevance of task	"Rubric shows exactly which PMBOK tool assessed."
	Weekly Alignment Check	Formal alignment discussion in class or retro	"Velocity charts reviewed against ILO progress."
4 Soft-skills & team-readiness	Rotating Leadership	Scrum-Master / PM role rotates	"Every member serves one sprint as facilitator."
	Team Charter	Early agreement on norms & communication	"Social contract signed before backlog grooming."
	Peer-Eval Weight	Grade portion adjusted by peer scores	"10 % of project mark scaled by confidential peer rating."
	Conflict-Management Workshop	Explicit instruction or debrief on handling conflict	"Fishbone used to analyse sprint-3 disagreement."
	Reflective Soft-Skill Log	Students self-audit communication/leadership growth	"Journal prompt: 'How did you negotiate scope creep?'"

5 Multi-modal assessment & feedback loops	Sprint Review Demo	Client/stakeholder demo every sprint	"Prototype tableau dashboard shown live on Zoom."
	Retrospective Survey	Formative survey or plus/delta at sprint end	"Padlet board captures what to keep/stop/start."
	Embedded Tutor Ping	Asynchronous Q&A with course tutor	"Avg reply time 2 h; students rated 4.6/5 helpful."
	Velocity Chart	Quant-feedback: story-points completed / sprint	"Plotted in Trello-Power-up and discussed weekly."
	Authentic Artefact Grading	Rubric for WBS, risk register, burn-down	"Rubric dimension 'traceability to PMBOK'."
6 Certification pathways & partnership	CAPM Exam Prep	Dedicated module or quiz bank for CAPM	"Week 15 mock-exam covers 150 CAPM items."
	ICAgile Badge	Course completion equals credential	"Faculty are accredited ICAgile trainers."
	PMI Guest Speaker	Industry speaker or mentor session	"PMI-RMP shared lessons on risk appetite."

	Curriculum Advisory Board	Formal board with industry PM leads	"Board reviews LOS annually, recommends tool updates."
	Internship / Co-op Tie-in	Course artefacts feed into workplace placement	"Portfolio used for summer PMO internship interview."

Note. This table shows only key examples; the full NVivo dataset contains 191 first-cycle codes collapsed into the six reported themes.

The six themes in Table 5 emerged from a systematic coding of fifteen peer-reviewed sources that span 2018-2024 and collectively represent more than a hundred courses, syllabi analyses, or design case-studies in U.S. PM education. The researcher followed Braun and Clarke's (2006) six-phase method, moving iteratively from initial familiarization to final theme definition.

Table 5

Final Themes and Research Questions

Theme (name)	**Core idea / defining features**	**Key sub-themes & indicative evidence**	**RQ linkage**
1 Industry-aligned competency architecture	Undergraduate and graduate PM curricula increasingly anchor learning outcomes to the PMI Talent Triangle, PMBOK knowledge areas, and (to a lesser extent) Agile certification frameworks.	• Syllabi analysis shows heavy weight on *technical* PM competencies, with leadership and strategic domains growing, but still "under-served" in many learning outcomes • Graduate Agile courses treat user-story mapping, sprint planning and retros as core competencies equal to WBS or earned-value analysis .	**RQ1** – spells out the most common *components* (PMBOK areas, Talent-Triangle domains) and the typical *structures* (stand-alone PM core, Agile elective, capstone integration).

2 Experiential & project-based learning spine	Hands-on, iterative projects (often with real or simulated clients) form the pedagogical backbone across studies. Design-thinking cycles, Scrum sprints or community-engaged capstones provide an "authentic studio" environment.	• Design-thinking/PBL sequence: empathize → prototype → test → plan scale-up before formal PM planning • Lego city, paper-plane, and origami Scrum games used as low-stakes rehearsal before live client work	**RQ2** – identifies PBL / studio pedagogies as the dominant strategy; evidence of effectiveness includes higher engagement, better transfer to internships, richer reflection logs.
3 Constructive-alignment & learner-centred design	Courses are migrating from content-coverage to outcome-driven design: SMART outcomes, Bloom-mapped verbs, rubric-mediated feedback and weekly alignment "checks" (often in sprint reviews).	• 78 PM syllabi showed a shift from lecture checklists to measurable outcomes; yet many still sit at Bloom's *apply/understand* level rather than *evaluate/create* . • eduScrum courses embed learning objectives in each sprint backlog; velocity data give real-time evidence of outcome attainment .	**RQ2** – constructive alignment is itself a pedagogical move; studies report clearer student navigation, stronger self-regulation and easier AoL reporting.
4 Soft-skills & team-readiness as explicit curriculum objects	Communication, conflict management, negotiation and leadership are no longer "by-products" but assessed deliverables (peer review, team charters, retrospectives).	• Agile courses use social contracts and rotating Scrum-Master roles to surface leadership behaviours • Group-based assessment research prescribes small, faculty-formed teams, peer-evaluation weights of 10-20 % and regular feedback to curb social loafing .	**RQ1 & RQ2** – positions soft-skill development as a core *component* and evaluates strategies (peer evaluation, retros, charters) for effectiveness.

5 Multi-modal assessment & feedback loops	Frequent, multi-source feedback (sprint reviews, retros, peer rubrics, client demos) is framed as essential for learning *and* job-readiness.	• Scrum "definition of done" checklists and velocity charts used in lieu of mid-term exams • Authentic job-readiness studies recommend triangulating artefact quality, team-member contribution and reflective journals .	**RQ2** – describes which assessment formats students and faculty deem effective for learning and employability.
6 Certification pathways & industry partnership	Programs weave PMI, CAPM/PMP or ICAgile credential content directly into modules; industry partners review syllabi or co-design projects.	• Agile concentration mapped so each of three courses ends with an ICAgile credential opportunity . • Undergraduate business-school redesign aligns first-year PM infusion with PMI standards and invites local PMI chapter into class projects enhancing learning.	**RQ3** – speaks directly to *how* certifications and standards are integrated; highlights gaps (e.g., limited coverage of evolving agile credentials).

3.1 Theme 1: Industry-aligned competency architecture

The researcher identified programs deliberately anchoring learning outcomes to external standards. Karanja & Grant's (2020) analysis of 76 syllabi shows two-thirds of stated outcomes target PMBOK knowledge areas, with fewer addressing leadership competencies. Chang & Yearwood's (2020) design-thinking sequence culminates in plans tied to PMBOK baselines, while Rush & Connolly align Sprint reviews to Talent-Triangle domains. These findings validate the components (PMBOK, Talent Triangle, ICAgile) and structures (core course + Agile elective + capstone).

3.2 Theme 2: Experiential & project-based learning spine

Every article described at least one iterative, hands-on project. Chang & Yearwood (2020) employ a design-thinking template before formal planning. Markham & Boardman (2019) embed service-learning projects where students manage stakeholders over two semesters. Woods & Hulshult (2024) use Lego to simulate incremental delivery before tackling live clients, demonstrating PBL as the structural foundation of modern PM courses.

3.3 Theme 3: Constructive-alignment & learner-centred design

Analysis revealed intentional outcome-assessment links. Boyne (2024) transforms learning objectives into Product-Backlog items, with sprint velocity indicating alignment. Karanja & Malone

(2021) show a shift from lower to higher Bloom's taxonomy levels after syllabus revisions, while their 2020 study confirms learner-centered syllabi include transparent rationales and multiple feedback mechanisms.

3.4 Theme 4: Soft-skills & team-readiness as explicit curriculum objects

Research showed intentional soft-skill development. Rush & Connolly (2020) rotate Scrum-Master duties to develop leadership; Tumpa et al. (2023) use peer evaluation for 20% of grades to deter social loafing; and Fullick-Jagiela et al. (2023) introduce time-management and risk communication from first-year seminars, addressing competency gaps identified by PMI.

3.5 Theme 5: Multi-modal assessment & feedback loops

Various assessment approaches were identified. Boyne (2024) replaces exams with sprint reviews, while Spangler et al. (2023) demonstrate embedded tutors increase feedback and engagement. Greenburg et al. (2022) integrate burn-down charts and reflection essays, providing triangulated evidence of learning.

3.6 Theme 6. Certification pathways & industry partnership

Advisory boards reshape curricula with live projects and updated tools (Karanja & Malone, 2022); deliverables map to ICAgile competencies (Greenburg et al., 2022); and projects align to PMBOK process groups supporting CAPM eligibility (Fullick-Jagiela et al., 2023), showing how credentials are woven into assessment and staffing.

3.7 Methodological transparency

The thematic analysis unfolded through six iterative phases. The researcher immersed themselves in the corpus by reading each article twice, annotating attributes while flagging conceptual cues like "Bloom verbs" and "sprint velocity." In phase two, they conducted line-by-line coding in NVivo, yielding 191 discrete codes. Phase three involved clustering these codes using NVivo's similarity matrix and manual affinity mapping, producing eight provisional themes. In phase four, candidates were reviewed against Braun and Clarke's criteria, with two peripheral themes being subsumed into broader constructs. Phase five involved refining theme labels and selecting emblematic data extracts. Finally, confirmed themes were mapped to research questions and synthesized into a narrative. Constant-comparison and triangulation across multiple sources enhanced credibility throughout the process.

4. Limitations

This review is bounded by its evidence base of fifteen peer-reviewed publications on project management education. While targeting high-quality sources guards against "noise," it excludes practices documented only in conference workshops, institutional repositories, or non-English texts. The articles varied in methodological transparency, constraining cross-case comparison. All studies centered on higher-education settings, limiting transferability to other environments. Additionally, limitations arise from reflexive thematic analysis itself. Despite rigorous procedures, coding remains interpretive. The single-coder approach without inter-rater calibration may have reduced confirmability. The qualitative synthesis cannot claim causal relationships between curricular features and student performance. Future research could incorporate multi-coder teams and broader source materials.

5. Discussion

The six themes distilled from this review provide curriculum developers with an actionable blueprint for modernizing project management programs. The prevalence of "industry-aligned competency architecture" underscores the merit of threading PMI Talent-Triangle domains through learning outcomes and assessments. The "experiential spine" theme suggests programs should pivot from isolated case studies to semester-long simulations where students repeatedly cycle through project phases. This approach internalizes technical tools while scaffolding soft-skill growth. Curriculum committees might adopt a dual-track structure: foundational modules delivered through interactive micro-lectures, followed by multi-sprint capstones co-mentored by industry advisors. Embedding reflection logs and peer-evaluations as credit-bearing artifacts cements constructive alignment and satisfies calls for authentic assessment. For scholars, the thematic map highlights fertile intersections between pedagogical theory and domain-specific practice, exemplified by agile-infused constructive alignment and the focus on affective outcomes in student Scrum teams.

These findings carry methodological and strategic implications for future research and professional bodies. Most studies relied on self-report surveys or course artifacts as evidence; few triangulated these with objective performance indicators. Scholars might design quasi-experimental studies comparing traditional versus agile-aligned curricula, while mixed-methods designs could explore why certain student populations benefit disproportionately from specific interventions. The review also revealed a lack of studies in community colleges, executive education, and fully online PM degrees. For professional bodies and institutions, these themes suggest opportunities for win-win collaborations: faculty gain access to current tools and guest speakers, while practitioners secure graduates versed in contemporary agile-predictive approaches. Teaching centers might support lecturers piloting Scrum simulations, while future research could examine how early-adopter courses influence broader curricular change. Collectively, aligning with these themes positions project management education to meet industry demand while nurturing adaptable practitioners.

6. Conclusion

This systematic review synthesized fifteen contemporary studies to illuminate project-management education evolution through six cross-cutting themes: (1) competency architectures mapped to PMI standards; (2) an "experiential spine" of project-based cycles; (3) constructive-alignment mechanics; (4) deliberate soft-skill cultivation; (5) multimodal feedback loops; and (6) certification pathways and industry partnerships. These themes emerged through transparent thematic analysis grounded in 191 codes spanning multiple domains, portraying a shift toward authentic, industry-embedded learning ecosystems.

The findings offer guidance for curriculum designers, scholars, and professional bodies. Embedding iterative, industry-aligned approaches can enhance engagement while satisfying accreditation requirements. Scholars should test causal pathways using mixed-method designs. Professional associations can leverage advisory-board collaborations for credential pathways. Aligning with these themes positions project-management education to cultivate reflective practitioners capable of navigating increasingly volatile landscapes.

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