The Global Reach of the Paul Elder Critical Thinking Framework: A Scoping Review

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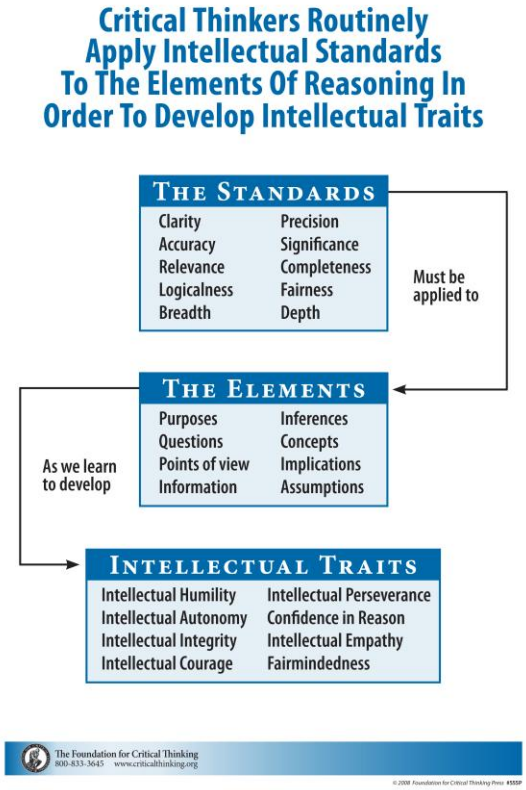
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Critical thinking (CT) has long been recognized as a fundamental aspect of human cognition and intellectual development. The concept of CT extends back to the Presocratic philosophers of the sixth and fifth centuries BCE, which laid the foundation for a concept that evolved through literary criticism, scientific investigation, philosophical reflection, and educational thought before emerging in the modern era (Lau, 2024) and becoming one of the core skills needed in the 21st century. Although these skills seem essential for every individual to survive, there has been a lack of detailed and systematic theories that guide individuals in developing and successfully applying CT skills in different domains. This gap was addressed by Paul and Elder, who developed a comprehensive CT Framework that categorizes CT into four dimensions: 1) Elements of Thought, 2) Intellectual Standards, 3) Intellectual Traits, and 4) Intellectual Barriers. Paul & Elder (2020) define critical thinking as a way of thinking in which thinkers improve the quality of their thinking by skillfully analyzing (Elements of Thought), assessing (Intellectual Standards), and reconstructing (Elements of Thought) their thinking.

These dimensions are not linear but rather interconnected. Within Paul & Elder's Framework, Intellectual Traits are an outcome of consistently applying the Elements and Standards of thought to one's thinking. The fourth dimension describes the Intellectual Barriers to critical thinking.



Source: The Miniature Guide to Critical Thinking Concepts and Tools, year 2020, p. 12

Elements of Thought

Paul and Elder (2020) identify eight elements presupposed in any thinking associated with our cognitive functions (i.e., critical thinking skills). These elements logically relate to one another as follows: "*Whenever we think, we think 1) for a purpose, 2) within a point of view, 3) based on assumptions, leading to* 4) implications, *and 5)* consequences. We use 6) concepts, ideas, and theories to interpret 7) data, facts, and *experiences in order to 8) answer questions, solve problems, and resolve issues."* (Paul, 2012, p.8). According to Paul, these elements are universal and present in any thinking or its products, such as an article or a book. Thus, any thought or product of human thought can be analyzed (critical thinking skill) into these elements.

Standards of Thought or Intellectual Standards

Once thinking is analyzed into its parts (Elements of Thought), it should be assessed using criteria or Intellectual Standards. Elder and Paul (2019) present a long list of intellectual standards and highlight eight as essential: clarity, accuracy, relevance, precision, depth, breadth, significance, and logicalness. Thus, critical thinkers analyze their thinking by breaking it down into its parts (Elements of Reasoning) and assess it as a whole and/or its parts by applying the standards of thought (Nosich, 2013; Paul, 2012), with the aim of improving it. For example, we should be concerned about obesity in the province of Nova Scotia, Canada, because 40% of Nova Scotians are obese. This statement seems convincing; however, the information provided is not accurate (standard) because 61% of adult Nova Scotians are obese, not 40% (Nova Scotia Department of Health and Wellness, 2026). Thus, making sure the shared information (element) is accurate by referencing reliable sources which is a defining characteristic of critical thinkers.

Intellectual Virtues/Traits

Critical thinking calls for consistent and explicit application of the Intellectual Standards to the Elements of Thought. When an individual explicitly and consistently applies this approach to their thinking, they develop into a critical thinker. Critical thinkers embody the intellectual traits of intellectual humility, autonomy, integrity, courage, perseverance, empathy, fair-mindedness, and confidence in reason (Paul & Elder, 2020).

Intellectual Barriers

A fourth dimension not visually represented in the model is intellectual barriers. According to Paul & Elder (2020), critical thinking means explicitly and intentionally applying intellectual standards to the individual's thinking, and its elements to enhance its quality. However, critical thinking is often hindered by barriers such as egocentrism and sociocentrism.

Egocentrism refers to selfish thinking, focusing on one's own interests when making decisions, regardless of how fair the decision is to others, while sociocentrism prioritizes the interests of the group the person identifies with (Paul & Elder, 2020). For example, dismissing another person's viewpoint solely because it does not align with their personal agenda is an instance of egocentric thinking and accepting arguments put forward by a group without examining accuracy, significance, and completeness is a form of sociocentrism.

The significance of the Paul-Elder structured framework is that it renders critical thinking teachable, assessable, and transferable across disciplines (Johnson et al., 2022). Paul and Elder offer a practical and generic framework that links the Elements of Thought, Intellectual Standards, and Intellectual Traits for classrooms, assessment, and professional practice (Hussein et al., 2025). For this reason, the Paul–Elder Critical Thinking Framework has been adopted in education, healthcare, business, leadership, communication, and other domains because of its generic nature and adaptability.

Problem Statement

Despite its prominence, the body of literature related to the Paul and Elder Critical Thinking Framework remains fragmented and difficult to systematically identify. Scholars, researchers, and students have approached the Foundation for Critical Thinking with concerns about the difficulty of locating evidence supporting the application of the Paul and Elder Framework and, in some cases, have questioned whether such evidence exists. In response to these concerns, a small team of scholars and students of the Foundation for Critical Thinking sought to explore this issue by addressing two questions:

1) Is there existing evidence supporting the application of Paul Elder Critical Thinking framework?

2) What is the breadth of this evidence?

Accordingly, this scoping review aims to map the breadth and main characteristics of empirical research and Scholarship of Teaching and Learning related to Paul Elder's Critical Thinking Framework.

Methods

Design

A scoping review was considered the most appropriate approach to answer these questions, as this type of review supports mapping the breadth of evidence across various study types and sources (O'Malley, 2005). Scoping reviews are particularly suitable for identifying the extent and nature of evidence, clarifying concepts, and highlighting knowledge gaps that can guide future research or later reviews (Campbell, 2025; Munn, 2022; Peters et al., 2021). Reporting of this review adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018).

Search Strategy

A comprehensive search strategy aimed to capture the breadth of evidence applying the Paul & Elder Critical Thinking Framework. The search was conducted in March and April 2024. A total of 11 databases and journals were searched, including ERIC-ProQuest, ProQuest Dissertations and Theses Global, ProQuest databases, Scopus, Project MUSE, Academic Search Premier, Taylor & Francis, Directory of Open Access Journals, PsycINFO, Embase, EBSCOhost Database. In addition, Google Scholar was included, which is a search engine rather than a database. and Google Scholar. These databases were selected in consultation with a university

librarian because they provide wide coverage of education, higher education, and Scholarship of Teaching and Learning (SoTL).

The search terms selected were those that directly relate to the Paul Elder Critical Framework and its dimensions. Initially, the search terms used were only Paul & Elder and critical thinking, but the number of retrieved articles was very limited. Thus, consultations were conducted with Dr. Nosich, a Fellow of the Foundation for Critical Thinking, and a university librarian, who advised on extending the search terms to include the dimensions and key components of the Framework. Thus, the final search terms were critical thinking AND (Paul and Elder, Paul & Elder, Paulian, elements of thought, elements of thinking, elements of reasoning, intellectual standards, intellectual barriers, intellectual virtues, OR intellectual traits). This broader search increased the number of retrieved articles.

Inclusion Criteria

Studies retrieved through the search were evaluated to ensure they met the inclusion criteria of Toronto & Remington (2020): study types, phenomenon under investigation, population characteristics, publication language, period covered by the review, and setting

1) Types of study: We included primary studies, Scholarship of Teaching and Learning (SoTL), and grey literature including theses, reports, and conference proceedings. Theoretical and opinion papers were excluded.
2) Phenomenon under investigation: Any study that applied the Paul Elder Critical Thinking Framework or any of its dimensions.
3) Characteristics of population studied: Any and all populations studied were included.
4) Publication language: we selected articled published in English.

5) Setting: Because Paul and Elder's Framework is a generic critical thinking one, the search was not limited to any specific setting or context; any and all settings were included.
6) Time period: no date limit was used to capture the full breadth and historical evolution of the Farmwork's use. All publications available up to March 2024 (the time of the search), were included.

Data Screening

Data screening was conducted using Covidence and consisted of two stages: title and abstract screening followed by full- text screening. One exception was the yield generated through Google Scholar. Because Google Scholar is a search engine rather than a database, a search would typically yield thousands of articles, many of which would not be relevant to the review topic. Therefore, consultation with a university librarian to determine the appropriate approach for screening Google Scholar results. The recommendation was to continue screening within Google Scholar until three consecutive pages of search results yielded no relevant articles. In our search, Google Scholar yielded 7300 articles. NE conducted an initial screening independently within Google Scholar, selecting any article related to critical thinking for further review. The final yield through Google Scholar was 596 publications.

The selected articles were imported to Covidence, a web-based review management and collaboration software. Each stage of the screening, including title and abstract screening and full-text screening, was conducted independently by two of the three reviewers (NE, DW, and SH). The three reviewers are all university faculty members with expertise in literature review methodologies, and NE is certified level I in the Paul Edler Critical Thinking Framework. When an article was flagged by Covidence as "conflict," meaning one reviewer voted to include the

article, another voted to exclude it or was not sure, the conflicts were resolved through discussion and consensus.

Data Extraction

The review team developed a data extraction template within Covidence in consultation with Dr. Nosich, a fellow at the Foundation for Critical Thinking, the home of the Paul-Elder Critical Thinking Framework. The template was designed to capture the breadth and basic characteristics of the existing evidence using the Paul & Elder CT Framework. Data extraction was conducted in Covidence and subsequently exported to Microsoft Excel for descriptive analysis.

Data Analysis

To capture the breadth of the evidence examining the application of the Paul & Elder Critical Framework, the included studies were analyzed using descriptive methods. Descriptive analysis was conducted to summarize the characteristics of the literature, including the year of publication, country of study, setting, discipline, and the dimensions of the Paul Elder Framework studied. The analysis also allowed identification of categories by discipline.

Findings

The search revealed a substantial body of literature that directly and explicitly addresses the Paul Elder Critical Thinking Framework. Google Scholar yielded a significantly broader range of publications than conventional bibliographic databases, suggesting that evidence related to the framework is dispersed across books, book chapters, conference proceedings, educational reports, theses, and journal articles. The initial search yielded a total of 1820 publications, half of which were generated through Google Scholar. This was reduced to 950 articles after removing

duplicates. The initial title and abstract screening resulted in 467 publications, and the full-text screening yielded 185 publications for data extraction. The characteristics of these publications were then examined, including the publication year, country, setting, discipline, and domains of the Paul-Elder Framework studied.



Link to Raw Data

https://www.criticalthinking.org/data/pages/12/a1e91bdbde52bab2a93ca8f32288a4db6aeccca85c5b1.xlsx

Year of Publication

Publications were identified since the inception of the Paul Elder framework in 1992, with 2024 being the date of the search for this review, resulting in a total of 184 studies. The 1990s generated four publications. Publication numbers remained limited during the early 2000s but increased substantially in the 2010s. The highest number of publications was in 2016 with 19 publications, followed by 2023 with 16 publications, and 2020 with 13 publications. Other years with a high number of publications included 2014, 2017, and 2019, each with 12 publications.

Overall, most publications were generated in the 2010s with a total of 105 publications. The period between 2020 and 2024 contributed an additional 58 publications, which is comparable to the 2010s given the shorter period. Although only one publication was identified in 2024, this number is not representative of the full year because the search was finalized in April 2024.

Table 1: Distribution of Included Studies by Year of Publication

Publication year	Number of Studies (n)
1992	1
1996	1
1997	1
1998	1
2000	1
2001	1
2002	3
2003	4
2004	2
2005	1
2007	1
2008	5
2009	5
2010	7
2011	6
2012	10
2013	11
2014	12

2015	10
2016	19
2017	12
2018	9
2019	12
2020	13
2021	11
2022	8
2023	16
2024	1

Country Where the Study Took Place

Data showed that studies applying the Paul and Elder Framework were conducted across the globe. The highest number of publications originated in the United States (89), followed by China (13), Indonesia (7), Turkey (5), Japan (5), Malaysia (4), the United Kingdom (4), and Singapore (4). Countries represented by three studies each included Colombia, Saudi Arabia, Mexico, Algeria, and Iran. Two studies were conducted in each of the following countries: Taiwan, Nigeria, Vietnam, United Arab Emirates, Canada, India, Ethiopia, Philippines, and Kazakhstan. Countries represented by one study each included Costa Rica, New Zealand, South Africa, Spain, Pakistan, Australia, Jordan, Oman, Portugal, Brazil, Lithuania, Sudan, and the Caribbean. The country where the study originated was not identified in seven studies. These findings demonstrate the internationally distributed evidence supporting the application of Paul Elder Framework.

Even though nearly half of the included publications originated in the United States, the findings show that the Paul-Elder Critical Thinking Framework has been applied across North America, South America, Europe, Asia, Africa, and Oceania. This geographic distribution demonstrates not only the existence of a substantial evidence base, but also the broad global uptake of the Paul Elder Critical Thinking Framework.

Table 2: Distribution of Included Studies by Country

Country	Number of studies	Country	Number of Studies
United States	89	India	2
China	13	Ethiopia	2
Indonesia	7	Philippines	2
Japan	5	Kazakhstan	2
Malaysia	5	Costa Rica	1
Turkey	4	New Zealand	1
United Kingdom	4	South Africa	1
Singapore	4	Spain	1
Colombia	3	Pakistan	1
Saudia Arabia	3	Australia	1
Mexico	3	Jordan	1
Algeria	3	Oman	1
Iran	3	Portugal	1
Taiwan	2	Brazil	1
Nigeria	2	Lithuania	1
Vietnam	2	Sudan	1
UAE	2	Carribeans	1
Canada	2	Not specified	7

Setting

Examining the setting in which the studies were conducted also showed the broad applicability of the Paul-Elder Critical Thinking Framework. Most studies were conducted in higher education settings (139 studies), including universities and colleges. Schools represented the second-largest setting, with a total of 31 studies conducted at different levels: primary, elementary, junior high, and high schools. A smaller number of studies (15 studies) were conducted in a variety of other settings, including the military, public health teaching institutions,

the workplace, such as business, English language for the public, media and everyday life. These findings suggest that the framework has been applied across diverse education and professional contexts, although its use has been concentrated in higher education.

Table 3: Distribution of Included Studies by Setting

Setting	Frequency (# of studies)	Percentage
University/higher education	141	76.6%
School (primary-K-12)	31	16.8%
Other	12	6.5%
Total	184	

Disciplines represented in Higher Education Publications

Studies conducted in higher education settings showed broad variation across disciplinary areas. English and language-related disciplines were the most frequently represented (35 publications), including English literature, writing, and English as a foreign Language. Engineering was the second most common discipline (23), followed by multidisciplinary studies involving students from more than one discipline (16). Health sciences generated 15 studies and included nursing, medicine, dentistry, pharmacy, public health, and other health fields. Other disciplines included education, business and management, computer and information sciences, and social sciences and humanities. In general, these findings demonstrate that the Paul Elder Critical Thinking Framework has been applied across a wide range of academic disciplines, with higher representation in language-related fields.

Table 4: Distribution of Higher Education Studies by Discipline

Discipline	Number of Studies
English and other languages	34
Engineering	27
Health	18
Multidisciplinary	17
Management	13
Education	10
Other disciplines	8
Computer Science	5
Arts	5
Sciences	4
Total	141

In addition to the above visual presentation, we attached Supplementary File 1(Excel spreadsheet), which compiles all included studies and categorizes them by setting and discipline. Each worksheet in the spreadsheet contains the citations of studies grouped according to the setting (higher education, school, others) and discipline within higher education, such as English and language studies, health, and engineering. This file was developed to help scholars, researchers, educators, and students access relevant evidence related to their context, discipline, or area of interest in order to support further application of the Paul-Elder Critical Thinking Framework.

Research Methodology

Variation in methodologies was also observed among the 194 included studies. Qualitative designs were the most frequently used approach (52 studies), followed by quantitative designs (48 studies). Scholarship of Teaching and Learning (SoTL) studies describing the design and implementation of educational interventions based on the Paul Elder Framework accounted for 47 studies. Mixed-method design was used in 37 studies. This distribution across qualitative, quantitative, mixed methods, and SoTL approaches suggests that the Paul Elder Framework has been examined using a diverse range of research methodologies.

Table 5: Distribution of Included Studies by Research Design

Study Design	Number of Studies
Qualitative	52
Quantitative	48
Scholarship of Teaching and Learning (SoTL) (design and implementation of educational intervention)	47
Mixed Methods	37

Dimensions of the Paul-Elder Critical Thinking Theory Studied

Examination of the studies showed that all four dimensions of the Paul-Elder Critical Thinking Framework, namely Elements of Reasoning, Intellectual Standards, Intellectual Virtues, and Intellectual Barriers, were addressed in the literature, with many studies examining more than one dimension. The Elements of Reasoning dimension was the most frequently examined one, appearing in 165 studies, followed by Intellectual Standards in 147 studies. Intellectual Virtues were addressed in 39 studies, while Intellectual Barriers were the least frequently examined dimension, appearing in 9 studies.

In addition to these four core dimensions, six studies focused on the 35 Dimensions of Critical Thought (The Critical Thinking Community, n.d.), and four studies examined the "Stages of Critical Thinking" (Paul & Elder, 2020, p. 10). Moreover, 55 studies incorporated teaching strategies and instructional approaches promoted by the Foundation for Critical Thinking (Foundation for Critical Thinking, 1999; Paul, 2012; Paul & Elder, 2019).

Overall, the findings suggest the literature has demonstrated the application of the four dimensions of the Paul Elder Framework and has focused primarily on the cognitive components of the framework, particularly the Elements of Reasoning and Intellectual Standards, with less emphasis on the Intellectual virtues and Intellectual barriers.

Table 5: Dimensions of the Paul Elder Critical Thinking Framework

Dimension	Frequency
Elements of Thought/logic	165
Intellectual Standards	147
Intellectual Virtues	39
Barriers	9
Teaching and Learning CT	55
Others	
35 Dimension of Critical Thought	6
Critical Thinking: A Stage Theory	4

Representation of the Paul-Elder Framework in Abstracts and Keywords

One motivation for conducting this review was the difficulty reported by scholars, researchers, and students in locating empirical evidence related to Paul Elder Critical Thinking Framework. However, our findings revealed a substantial body of evidence identified through this review, which was mostly generated through Google Scholar. Therefore, we examined the abstracts and keywords of the included articles to better understand why this literature may be difficult to retrieve through conventional bibliographic databases. Bibliographic Database searches (such as EBSCO or ERIC and others mentioned earlier), which are widely used in North American academic institutions, typically retrieve articles by matching search terms to words contained in the articles' title, abstract, and keywords (which are often author-generated) (Bramer et al., 2018). Among the 184 included publications, only 12 explicitly referenced Paul and Elder in the abstract or keywords, two referenced Intellectual Standards, and one referenced Elements of Reasoning. Consequently,169 publications would not likely be retrieved through conventional database searches using these framework-specific terms alone. Many of these publications were identified through Google Scholar rather than through traditional bibliographic database searches.

Discussion

This scoping review aimed to determine whether evidence supporting the application of the Paul Elder Critical Thinking Framework exists and to examine the breadth and main descriptors of this evidence. The findings identified a substantial body of literature comprising 184 publications originating over a period of three decades. The evidence also showed that the framework has been applied across diverse countries, settings, and disciplines, and studied through various research methodologies.

One significant finding of this review is demonstrating the existence of a broad evidence base related to the application of the Paul Elder Critical Thinking Framework across time, geography, setting and discipline. First, the findings showed that implementing and studying the framework began with its introduction in 1992 and continued through 2024, with a significant increase after 2010, and sustained publications till the time of this search in April 2024. Second, the findings showed a broad geographic reach, with publications identified across 36 countries spanning North America, South America, Europe, Asia, Africa, and Oceania. Third, the framework was applied across diverse contexts, including higher education, primary and secondary schools, professional and workplace settings, military, media, and everyday life. Within higher education, the framework was applied across a wide range of disciplines including language studies, engineering, management, health sciences, education, arts, and sciences.

These findings show that the Paul & Elder Critical Thinking Framework has successfully passed the test of time, boundaries, and context. Over the three decades represented in this review, the world has experienced the emergence of several educational theories, critical thinking models and theories, technological innovations, and changing educational priorities (Marshal et al., 2024). At the same time, educational systems, language, cultural traditions, and approaches to teaching and learning vary considerably across countries and regions. Despite these changes and

differences, the Paul Elder Critical Thinking Framework has continued to attract the attention of scholars, researchers, and educators worldwide and has been applied in a wide range of cultural, linguistic, educational, and professional contexts. This success and sustained interest speak to the universality and generic nature of the framework, its use of simple everyday language that resonates with people in different countries, and the availability of concrete tools and strategies that support its application. Moreover, the continued use of the framework across diverse contexts suggests that educators and researchers around the world have found it sufficiently flexible to apply to local needs.

Another finding of this review is the limited representation of the Paul Elder Framework-specific terms within the titles, abstracts, and keywords of the retrieved publications. Among the 184 included studies, only 15 explicitly used Paul Elder-related terms. As noted earlier, when conducting a search, conventional bibliographic databases match search terms with words included in the title, abstract, and keywords of published articles. This retrieval mechanism implies that a conventional database search will not typically retrieve publications that include Paul Elder Framework terms only in the body of the publication. Therefore, the challenge appears not to be the absence of evidence, but the discoverability and accessibility of that evidence. This conclusion helps explain the challenges that researchers and scholars faced when trying to locate empirical evidence related to the Paul Elder Critical Thinking Framework.

Similarly, our search revealed that a substantial proportion of the included publications were not retrieved through traditional bibliographic database searches but rather through Google Scholar. Google Scholar is a search engine, rather than a database, that searches beyond article titles, abstracts, and keywords to include more content of the body of the publication (Beel et al., 2010). In addition, Google Scholar can retrieve publications from a wider range of scholarly

sources than many conventional bibliographic databases. This feature of Google Scholar may have facilitated the identification of publications from international journals and other scholarly sources that may fall outside the coverage of some commonly used bibliographic databases (Gusenbauer, 2019), many of which are widely used in North American academic institutions. Consequently, Google Scholar may have supported the retrieval of publications from diverse geographic regions that may not have been identified through conventional database search alone.

These findings imply that accessing evidence that supports the application of the Paul-Elder requires search strategies that extend beyond conventional keyword and database searches and are best supported by librarians. Thus, future searches for Paul-Elder-related publications require a broad range of search terms representing the framework, exploring database-specific subject headings and indexing terms, and incorporating search approaches that examine the full text of publications rather than relying solely on titles, abstracts, and keywords. It is also important to select multiple relevant databases and other search tools, such as Google Scholar, and follow the citations specified in relevant publications to maximize retrieval of relevant evidence. In addition, authors publishing research related to the Paul-Elder Framework should consider explicitly referencing the framework and its core concepts in article abstracts and keywords to improve the discoverability, accessibility, and dissemination of this body of evidence.

The findings also showed that the two Paul-Elder framework domains, Elements of Reasoning and the Intellectual Standards, were mostly studied, with 165 and 147 publications, respectively. We find that this finding logically aligns with the structure of the Paul Elder framework, as these two domains constitute the beginning of critical thinking. The elements of

reasoning provide the structure for thinking, and the Intellectual Standards offer criteria for evaluating the quality of that thinking (Paul & Elder, 2020). Moreover, the foundation for Critical thinking offers many tools and guidelines on how to apply the elements and standards to one's thinking, when evaluating others' thinking, and for effective teaching and learning (Paul & Elder, 2019). As a result, these two domains were the more dominant and applied domains of the framework in the included studies. On the other hand, Intellectual Virtues and Intellectual Barriers received considerably less attention. One possible explanation is that virtues such as intellectual humility, courage, etc., are viewed as developmental outcomes that emerge from repeated application of the Elements of Reasoning and Intellectual Standards over time, rather than as initial instructional targets (Paul, 2012; Paul & Elder, 2020). While the predominance of studies focusing on the Elements of Reasoning and Intellectual Standards is expected, the relatively limited attention given to Intellectual Virtues and Intellectual Barriers highlights opportunities for future research to explore these dimensions more fully and to examine how the application of reasoning and standards contributes to the development of fair-minded critical thinkers.

Implications

The findings of this review hold several implications for researchers, educators, and authors interested in applying the Paul Elder Critical Thinking Framework. First, the review showed that the Paul Elder Framework has been applied across a range of times, countries, settings, and disciplines. This implies a significant opportunity for a broader use of the framework in research, teaching and curriculum development. Second, the limited representation of Paul Elder terminology in article keywords and abstracts hindered article retrieval. Therefore, it is important for researchers and authors to explicitly reference framework-related terms in their

publication's title, abstract, and keywords. Doing so would improve the discoverability, accessibility, and dissemination of the evidence. Third, future searches for Paul Elder literature should be carefully designed to include all relevant search terms, multiple databases, Google Scholar, and citation tracking to ensure comprehensive retrieval of relevant studies.

The findings also hold implications for future research. First, while research on the Elements of Reasoning and Intellectual Standards should continue, there is a need to explore the other dimensions of the framework, including Intellectual Virtues and Barriers. In particular, future research should examine how the application of Elements of Reasoning and Intellectual Standards contributes to the development of traits such as Intellectual humility, Intellectual courage, and Intellectual empathy. Moreover, the large number of studies identified in this study suggests that future systematic, scoping and integrative reviews are needed to provide a deeper understanding of the framework's application, effectiveness, and outcomes within specific contexts, such as within specific disciplines or settings.

Limitations

This review has several limitations. First, it included only publications available in English. During screening, particularly through Google Scholar, several potentially relevant publications in languages other than English were excluded. Therefore, our findings may not fully capture the international literature related to the Paul Elder Framework. Second, as noted, most studies did not reference framework-specific terms in their keywords and abstracts; consequently, some relevant publications indexed in databases may have been missed. Third, although Google Scholar helped retrieve several publications from a range of scholarly sources, its search process is less transparent and reproducible than conventional bibliographic databases (Boeker et al., 2013). Fourth, this review included a large number of publications to highlight the

breadth of evidence. However, this volume limited our ability to conduct a more in-depth examination of the application and outcomes of the Framework across different contexts. Finally, as a scoping review, our aim was to map the breadth and key characteristics of the evidence; we did not assess the methodological rigour of the studies or examine the effectiveness of the Paul Elder Framework.

Use of Artificial Intelligence (AI):

Microsoft Copilot and Grammarly were used to assist with editing selected texts for clarity, grammar, readability, and flow. Microsoft Copilot was used as a search engine specifically for references related to Google Scholar. All ideas, interpretations, analyses, and conclusions presented in this work are solely those of the authors, and we assume full responsibility for the content.

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