Developments in Technology and Engineering Education from 2015–2025: A Content Analysis of Scholarly Output Within Two Professional Networks

Abstract

This study examined thematic developments in Technology and Engineering Education (TEE) scholarship from 2015 to 2025 through a content analysis of publications authored by members of the Council for Technology and Engineering Teacher Education (CTETE) and the 1909 Conference. We identified 506 authors across 2,131 total publications with 1,623 unique works after removing duplicates. Quantitative findings revealed uneven authorship patterns, with a small group of authors contributing a disproportionate share of publications. Qualitative analysis produced 11 thematic categories across the publications. The categories of Teacher Preparation, Student Learning, STEM & Integrated Education, and TEE Pedagogy accounted for over half of all publications. Additionally, the results indicated some continuity with prior research—especially in the area of teacher preparation and pedagogy—and the emergence of other new areas of focus such as computing and equity.

Keywords: Technology & Engineering Education, Teacher Education

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Introduction

Technology and Engineering Education (TEE) has undergone structural, curricular, and thematic shifts over the past decade (Loveland et al., 2020; Huang & Qiao, 2024; Strimel & Grubbs, 2016). Between 2015 and 2025, the field of TEE has experienced the release of the *Standards for Technological and Engineering Literacy* (STEL) in 2020 (International Technology and Engineering Educators Association, 2020, p. ix), the integration of computational thinking and artificial intelligence into educational contexts (Huang & Qiao, 2024), increased engagement with the larger "STEM Education" community (Strimel & Grubbs, 2016), and the disruption of societal and educational settings as part of the COVID-19 pandemic (Kumar, 2021). These developments occurred within and alongside TEE, influencing scholarly work, educational policy, and classroom practices (Hacker, 2024).

Two studies published in 2015 examined some of the ways TEE has evolved, shifted, and changed over the years with an emphasis on thematic trends within TEE professional publications. Wells (2015) analyzed a century of conference presentations from the Mississippi Valley Technology Teacher Education Conference (MVTTEC), identifying specific ways the emphases of

the profession had both endured and shifted during the 100-year time span. Reed and LaPorte (2015) also conducted a content analysis; they utilized special interest sessions from AIAA/ITEA/ITEEA conferences spanning 1978–2014 and reported on the transition from industrial arts to technology and engineering emphases with notable findings around themes and key changes shown in those sessions. Together, these studies provide longitudinal analyses of thematic developments within TEE-specific academic work over an extensive period of time. However, a decade has now elapsed since these two analyses were published; a decade which included new standards, COVID-19 worldwide disruptions, and widespread adoption of artificial intelligence tools and advanced computing. Given that professional discourse can both reflect and shape disciplinary priorities, the most recent decade (2015 to 2025) warrants renewed examination of TEE scholarly output – both in terms of thematic developments as well as for comparison to previous findings.

The professional landscape of TEE during this decade was shaped by structural and organizational developments within the field. Following the 2009 transition from the International Technology Education Association (ITEA) to the International Technology and Engineering Educators Association (ITEEA), ongoing discussions emphasized the expanding scope of engineering content and its relationship to K–12 standards (Grubbs, Strimel, & Huffman, 2018). These discussions, along with other efforts in Science, Technology, Engineering, and Mathematics (STEM) education, computational thinking, and other topics culminated in the release of STEL in 2020. The release of these standards coincided with continued TEE positioning within broader STEM and educational conversations, prompting questions and discussion about TEE's identity, the place and need for additional or specific content integration, and curricular alignment (Daugherty et al., 2021; Strimel & Grubbs, 2016). Other changes to the professional TEE landscape took place during this decade (e.g., a reduced focus on research presentations at the ITEEA annual conference, adjustments in the way the 1909 conference solicited presentations [from assigned topics to open calls for proposals], and changes to CTETE committee structure, membership, and leadership). These professional developments and discussions help form the contextual backdrop from which scholarship between 2015 and 2025 was produced and disseminated. While we do not attempt to establish causal relationships between these developments and publication trends, we do acknowledge the importance and impact of this professional context which provides grounding for examining these emphases during this period.

Rather than mirroring the efforts of Wells (analysis of conference presentations) or Reed & LaPorte (analysis of conference special interest sessions), this present study focuses on an analysis of publications authored by members of two long-standing professional networks: the Council for Technology and Engineering Teacher Education (CTETE) and the 1909

Conference (formerly MVTTEC). These organizations, while not inclusive of all members of the TEE community, represent two historically sustained groups from which TEE scholarly work has been produced and shared with the larger TEE community. Further, an analysis of work from these authors enables examination of the thematic efforts of a specific subset of TEE professionals during the timeframe of 2015–2025. By analyzing published works authored by members of these two organizations between January 1, 2015, and June 1, 2025, this study seeks to 1) identify thematic developments reflected in this TEE-related scholarly output and 2) to consider how these developments align with, or diverge from, patterns identified through similarly-focused prior research. Using both quantitative and qualitative methods, we explored the following research objectives:

> RO1: Identify thematic developments reflected in TEE scholarship between 2015–2025 using the scholarly output (e.g., publications) of TEE authors affiliated with CTETE and the 1909 Conference.
>
> RO2: Identify potential relationships between thematic developments reflected in TEE scholarship between 2015-2025 and those thematic trends reported in the 2015 research conducted by Wells (2015) and Reed & LaPorte (2015).

In doing so, this study both extends prior examinations of professional discourse into a new decade and offers a bounded analysis of thematic trends during this time period.

Method

Research Design

This study utilized a mixed-methods content analysis to examine thematic developments reflected in TEE-related scholarly output between January 1, 2015, and June 1, 2025. Building upon prior analyses by Wells (2015) and Reed and LaPorte (2015), this study extends these examinations of thematic trends into the next decade.

Conference presentations noted above, we determined to instead focus on scholarship published by authors who were members of two specific professional networks within TEE: the Council for Technology and Engineering Teacher Education (CTETE) and the 1909 Conference (previously known as the Mississippi Valley Technology Teacher Education Conference [MVTTEC]). Our research is therefore bounded in scope with an examination of the thematic emphases derived from scholarly output of authors affiliated with one, or both, of these two networks between 2015 and 2025.

Data Sources

The dataset for this study was derived from publications authored by individuals identified through two sources:

1. CTETE member reports obtained from organizational leadership;
2. Membership rosters published by the 1909 Conference (formerly MVTTEC).

While not encompassing all scholarship produced in the field, these organizations represent historically active networks of scholarly debate and discussion within TEE. Further, these bounds provided a clearly defined context for examining thematic developments during the established timeframe of January 1, 2015, through June 1, 2025.

CTETE Member Publications. CTETE has historically supported scholarly dissemination through multiple venues, including its yearbooks. These yearbooks are peer-reviewed edited volumes with various emphases relevant to technology and engineering teacher education and have been published, in varying intervals, in collaboration with academic publishers. However, this study did not limit inclusion in our analyses to CTETE-sponsored publications (e.g., yearbooks or yearbook chapters); rather, any publication authored by an individual appearing on the CTETE membership list was eligible for inclusion.

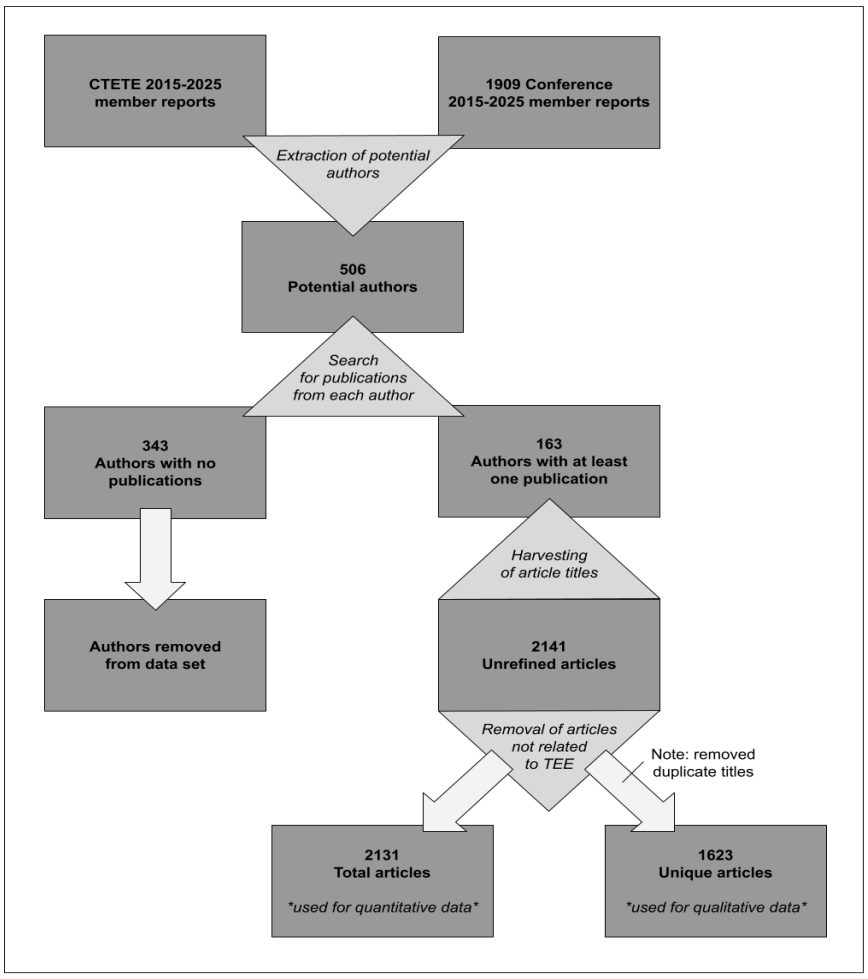
1909 Conference Member Publications. The 1909 Conference (an official merger of the former MVTTEC and STEC) is an annual scholarly meeting that has historically served as a forum for research dissemination and scholarly debate and dialogue within TEE. Authors identified through 1909 Conference membership rosters were included in the same publication search process applied to CTETE-affiliated authors.

Data Collection

A research team comprised of six graduate students, one undergraduate student, and one faculty member identified potential authors (N = 506) using CTETE membership reports and 1909 Conference rosters. Team members extracted author names from assigned roster subsets and then cross-checked all names to eliminate duplication and standardize formatting within a shared spreadsheet. A final review after adding all names ensured consistency of formatting and removal of duplicate entries. The data collection process is summarized by the flowchart depicted in Figure 1.

Figure 1:

Data Collection Process



For each of the 506 identified authors, publication searches were conducted using the following sources:

- Google Scholar
- ERIC
- EBSCOHost

Searches were performed using authors' first and last names and, following each search, potential publications were reviewed for inclusion based on the following criteria:

1. The publication was authored, or co-authored, by an individual listed in CTETE or 1909 membership rosters at any time between 2015 and 2025;
2. The publication date fell between January 1, 2015, and June 1, 2025;
3. The publication addressed topics related to Technology, Engineering, Education, or TEE – as determined through title and abstract review.
4. The publication was indexed in one of the identified databases (Google Scholar, ERIC, EBSCOHost

All publication types (e.g., journal articles, conference proceedings, book chapters) garnered from the searches that met the set of criteria were included in the dataset. If an author yielded no qualifying publications, a value of "0" was recorded for that individual.

Following initial compilation, the dataset was reviewed for accuracy and relevance. Ten publications were removed for topical non-alignment (primarily unrelated publications about healthcare or medical procedures associated with authors sharing names with those included in the dataset).

Data Analysis

Quantitative. The quantitative analysis examined authorship patterns and publication totals. The total number of publications included in our dataset was used to calculate authorship distribution. It is critical to note that because multiple authors frequently collaborated on publications, articles were counted once per author to determine individual publication totals (e.g., several articles were listed multiple times in our list based on collaboration between authors from our identified pool). Authors were then categorized into publication frequency ranges (e.g., 1–5 articles, 6–10 articles, etc.). Total counts and proportional distributions were calculated (Table 1).

Table 1

Breakdown of Publications Per Author

	Authors		Publications	
Pub *f* Range	***n***	**%**	***n***	**% Total**
0	343	67.79	0	0.00
1-5	81	16.01	176	8.26
6-10	22	4.35	172	8.07
11-15	17	3.36	222	10.42
16-20	9	1.78	163	7.65
21-25	12	2.37	272	12.76
26-30	6	1.19	167	7.84
31-35	2	0.40	65	3.05
36-40	3	0.59	111	5.21
41-45	2	0.40	85	3.99
46-50	1	0.20	50	2.35
>50	8	1.58	648	30.41

Note. Authors: $N = 506$; Publications: $N = 2131$

Following initial data analyses, duplicate titles were removed to generate a final list of 1,623 unique publications with each publication occurring only one time regardless of collaboration between authors included in our dataset. This final list was used to calculate trends in annual publication frequencies across the 2015–2025 period and as part of our subsequent qualitative analysis.

Qualitative. The qualitative analysis employed thematic coding procedures informed by Saldaña (2021) using the 1,623 unique publications identified through quantitative analyses. Three members of the research team independently reviewed titles and generated preliminary thematic categories. Specifically, initial theme generation was informed by:

- Saldaña's thematic coding framework,
- prior thematic categories identified by Wells (2015), and
- prior findings reported by Reed & LaPorte (2015).

Initial themes were collated and, through iterative discussion, the team consolidated and refined these themes, ultimately establishing 10 potential thematic categories. Further discussion yielded an 11th category (TEE Content) which was added to capture publications that addressed TEE content but did not clearly align with any of the other 10 themes. The final list of identified thematic categories were:

1. 21st Century Soft Skills
2. Assessment & Evaluation
3. Computer Science & Related Technologies
4. Diversity, Equity, & Inclusion
5. Spatial Skills & Visualization Tools
6. Standards, Curriculum Development, & Safe Learning Environments
7. STEM & Integrated Education
8. Student Learning, Engagement & Empowerment
9. Teacher Preparation, Experience, & Professional Development
10. TEE Pedagogy & Learning Modality
11. TEE Content

To assess co-coding reliability, team members independently coded a set of 30 randomly selected titles from the final publication dataset. Initial co-coder comparisons resulted in 77% agreement amongst coders. To increase co-coding reliability, team members met to discuss and clarify thematic definitions. Following thematic clarification, an additional 30 titles were then independently co-coded. Comparison of co-coding resulted in 83% agreement. Having established acceptable co-coding consistency, the 1,623 publications were then divided among team members who conducted independent coding of thematic classifications. In most cases titles were sufficient to determine thematic categorization; however, in instances where titles were insufficiently clear for categorization, abstracts were also reviewed. Final thematic counts were then compiled and explored in line with the identified research objectives.

Findings

Quantitative

Between January 1, 2015, and June 1, 2025, a total of 2,131 publications were identified across 506 authors listed on CTETE and/or 1909 Conference membership rosters. From these authors, 163 were identified who produced at least one qualifying publication during the specified period. After removing duplicate titles resulting from collaboration amongst authors, 1,623 unique publications comprised the dataset upon which thematic analysis was conducted.

Authorship distribution varied in publication frequency during the decade timeframe. Most of the identified authors (n = 343; 67.79%) did not produce a qualifying publication during the study period. However, among those who did publish at least one article, most produced between one and five publications (n = 81; 16.01%). A smaller subset of identified authors accounted for a substantial proportion of total articles identified; eight authors (1.58% of the total author pool) collectively contributed 648 publications (30.41% of total publications).

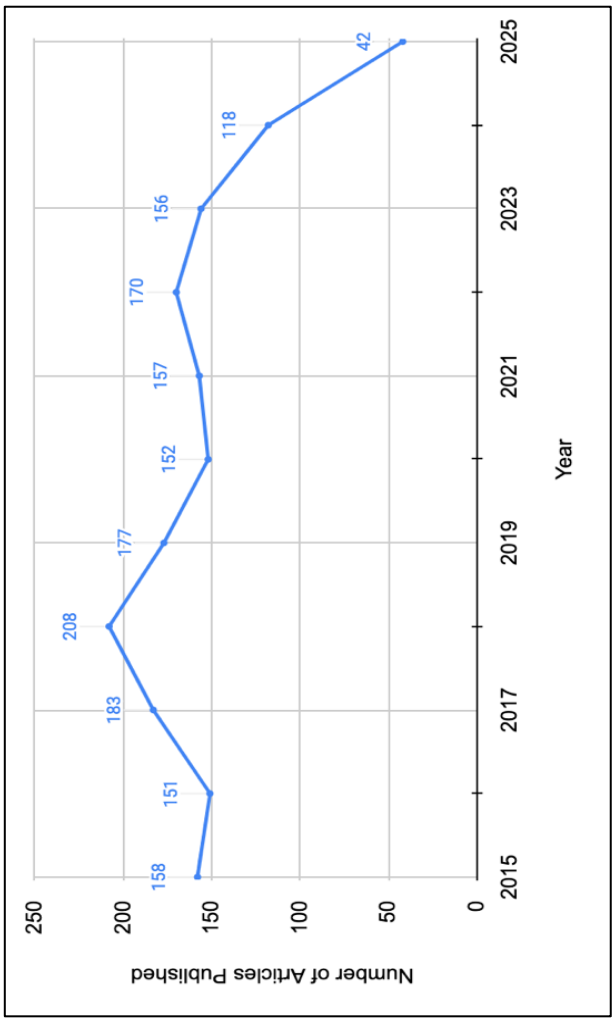


Figure 2: *Total number of articles published per year*

Annual publication counts based on the 1,623 unique titles (Figure 2) varied across the 2015–2025 period. Note that while 2025 corresponded with the

lowest number of published articles, these findings do not reflect an entire year given June 1, 2025, was the cut-off date for data inclusion.

Qualitative

Thematic coding of 1,623 unique publications resulted in 11 thematic categories. Presented in Table 2 are these thematic categories rank ordered by proportional distribution based on the frequency of publications across the identified themes.

Table 2

Rank Order of Thematic Coding Results for Articles Published 2015-2025

Theme	*n*	%
Teacher Preparation, Experience, & Professional Development	238	14.66
Student Learning, Engagement & Empowerment	228	14.05
STEM & Integrated Education	226	13.92
TEE Pedagogy & Learning Modality	215	13.25
TEE Content	144	8.87
Standards, Curriculum Development, & Safe Learning Environments	137	8.44
Computer Science & Related Technologies	112	6.90
Diversity, Equity, & Inclusion	94	5.79
Assessment & Evaluation	84	5.18
Spatial Skills & Visualization Tools	80	4.93
21st Century Soft Skills	65	4.00

Note. N = 1623 articles

The top four thematic areas included 907 articles accounting for more than half (55.88%) of the total coded publications. The remaining seven themes accounted for 716 publications (44.12%) of the total.

A comparison of trends (Figure 3) among the top four thematic categories shows TEE Pedagogy and Teacher Preparation publications somewhat

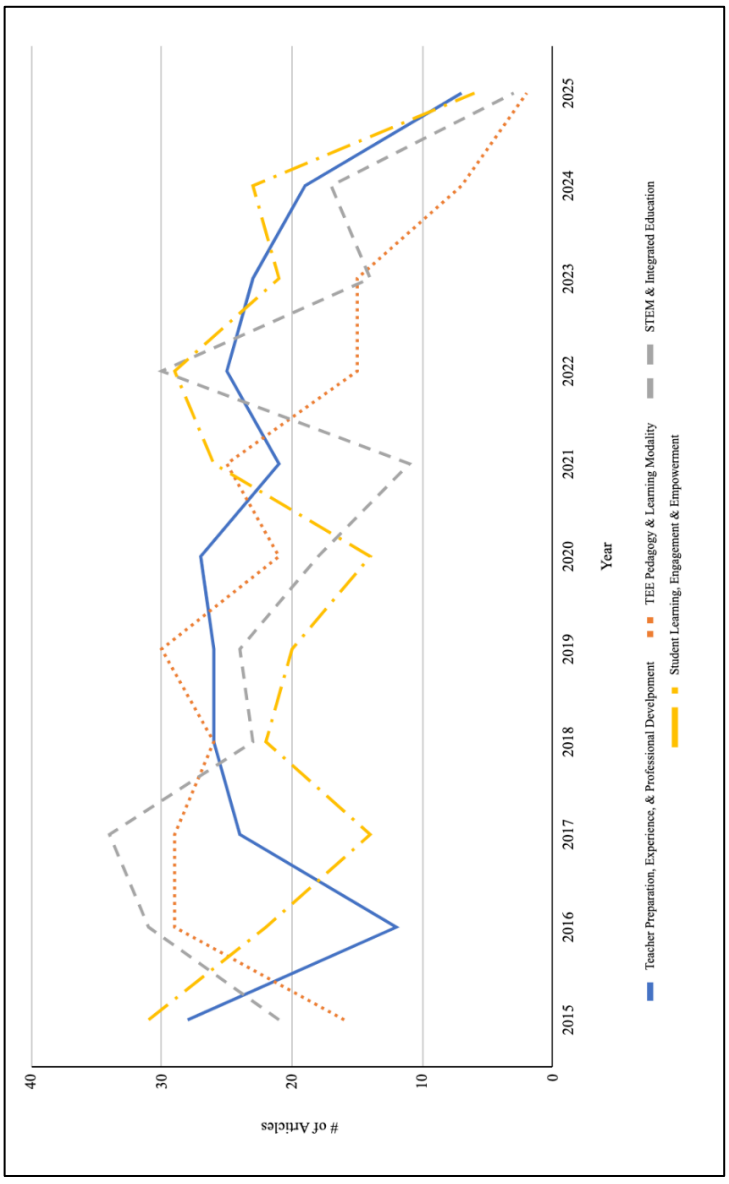


Figure 3

Trend Comparison Among Top Four Thematic Categories

paralleled each other in being consistently high between 2017 and 2021. On the other hand, in 2015 and 2016 STEM and Student Learning began high, trended downward through to 2021, spiked high in 2022, but then followed a downward

trend for the remaining years of the decade. The thematic category demonstrating the most consistently high trend (2017 to 2023) was Teacher Preparation.

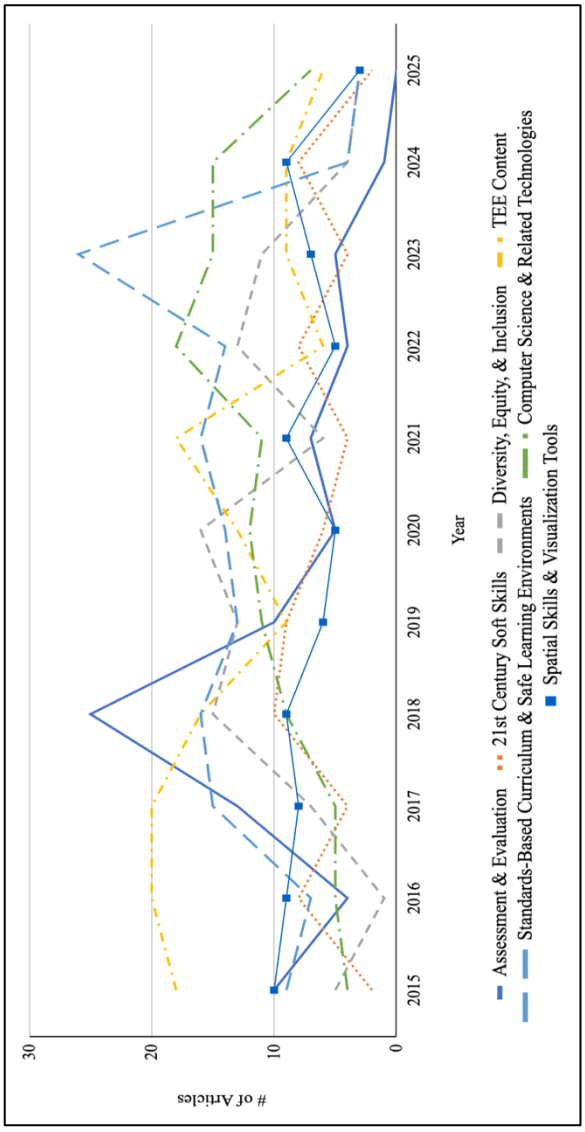


Figure 4

Trend Comparison Among Remaining Seven Thematic Categories

Of the remaining seven thematic categories (Figure 4), TEE Content publications were consistent throughout the decade with a slight downward

trend in 2022. Standards-Based Curriculum & Safe Learning Environments also stayed relatively consistent throughout this time period with a peak in 2023 followed by a decrease the next year. Computer Science & Related Technologies began the decade with lower publications but slowly increased as years passed. 21st Century Soft Skills initially followed the same trend as Computer Science & Related Technologies but decreased in 2020 and remained low while Computer Science & Related Technologies continued increasing.

Brief descriptions of each thematic category rank ordered by relative frequencies are described in the following paragraphs.

Teacher Preparation, Experience, & Professional Development

The largest category, with a total of 238 publications (14.66%), was the Teacher Preparation, Experience, & Professional Development theme. Publications in this category addressed pre-service teacher preparation programs, in-service professional development initiatives, teacher efficacy, instructional readiness, and experiences of educators within TEE schools and classrooms. The highest annual frequency within this theme occurred in 2015 (n = 28), with the lowest number of publications for this theme occurring in 2016 (n = 12). Publication counts in other years remained relatively consistent across the study period and this theme was the most consistently high throughout the decade. In 2025, seven publications had been coded within this category at the time of data collection.

Student Learning, Engagement, & Empowerment

A total of 228 publications (14.05%) were coded as part of the Student Learning, Engagement, & Empowerment theme. Publications in this area addressed student motivation, engagement strategies, active learning, persistence, and student empowerment within TEE settings. The highest annual count occurred in 2015 (n = 31), while 2017 and 2020 each had 14 publications. This theme showed the highest fluctuations between high and low frequencies across the decade.

STEM & Integrated Education

Two hundred twenty-six publications (13.92%) were coded as part of the STEM & Integrated Education theme. This category included publications addressing interdisciplinary integration, cross-disciplinary curriculum design, and alignment of TEE with broader STEM frameworks. The highest annual frequency occurred in 2017 with 34 publications categorized in this theme. Additionally, this theme showed a steady downward trend over the decade with the exception of 2022.

TEE Pedagogy & Learning Modality

A total of 215 publications (13.25%) were coded within TEE Pedagogy & Learning Modality. Publications in this category addressed instructional approaches, pedagogical frameworks, and modality-related considerations, including hands-on learning models and instructional delivery formats. This theme remained consistently high between 2016 and 2019 with the highest annual frequency occurred in 2019 (n = 30). Following 2019, this theme showed a steady downward trend with 2024 having seven publications.

TEE Content

One hundred forty-four publications (8.87%) were categorized as focusing on TEE Content. This theme included publications that focused on TEE-specific technical knowledge, core disciplinary concepts, and content/curricular development within TEE. The highest annual frequency occurred in 2016 and 2017 (n = 20 each), while subsequent years had less (e.g., 2022 recorded six publications).

Standards, Curriculum Development, & Safe Learning Environments

A total of 137 publications (8.44%) were thematically coded as Standards, Curriculum Development, & Safe Learning Environments. Publications in this category centered on curriculum frameworks, the implementation of standards, instructional design, laboratory safety, and related structural considerations within TEE classrooms and programs. Annual frequencies remained relatively consistent across most years, with a higher count observed in 2023 (n = 26).

Computer Science & Related Technologies

A total of 112 publications (6.90%) were coded in the Computer Science & Related Technologies category. This theme included publications discussing computational thinking, programming, artificial intelligence, cybersecurity, robotics, and the integration of other computing concepts within TEE schools and classrooms. The highest number of publications in this category occurred in 2022 (n = 18) and the lowest occurred in 2015 (n = 4).

Diversity, Equity, & Inclusion

Ninety-four publications (5.79%) were categorized within the Diversity, Equity, & Inclusion theme. Publications in this category discussed issues of access, representation, inclusion, and/or equity in TEE. Annual counts increased through 2020 (n = 16), followed by lower frequencies in subsequent years, including six publications coded in 2021.

Assessment & Evaluation

Eighty-four publications (5.18%) were thematically organized as Assessment & Evaluation. These publications largely focused on approaches of measuring student learning, performance in design-based tasks, evaluation frameworks, and other potential assessment strategies within TEE settings. The highest annual frequency was observed in 2018 (n = 25). In 2025, prior to June 1, 2025, there were no publications coded within this theme.

Spatial Skills & Visualization Tools

Eighty publications (4.93%) were coded within the Spatial Skills & Visualization Tools category. This theme was inclusive of research around spatial reasoning, visualization strategies, and included publications discussing instructional tools supporting spatial development in TEE. The highest annual count occurred in 2015 (n = 10), while 2020 and 2022 each recorded five publications during those years.

21st Century Soft Skills

A total of 65 publications (4.00%) were coded within the 21st Century Soft Skills theme. Publications in this category centered on ideas such as collaboration, creativity, problem solving, and communication within TEE contexts. The highest annual count of publications coded within this category occurred in 2018 (n = 10), while the lowest count occurred in 2015 (n = 2).

Discussion

This study investigated potential thematic trends reflected in select TEE scholarship between 2015 and 2025 using published work authored by members of CTETE and/or the 1909 Conference. The findings showed patterns in authorship by year as well as thematic emphases. The discussion below considers these findings in relation to prior analyses (Wells, 2015; Reed & LaPorte, 2015), while also acknowledging differences in both the scope of this effort and the timeframe of the publications reviewed.

Patterns in Publication Authorship

The quantitative findings showed that publication authorship during the study period was skewed towards a relatively small subset of authors. While 506 individuals were identified through CTETE and 1909 membership rosters, there were 163 authors that produced at least one qualifying publication, eight of whom accounted for approximately 30% of all publications. It should be noted that these eight authors almost always published collaboratively with other TEE authors, and frequently they published articles together.

This high variability (skewness) in publications among the potential authors identified was a notable finding. However, we do recognize that because this

study is limited to authors identified through membership lists and we did not review all scholarship produced within TEE, these findings should be interpreted as such within the identified bounds; these are not representative of TEE authors collectively, nor of the field as a whole.

While prior studies by Wells (2015) and Reed & LaPorte (2015) focused on conference presentations and special interest sessions rather than publication counts, this study emphasized publication counts and qualitative analysis of titles and abstracts. Given those differences, direct comparisons between the present study (publications) and these prior analyses (presentations) are not possible. Nevertheless, findings from this study do provide insight into the thematic emphases of our chosen subset of scholars and, if compared to themes revealed through those prior studies, will contribute to our understanding and discussion regarding what the body of published TEE literature suggests is of importance to scholars in the field.

Dominant Thematic Emphases

Four of the chosen thematic categories (Teacher Preparation, Student Learning, STEM & Integrated Education, and TEE Pedagogy & Learning Modality) accounted for more than half of all analyzed publications. These areas represent continued attention to instructional practice and teacher development in TEE literature. Further, these showcase a sustained focus on how TEE positions itself within the larger educational space and its alignment with other disciplines.

Teacher Preparation, Experience, & Professional Development emerged as the largest single category - an area Wells (2015) also identified as a recurring emphasis across a century of conference presentations. Although the timeframe of our study and that of Wells (2015) differ substantially (100 years versus 10 years), the continued emphasis on teacher preparation in both analyses suggests this is an area of high priority in TEE. Similarly, the themes of Student Learning and TEE Pedagogy and Learning Modality, both accounting for a high percentage in our findings (approximately 14% and 13% respectively), also aligns with a broader emphasis on best instructional practices and classroom implementation. These results should not be surprising given the main goal of Technology and Engineering Education is the preparation of individuals who are technologically literate. Moreover, given the results from both studies similarly found this theme to be the most dominant corroborates and substantiates findings from the present study.

STEM & Integrated Education constituted another of the more dominant themes (nearly 14%) from our analysis. Publications in this category revolved around positioning TEE within education and interdisciplinary integration, especially in terms of STEM frameworks. Reed & LaPorte (2015) similarly highlighted increasing attention to engineering in addition to STEM-related themes across the conference sessions they studied spanning 1978–2014. While

the timeframe and substance of our analysis differ from Reed & LaPorte's work (2015), the continued presence of STEM and STEM-related emphases in the 2015–2025 publications we reviewed suggests that these ideas remain relevant to TEE academic discussions into 2025.

Less Dominant Thematic Areas

Publications categorized under the thematic category of Standards, Curriculum Development, & Safe Learning Environments represented a modest 8.44% of the coded dataset. These publications centered on curriculum ideas and frameworks, standards implementation in classrooms and schools, and other considerations for TEE programs at large (e.g., how do the new standards fit into existing curricula).

The release of STEL in 2020 occurred within the study timeframe, but the publications classified into this category did not necessarily coincide with this release. However, this misalignment may well be associated with the lengthy publication timelines tied to peer-reviewed scholarship. Regardless of the bounds structuring this research, we still found that the standards-related discussions were distributed across the decade rather than immediately following the release of the standards. This might be expected given scholars in the field would address the need for new standards prior to their release, followed by reaction to them once published.

Emerging and Specialized Themes

Themes such as Computer Science & Related Technologies, Diversity, Equity, & Inclusion, Spatial Skills & Visualization Tools, Assessment & Evaluation, and 21st Century Soft Skills collectively accounted for 44.12% of coded publications. Computer Science & Related Technologies showed increased frequency in later years of the study period – perhaps a result of a larger national trend towards an emphasis on specific skills deemed necessary. Diversity, Equity, & Inclusion publications increased through 2020 before declining in the years following. Assessment & Evaluation and 21st Century Soft Skills represented smaller amounts of the articles coded into this category. The collective percentage of themes in this area suggests a wide distribution of ideas being discussed, studied, and researched within TEE.

Our findings extend and build upon the prior analyses (Wells, 2015; Reed & LaPorte, 2015) with a specific emphasis on a new decade (2015-2025) offering additional insights into themes reflected in TEE research, some similar and others unique to previous studies, and how they have changed over time. Specific findings were reported previously, however, we note that the analyses of publications by authors with membership in CTETE and/or the 1909 Conference between 2015 and 2025 demonstrated similar emphases on teacher preparation and pedagogy, student learning, STEM integration, standards, content, equity, and emerging technologies. These findings highlight some of

the comparable thematic developments between the 2015 studies and those revealed within TEE during 2015-2025 based on the scholarly work published by specifically identified authors.

Finally, we identified several opportunities for additional work; broader samples including additional professional networks and/or publication venues would help confirm or broaden the identified patterns. Additionally, other longitudinal efforts could trace individual authors' trajectories and potentially clarify how authorship themes develop and/or change over time.

Conclusions

This study reviewed thematic developments in TEE scholarship between January 1, 2015, and June 1, 2025, by analyzing publications from authors who were members of CTETE and/or the 1909 Conference during that timeframe. Using those parameters, we found two specific patterns that emerged most clearly.

Our first research objective centered on identifying thematic developments between 2015-2025. We noted that scholarship was most concentrated around four thematic categories: Teacher Preparation, Experience, & Professional Development; Student Learning, Engagement, & Empowerment; STEM & Integrated Education; and TEE Pedagogy & Learning. These four thematic categories accounted for a majority of the coded publications (55.88% of the 1,623 unique titles) during that timeframe.

A second set of topics (standards and curriculum, TEE content, computer science and related technologies, diversity/equity/inclusion, assessment, spatial skills, and 21st century soft skills) combined to make up the remaining 44.12% of publications. Second, publication activity within the examined networks was not even across authors with a small subset of individuals producing a disproportionately large share of the output (eight authors accounted for ~30% of all identified publications).

Our second research objective focused on relationships between thematic developments identified by 2015 research and the findings from the 2015-2025 studies. Our fundings demonstrated continuity with earlier analyses (notably the recurring attention to teacher preparation and pedagogy identified by Wells, 2015), while also documenting new thematic emphases that align with broader, contemporaneous developments (e.g., greater representation of computer science–related publications). These patterns and relationships may help other scholars identify where attention has been concentrated within TEE as well as areas where opportunities exist.

Limitations

Several limitations should be acknowledged when interpreting the findings of this study. First, the dataset was intentionally bounded to publications authored by individuals identified through CTETE membership reports and 1909 Conference rosters. While these organizations represent historically sustained sites of scholarly exchange within TEE, they do not encompass all scholars or all publication venues within the field. As such, the findings describe thematic developments within these two institutional networks rather than the entirety of TEE scholarship.

Second, author identification was based on membership rosters and publication searches conducted through Google Scholar, ERIC, and EBSCOHost. Although these platforms provide broad coverage of academic publications, it is possible that some relevant publications were not indexed or were not retrievable through name-based searches. In addition, authors with common names required additional review to reduce misattribution; despite these efforts, some errors of omission or inclusion may remain.

Third, the thematic analysis relied primarily on title-based coding, with abstract review conducted when necessary. While this approach allowed for systematic classification across a large dataset, it may not capture the full nuance of each publication's conceptual focus. More in-depth qualitative analysis of full manuscripts could yield additional insight into thematic complexity.

Fourth, inter-coder reliability was assessed using percentage agreement. Although acceptable agreement levels were achieved following iterative refinement, alternative reliability measures (e.g., Cohen's kappa) may yield different statistical estimates of agreement.

Finally, the study's timeframe concluded on June 1, 2025. Publication counts for 2025 therefore represent partial-year data and should be interpreted accordingly.

These limitations do not diminish the descriptive value of the findings but instead clarify the scope within which interpretations should be situated. Future research incorporating additional professional networks, publication venues, and methodological approaches would further extend understanding of thematic developments in TEE scholarship.

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analysis, and conclusions of the manuscript are solely those of the authors, who critically evaluated and finalized all text.

Competing Interests

The authors have no competing interests to declare.

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