



An Analysis of References to Information Literacy in National Disciplinary Standards

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abstract: This article uses qualitative methods to examine 29 undergraduate disciplinary learning standards and accreditation documents to identify mentions of the phrase *information literacy* (IL) and references to IL concepts from the Association of College and Research Libraries Framework for Information Literacy for Higher Education. Results show that *information literacy* appears in very few standards and suggests that the adoption rate of the Framework's individual frames may be influenced by how each discipline creates and uses information. These findings can be used by librarians to identify common language with disciplinary faculty and to develop learning outcomes closely aligned to disciplinary standards.

Introduction

Subject librarians strive to understand the needs of the disciplines they support, to create strong connections with disciplinary faculty and the curriculum, and to develop authentic learning experiences for students. Common advice for achieving these goals is to meet on faculty's terms and to use language found in national disciplinary standards when speaking with faculty and writing learning outcomes.¹ The Association of College and Research Libraries (ACRL) Framework for Information Literacy for Higher Education (henceforth the Framework) provides six frames setting out broad information literacy (IL) threshold concepts that can be used to write learning outcomes:

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- “Authority Is Constructed and Contextual”
- “Information Creation as a Process”
- “Information Has Value”
- “Research as Inquiry”
- “Scholarship as Conversation”
- “Searching as Strategic Exploration.”²

Professional guides such as the ACRL Instruction Section’s Information Literacy in the Disciplines Guide aim to help librarians situate information literacy and the Framework within the disciplines by gathering professional disciplinary association standards and accreditation documents.³ Despite these efforts, and the consensus by academic librarians and information literacy scholars that IL should be housed in the disciplines, a 2014 review of the literature by Jonathan Cope and Jesús Sanabria found “insufficient research that addresses specific questions about how academic fields shape faculty’s conceptions of IL.”⁴

For this study, the researchers found only a few articles that mapped individual disciplinary standards either to the Framework or to the ACRL Information Literacy Competency Standards for Higher Education (henceforth the ACRL Standards).⁵ No study extensively reviewed disciplinary standards to identify how IL topics are discussed. Instead, most investigations primarily used surveys and interviews to explore how disciplinary identities impact faculty’s understanding of IL⁶ and how faculty rank the importance of IL concepts, such as the frames from the Framework.⁷

This study aims to examine a wide breadth of national disciplinary standards and accreditation documents to discover if the phrase *information literacy* is present, the extent to which the standards integrate the Framework’s six IL frames, and any patterns in how broader disciplinary categories discuss IL concepts using Tony Becher’s disciplinary categories for analysis. The researchers believe these findings can enrich conversations between disciplinary faculty and subject liaison librarians, foster meaningful university-wide interdisciplinary conversations regarding IL learning outcomes and assessment, and shed light on how disciplinary practices influence information literacy conception and adoption.

Literature Review

Ann Grafstein notes in her foundational 2002 article “A Discipline-Based Approach to Information Literacy” that IL research is rarely placed in disciplinary contexts and that effective instruction must integrate IL into the disciplinary curriculum.⁸ Cope and

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Sanabria echoed this sentiment in a 2014 interview study that found faculty view IL as embedded in their disciplines rather than as a distinct literacy and believe that students develop IL skills through disciplinary lenses.⁹ Since the publication of Grafstein’s article, researchers have investigated how faculty define and value IL as a foothold for incorporating it into specific disciplines.¹⁰

While the Framework and its definition of IL are intended to be broad and free from disciplinary specifics, its language still derives from and is most familiar to librarians and teaching faculty from humanities and social science backgrounds rather than to those from STEM fields.¹¹ A disconnect in language between the Framework and teaching faculty is cause for concern. Research by Lorna Dawes has shown that faculty “teach information literacy as a part of their discipline content and find it difficult to speak about teaching information use without referring to their pedagogy as it relates to the subject content.”¹² In short, it is essential for librarians to contextualize the Framework and its language to specific disciplines to make the Framework accessible to faculty.

While research demonstrates that faculty value IL and see it as integrated into their disciplines, there is disagreement on if, or how, disciplinary differences manifest themselves. Two interview studies, one in the United Kingdom and one in Canada, both found that faculty across various disciplines equally value such skills as critical thinking and accessing information.¹³ Likewise, a United States study revealed that when faculty were asked to rank the importance of the six Framework frames to student success from 1 (lowest) to 5 (highest), they ranked all frames highly. There was, however, a notable difference in how the frame “Authority Is Created and Contextual” was rated by faculty in the humanities (4.40) and in STEM disciplines (3.89).¹⁴ A survey in Spain uncovered additional differences between science and humanities instructors, finding that faculty in science and technical disciplines generally were less aware of the importance of IL than those in the arts and humanities, social and legal science, and health science.¹⁵ Some disciplinary differences may arise from how faculty believe IL is applied. The U.K. interview study, for example, discovered that marketing faculty tended to affiliate IL with solving real-world problems, in contrast with English faculty, who associated IL with purely academic pursuits.¹⁶

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Disciplinary Classification Schemes

One approach to better understanding how disciplines adopt information literacy is to categorize the academic fields with a disciplinary classification scheme for analysis. Anthony Biglan’s widely adopted system classifies disciplines into three dimensions (hard/soft, pure/applied, and life/nonlife).¹⁷ The hard/soft dimension is concerned with “the degree to which there is a shared inquiry paradigm” in a discipline,¹⁸ and the pure/applied aspect delineates fields of study by their focus on “knowledge application.”¹⁹ The life/nonlife dimension reflects if a discipline studies living systems. Tony Becher later combined the hard/soft and pure/applied dimensions into four categories (pure-hard, pure-soft, applied-hard, and applied-soft)²⁰ that can be used to investigate disciplinary differences.²¹ In Becher’s scheme, pure-hard sciences, such as chemistry, concentrate on the study of phenomena through observation, experimentation, and other scientific methods to discover new facts, and tend to have a cumulative and quan-



titative nature. By contrast, pure-soft disciplines such as sociology are concerned with critical thinking and tend to have a qualitative or reiterative nature with “no sense of superseded knowledge.”²² Applied-hard sciences, including engineering and medicine, utilize existing scientific knowledge to develop techniques and products that will solve real-world problems. Applied-soft disciplines, such as nursing and criminal justice, also focus on applying knowledge to solve real-world problems and to create and refine professional protocols.²³

In 2017, Adrian Simpson validated the pure/applied and hard/soft dimensions and found that they “still emerge as the most important descriptors of institutional species,” while also noting that few studies use the life/nonlife dimension.²⁴ Thus, this paper uses Becher’s four disciplinary categories to investigate if academic fields adopt IL concepts differently in their standards and accreditation documents.

IL in University Accreditation

To receive federal funding, universities in the United States are obliged to meet accreditation standards from one of six major regional organizations, all of which indirectly or directly reference information literacy.²⁵ In 2002, Gary Thompson noted that new IL mandates produced by several of the organizations could “change the approach to library instruction.”²⁶ Despite these findings, Laura Saunders reviewed library IL research from 2000 to 2007 and discovered a dearth of literature that involved national accreditation guidelines.²⁷ This absence of research cannot be attributed simply to a lack of awareness. A nationwide survey of 148 library instructional coordinators found that most (85–90 percent) were aware of their university’s accrediting body, but only 55 percent knew how the accrediting documents treated information literacy.²⁸

IL in Disciplinary Standards and Guidelines

In addition to university accrediting bodies, an array of professional organizations provide programmatic accreditation, often to disciplines that require licenses to practice (for example, engineering and nursing). Other fields of study, such as mathematics, are not accredited and instead rely on their professional organizations to supply national disciplinary standards or learning outcomes as guidelines to local departments.²⁹ Limited research has explored how programmatic accreditation and disciplinary standards treat IL in student learning outcomes, and even fewer studies have been performed with a cross-disciplinary lens.³⁰ The absence of research is surprising given that several decades ago, in 1990, a study found that faculty use “their academic field as a foundation for content selection.”³¹ More recently, a 2016 study observed that in undergraduate psychology programs in the United States, “Practically all program directors are aware of the *APA Guidelines for the Undergraduate Psychology Major* and that more than three quarters (82%) of them incorporated the first iteration of the *Guidelines* in part or whole into their own program goals and outcomes.”³² Additionally, a 2015 study demonstrated the value of looking at standards across disciplines. The study found differences in how information literacy is used in nutrition and political science programs, variations that the authors theorized are linked to nutrition science programs having a “highly



prescribed curriculum,” while political science programs have greater flexibility with course development.³³

Integrating IL into the Curriculum

Subject librarians and information literacy scholars have taken several approaches to integrating IL into the curriculum, including mapping the Framework to student learning outcomes. For instance, Eleonora Dubicki reviewed 180 syllabi across 23 departments to create a map between the six frames of the ACRL Framework and “faculty-defined learning outcomes.”³⁴ Researchers also explored connections between the ACRL Framework or Standards and a discipline’s standards, the core building blocks of faculty’s curriculum. For instance, Gloria Willson and Katelyn Angell mapped the Framework to the American Nurses Association’s “Standards of Professional Nursing Practice” to create an assessment rubric for IL in nursing student research papers.³⁵ Mindi Miller and Linda Neyer mapped the ACRL’s “Information Literacy Competency Standards for Nursing” to both a disciplinary standard and a rubric from the Association of American Colleges & Universities to improve collaborations between librarians and nursing faculty.³⁶ Claudia Ruediger and Donald Jung used both the ACRL Standards and the Accrediting Council on Education in Journalism and Mass Communication’s *Journalism and Mass Communications Accreditation* to design a library instruction session that improved student success and self-efficacy.³⁷

Several book chapters reference specific standards as well. In the 2006 edition of *Information Literacy Instruction That Works: A Guide to Teaching by Discipline and Student Population*, only the “Science” chapter explicitly discusses accrediting bodies and professional standards.³⁸ Eleven years later, in the 2017 edited volume *Disciplinary Applications of Information Literacy Threshold Concepts*, 7 of the 25 chapters deal with disciplinary standards. These chapters typically use disciplinary standards in two ways, either to set the foundation for librarians to work with a field of study or by directly mapping the Framework to a standard.³⁹ For example, the authors of the social work chapter link their IL instruction to the Council of Social Work Education standard, the Framework’s “Authority Is Constructed and Contextual” frame, and the newly redesigned social work curriculum at the authors’ university.⁴⁰ The chapter on public health directly maps the frame “Information Creation as a Process” to the Council on Education for Public Health (CEPH) “Accreditation Criteria: Schools of Public Health & Public Health Programs.” To do this, the author created a spreadsheet that

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listed each core class in the major, along with the “Information Creation as a Process” frame, social determinants of health, and the CEPH foundational domains for informa-

tion literacy lessons.⁴¹ Both chapters stress reviewing the standards to connect librarians with disciplinary faculty and exemplify how standards can help bridge the language gap between the two groups.

If librarians hope to ratify IL and themselves as fundamental parts of the curriculum and factors in student success, they must review disciplinary standards and programmatic accreditation documents. Studying the standards can help librarians contextualize IL concepts within individual disciplines. Without such context, librarians risk presenting IL as a stand-alone skill rather than as a literacy that is fundamentally intertwined with disciplinary practice.⁴² Additionally, librarians need to look across a wide range of disciplinary categories to fully understand how disciplinary information practices impact the adoption of individual IL frames.

Methods

Standards Selection

The researchers searched for national-level undergraduate disciplinary standards and programmatic accreditation documents (both henceforth referred to as “standards”) from agencies and professional associations in the United States for all disciplines listed in the article “The Effects of Discipline on Deep Approaches to Student Learning and College Outcomes.”⁴³ Disciplines were grouped into Becher’s four disciplinary categories (pure-hard, pure-soft, applied-hard, and applied-soft) using the pure / applied and hard / soft dimensions but removing the life / nonlife dimension.⁴⁴ Standards were gathered by reviewing the “Information Literacy in the Disciplines Guide” on the ACRL’s Instruction Section website, scholarly literature, and Google searches, and by conferring with colleagues.⁴⁵ If there were multiple standards for a discipline, such as biology,⁴⁶ the authors selected one to review based on widest adoption, recency, pertinence to undergraduate students, and match to project scope.

Overall, the researchers identified 29 undergraduate standards: 7 pure-hard, 8 pure-soft, 3 applied-hard, and 11 applied-soft (see the Appendix). The applied-hard category included the fewest standards because applied-hard disciplines are more often studied at the graduate level (for example, pharmacy or veterinary medicine).⁴⁷ One exception was the Association of American Medical Colleges (AAMC) “Core Competencies for Entering Medical Students,” which covers what undergraduates need to know for medical school.⁴⁸ Additionally, one accreditation standard covers multiple engineering subdisciplines.

Code Descriptions and Application

During the first round of coding, the two researchers each individually read and coded all 29 standards, blind to the other researcher’s coding, using the online application Dedoose. They ignored sections of standards that focused on graduate students, doctoral students, or degree foci. The code “information literacy” was applied to standards that directly used the phrase *information literacy*. The six ACRL frames were each assigned a code that was applied to standards which mentioned concepts or skills associated with the individual frame, including its knowledge practices and dispositions, as follows:

- “Authority Is Constructed and Contextual,” coded in this study as AUTH
- “Information Creation as a Process,” coded as CREATE
- “Information Has Value,” coded as VALUE
- “Research as Inquiry,” coded as INQUIRY
- “Scholarship as Conversation,” coded as CONVO
- “Searching as Strategic Exploration,” coded as SEARCH.

Multiple codes were applied to excerpts when appropriate, and the selections included full sentences when possible. Large sections, paragraphs, or bulleted lists that dealt with the same concept were marked as one excerpt. Alternatively, if a large section included different ideas, it was coded as multiple excerpts. Sentences or phrases that were repeated throughout a standard were only coded once.

Following the first round of coding, the researchers reviewed the excerpts together, using the Framework’s descriptions of the frames as a reference tool to settle coding disagreements. Excerpts were removed when the connection to a frame was deemed tenuous and implicit rather than explicit. Next, the researchers analyzed the remaining excerpts to create a coding guidelines document describing what type of wording and topics counted for each frame. This codebook was used to identify language and themes in the excerpts. The researchers then conducted a second coding, with each investigator reviewing and coding half the standards using the codebook. Following the second round, the researchers reviewed all newly coded quotations together to normalize coding further and to mark excerpts for the appropriate language and themes.

Results

All 29 standards included at least one reference to a frame concept, and the standards for art, chemistry, English, and history presented ideas from all six frames.⁴⁹ Table 1 details the number of ACRL Framework concepts and *information literacy* phrases in each standard, along with the total number of ACRL frames present. Themes emerged from the analysis process regarding how the standards dealt with Framework concepts, which are discussed further in the “Results” and “Discussion” sections of this article.

“Research as Inquiry” concepts appeared the most often across the standards, while “Information Has Value” ideas were minimal or absent. The number of excerpts categorized across the four disciplinary categories (pure-hard, pure-soft, applied-hard, and applied-soft) are presented in Table 2. Table 3 further contextualizes the concepts listed in Table 2, presenting the number and percentage of standards in which frames from the ACRL Framework appear by disciplinary category. Tables 2 and 3 allow for further exploration into how a discipline’s method of creating and using information impacts adoption of ideas from the Framework into the discipline’s standards. Overall, frame concepts were most common in the pure-soft category. Of the four disciplinary categories, five of the six frames appeared in the highest percentage of standards within the pure-soft category (see Table 3). Additionally, “Information Creation as a Process” and “Searching as Strategic Exploration” appeared in all pure-soft standards.

Table 1.
References to ACRL frames across disciplinary standards

Discipline and disciplinary category*	ACRL frames										Number of ACRL frames	Occurrence of information literacy
	AUTH	CREATE	VALUE	INQUIRY	CONVO	SEARCH						
Accounting, applied-soft	0	0	0	1	2	0	0	0	0	0	2	0
Art, pure-soft	2	4	1	1	5	2	0	0	0	0	6	0
Biology (general), pure-hard	0	0	0	2	2	1	0	0	0	0	3	0
Business administration (general), applied-soft	0	0	1	2	0	0	0	0	0	0	2	0
Chemistry, pure-hard	1	1	3	3	2	3	0	0	0	0	6	0
Child development/Family studies, applied-soft	6	0	1	5	3	2	0	0	0	0	5	0
Communications, applied-soft	2	3	0	3	3	1	0	0	0	0	5	0
Criminal justice, applied-soft	0	0	0	1	0	0	0	0	0	0	1	0
Education, applied-soft	0	0	0	1	0	0	0	0	0	0	1	0
Engineering, applied-hard	0	1	0	3	0	0	0	0	0	0	2	0
English (language and literature), pure-soft	5	11	7	11	4	3	0	0	0	0	6	0
Environmental science, pure-hard	1	0	0	8	5	3	0	0	0	0	4	0
Food science, applied-hard	1	1	0	2	1	3	0	0	0	0	5	0
Foreign language, pure-soft	0	1	0	0	0	2	0	0	0	0	2	0
History, pure-soft	1	1	1	6	3	3	0	0	0	0	6	0
Journalism, applied-soft	2	1	1	1	0	0	0	0	0	0	4	0
Kinesiology, pure-hard	3	0	0	0	0	0	0	0	0	0	1	0
Mathematics, pure-hard	0	1	0	2	4	0	0	0	0	0	3	0



Medicine, applied-hard	0	0	1	1	0	0	2	0
Music, pure-soft	2	2	1	0	4	1	5	0
Nursing, applied-soft	5	3	4	9	3	6	6	3
Physics, pure-hard	0	0	1	0	0	0	1	0
Psychology, pure-soft	9	6	3	5	3	2	6	3
Public administration, applied-soft	0	1	0	1	0	0	2	0
Public health, applied-soft	2	0	0	0	2	2	3	1
Social work, applied-soft	0	0	1	2	1	0	3	0
Sociology, pure-soft	1	1	0	2	0	2	4	1
Statistics, pure-hard	1	2	1	2	0	0	4	0
Theater, pure-soft	3	2	0	0	3	1	4	0
Total	47	47	27	74	48	37		8

*AUTH, "Authority Is Constructed and Contextual"; CREATE, "Information Creation as a Process"; VALUE, "Information Has Value"; INQUIRY, "Research as Inquiry"; CONVO, "Scholarship as Conversation"; SEARCH, "Searching as Strategic Exploration."

In Tony Becher's scheme, pure-hard sciences, such as chemistry, concentrate on the study of phenomena through observation, experimentation, and other scientific methods to discover new facts, and tend to have a cumulative and quantitative nature. By contrast, pure-soft disciplines such as sociology are concerned with critical thinking and tend to have a qualitative or reiterative nature with "no sense of superseded knowledge." Applied-hard sciences, including engineering and medicine, utilize existing scientific knowledge to develop techniques and products that will solve real-world problems. Applied-soft disciplines, such as nursing and criminal justice, also focus on applying knowledge to solve real-world problems and to create and refine professional protocols. See Tony Becher, "The Significance of Disciplinary Differences," *Studies in Higher Education* 19, 2 (1994): 151-61.

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Table 2.

Number of excerpts across the standards referencing frames from the ACRL Framework, by disciplinary category

Disciplinary category of standards†	The six frames* of the ACRL Framework					
	AUTH	CREATE	VALUE	INQUIRY	CONVO	SEARCH
Pure-hard (n = 7)	6	4	5	17	11	2
Pure-soft (n = 8)	23	28	13	25	22	16
Applied-hard (n = 3)	1	2	1	6	1	3
Applied-soft (n = 11)	17	8	8	26	14	11
Total excerpts	47	42	27	74	48	37

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Standards with Direct Mentions of *Information Literacy*

Only four standards directly referenced *information literacy*: psychology, public health, nursing, and sociology.⁵⁰ The extent to which these four standards incorporated information literacy concepts varies (see Table 1). For instance, the frames "Authority Is Constructed and Contextual" and "Searching as Strategic Exploration" were present in all four, "Information Has Value" appeared in just the nursing and psychology standards, and the most frequent frame, "Research as Inquiry," was missing entirely from the public health standard. Psychology and nursing situated information literacy as essential to undergraduate learning, presenting IL concepts from all six frames and directly referencing *information literacy* three times each.

The Frame "Authority Is Constructed and Contextual"

A total of 47 excerpts were counted for the frame "Authority Is Constructed and Contextual" (AUTH), primarily in the pure-soft and applied-soft disciplines, with 23 and

Table 3.

Number and percentage of standards with references to frames from the ACRL Framework, by disciplinary category

Disciplinary category	Frames of the ACRL Framework					
	AUTH	CREATE	VALUE	INQUIRY	CONVO	SEARCH
Pure-hard (n = 7)	4 (57.14%)	3 (42.86%)	3 (42.86%)	5 (71.43%)	4 (57.14%)	3 (42.86%)
Pure-soft (n = 8)	7 (87.50%)	8 (100%)	5 (62.50%)	5 (62.50%)	6 (75.00%)	8 (100%)
Applied-hard (n = 3)	1 (33.33%)	2 (66.67%)	1 (33.33%)	3 (100.00%)	1 (33.33%)	1 (33.33%)
Applied-soft (n = 11)	5 (45.45%)	4 (36.36%)	5 (45.45%)	10 (90.91%)	6 (54.55%)	4 (36.36%)
All (n = 29)	17 (58.62%)	17 (58.62%)	14 (48.27%)	23 (79.31%)	17 (58.62%)	16 (55.17%)

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17 excerpts, respectively (see Tables 1 and 2). Although the pure-hard and pure-soft categories had similar numbers of standards, the pure-hard group had only a quarter of the AUTH frame concepts that the pure-soft category had (see Table 2). The standards with the most AUTH excerpts included those from the pure-soft fields of English and psychology, along with the applied-soft disciplines of child development and nursing.⁵¹ Across the 17 disciplinary standards that included AUTH concepts, the pure-soft standards most frequently included concepts related to the frame (see Table 3). Six major themes were uncovered across the selections (see Table 4), including students recognizing varying levels of authority, which was present in the only applied-hard excerpt.

Table 4.
Themes in disciplinary standards referencing the frame “Authority Is Constructed and Contextual” (AUTH)

Excerpt	Theme	Example excerpt	Discipline
1	Evaluation of sources	“Critically evaluate research related to physical activity and its impact on health and chronic disease.”	Kinesiology
2	Disciplinary context of authority	“Read texts from multiple points of view (e.g., sympathetic to a writer’s position and critical of it) and in ways that are appropriate to the academic discipline or other contexts where the texts are being used.”	English
3	Evaluation of student’s own authority	“Critically evaluate their own work and that of others for accuracy and fairness, clarity, appropriate style, and grammatical correctness.”	Journalism
4	Bias and accuracy of sources	“a. Consider a variety of historical sources for credibility, position, perspective, and relevance. b. Evaluate historical arguments and how they were constructed and might be improved.”	History
5	Cultural/social context of authority	“Recognize the systemic influences of sociocultural, theoretical, and personal biases on the research enterprise and evaluate the effectiveness with which researchers address those influences in psychological research.”	Psychology
6	Recognize/evaluate levels and types of authority (e.g., peer-reviewed and scientific sources)	“Independently research scientific and nonscientific information.”	Food science



The Frame “Information Creation as a Process”

“Information Creation as a Process” (CREATE) concepts appeared in 17 standards (see Table 1). Overwhelmingly, the 8 standards in the pure-soft category included the most CREATE references, accounting for almost two-thirds of the 42 excerpts (see Tables 2 and 3). All pure-soft standards included CREATE concepts, including the English and psychology standards, which had the most references to ideas from this frame (see Table 1).⁵² Conversely, CREATE concepts were minimally adopted across the applied-soft standards, as slightly over a third included ideas from the frame (see Table 3). Five major themes emerged in how CREATE concepts were discussed, including students understanding that the information creation process affects the final information product, in other words, what they know, and students reviewing an audience or need to determine the best creation process, in other words, what they do (see Table 5).

The Frame “Information Has Value”

“Information Has Value” (VALUE) concepts were identified the least of the six frames, with 27 excerpts across slightly less than half of the 29 standards (see Tables 1 and 3). Most standards that included VALUE ideas minimally incorporated it, with only the chemistry, English, nursing, and psychology standards including more than one occurrence.⁵³ Pure-soft was the only category in which more than 50 percent of standards mention VALUE concepts (see Table 3), with 13 excerpts overall in the 8 pure-soft standards (see Table 2). Conversely, the medical standard was the only applied-hard standard that mentioned concepts from this frame.⁵⁴ Four main themes were drawn from the frame’s excerpts: citation, legal terminology, the contextual value of information, and ethical use of information (see Table 6).

The Frame “Research as Inquiry”

Overall, the “Research as Inquiry” frame was well represented across the standards and was the most prevalent frame (see Tables 1, 2, and 3). Of the six frames, “Research as Inquiry” (INQUIRY) appeared in the highest number of standards and was the only frame with concepts in all three applied-hard standards and in over half the standards in all disciplinary categories. The English and nursing standards incorporated INQUIRY concepts most often, with 11 and 9 excerpts, respectively.⁵⁵ Although the pure-soft category accounted for 25 of the 74 excerpts, only a little over half the standards in that category included INQUIRY (see Tables 2 and 3). Seven main themes from the frame emerged in the excerpts, including several with language closely related to the frame’s knowledge practices (see Table 7).

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Table 5.
Themes in disciplinary standards referencing the frame “Information Creation as a Process” (CREATE)

Excerpt	Theme	Example excerpt	Discipline
1	Self-evaluation of communication choices	“Reflect on the choices they make in light of context, purpose, and audience.”	English
2	Disciplines/ cultures affect creation process	“An understanding of playwriting and production processes, aesthetic properties of style, and the way these shape and are shaped by artistic and cultural forces.”	Theater
3	Communicates in a variety of formats	“Demonstrate the use and practice of different levels of oral and written communication skills. This includes such skills as writing technical reports, letters, and memos; communicating technical information to a nontechnical audience; and making formal and informal presentations.”	Food science
4	Understands information creation process affects product [knowing]	Students should become critical consumers of statistically “based results reported in popular media, recognizing whether reported results reasonably follow from the study and analysis conducted.”	Statistics
5	Reviews audience/ need to determine creation process [doing]	“Communicate mathematical ideas clearly and coherently both verbally and in writing to audiences of varying mathematical sophistication.”	Mathematics



Table 6.
Themes in disciplinary standards referencing the frame “Information Has Value” (VALUE)

Excerpt Theme	Excerpt	Discipline
1 Citation	“Students should be trained in the responsible treatment of data, proper citation of others’ work, and the standards related to plagiarism and the publication of scientific results.”	Chemistry
2 Legal terminology	“Develop an awareness of copyright, licensing, and permission requirements as they relate to access to and use of musical works.”	Music
3 Contextual value of information (e.g., disciplinary / cultural)	“Explore the concept of intellectual property (i.e., ownership of ideas) as it is used in different disciplines and contexts, and identify differences between errors and intentional variations from expected conventions.”	English
4 Ethical use of information	“Make ethical decisions by applying the standards of the NASW [National Association of Social Workers] Code of Ethics, relevant laws and regulations, models for ethical decision making, ethical conduct of research, and additional codes of ethics as appropriate to context.”	Social work

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Table 7.
Themes in disciplinary standards referencing the frame “Research as Inquiry” (INQUIRY)

Excerpt	Theme	Example excerpt	Discipline
1	Identify questions or problems	“Scientific Inquiry: Applies knowledge of the scientific process to integrate and synthesize information, solve problems and formulate research questions and hypotheses; is facile in the language of the sciences and uses it to participate in the discourse of science and explain how scientific knowledge is discovered and validated.”	Medicine
2	Applying information to solve problems or answer questions	“Be able to develop a process for solving and prevent reoccurrences of ill-defined problems; know how to use library and internet resources to search for quality information, and solve a problem and make thoughtful recommendations.”	Food science
3	Use information outside of academia	“Demonstration of higher-order cognitive skills to analyze an unstructured problem, formulate and develop a solution using appropriate technology and effectively communicate the results to stakeholders.”	Business
4	Outlines inquiry process	“Social workers understand quantitative and qualitative research methods and their respective roles in advancing a science of social work and in evaluating their practice. Social workers know the principles of logic, scientific inquiry, and culturally informed and ethical approaches to building knowledge. Social workers understand that evidence that informs practice derives from multidisciplinary sources and multiple ways of knowing. They also understand the processes for translating	



<p>research findings into effective practice. [Social workers] use practice experience and theory to inform scientific inquiry and research; apply critical thinking to engage in analysis of quantitative and qualitative research methods and research findings; and use and translate research evidence to inform and improve practice, policy, and service delivery.”</p> <p>“Identify, summarize, appraise, and synthesize other scholars’ historical arguments.”</p> <p>“To analyze, synthesize, think critically, solve problems and make decisions.”</p> <p>“They are continuous, collaborative learners who demonstrate knowledgeable, reflective, and critical perspectives on their work, making informed decisions that integrate knowledge from a variety of sources.”</p>	<p>Social work</p> <p>History</p> <p>Public administration</p> <p>Child development</p>
<p>5 Synthesize information</p>	
<p>6 Analyze /interpret information</p>	
<p>7 Introspection: values critique as a part of research process</p>	

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Table 8.
Themes in disciplinary standards referencing the frame “Scholarship as Conversation” (CONVO)

Excerpt	Theme	Example excerpt	Discipline
1	Students communicate information—inside classroom	“Undergraduate research allows students to integrate and reinforce chemistry knowledge from their formal coursework, develop their scientific and professional skills, and create new scientific knowledge.”	Chemistry
2	Disciplinary landscape	“Candidates demonstrate basic knowledge of the research base underlying each content area, basic knowledge of the core concepts and standards of professional organizations in each content area, and rely on sound resources for that knowledge.”	Child development
3	Build on ideas or previous research	“The mining of information from existing sources (secondary investigation) often precedes and informs the design and conduct of basic research, which involves gathering new information or data (primary investigation), and requires a new set of abilities associated with the use of processes commonly used in science or social science research (i.e., the ability to pose questions, both quantitative and qualitative; create methods to collect data; interact with the public or the environment to gather data; organize and interpret data; and communicate the outcomes of the investigation).”	Environmental science
4	Seek out or knowledge of interdisciplinary/multiple perspectives	“Mathematics students should encounter a range of contemporary applications that motivate and illustrate the ideas they are studying, become aware of connections to other areas (both in and out of the mathematical sciences), and learn to apply mathematical ideas to problems in those areas. Students should come to see mathematical theory as useful and enlightening in both pure and applied contexts.”	Mathematics



5	Students communicate information— outside of classroom	“Demonstrate the use and practice of different levels of oral and written communication skills. This includes such skills as writing technical reports, letters and memos; communicating technical information to a nontechnical audience; and making formal and informal presentations.”	Food science
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The Frame “Scholarship as Conversation”

“Scholarship as Conversation” (CONVO) concepts appeared in slightly over half the standards, with 48 excerpts (see Tables 1 and 3). Only one applied-hard standard, that of food science, presented CONVO ideas.⁵⁶ They also occurred in just over half the pure-hard and applied-soft standards and in three-quarters of the pure-soft standards. Five core themes emerged in the CONVO excerpts, including students communicating information, both in and outside the classroom (see Table 8).

The Frame “Searching as Strategic Exploration”

“Searching as Strategic Exploration” (SEARCH) concepts occurred 37 times across 16 standards (see Tables 1 and 3). All the pure-soft standards included SEARCH topics, while less than half the standards from the three other disciplinary categories mentioned them (see Table 3). Notably, the applied-soft nursing standard included double the number of SEARCH excerpts of any other standard.⁵⁷ Like the AUTH and CONVO frames, the only applied-hard standard to discuss SEARCH concepts was the food science standard (see Table 1).⁵⁸ Among the five themes identified across SEARCH excerpts, the theme of generally finding information was most common. See Table 9.

Discussion

Direct Mentions of Information Literacy

All four standards that directly mention information literacy connect it to practical applications of knowledge, as demonstrated by the sociology standard, which uses the phrase to describe an essential competency focused on students applying knowledge to communicate information to the public and to inform policy.⁵⁹ Similarly, the public health standard references information literacy in its “Intellectual and Practical Skills” domain, and the nursing standard states that upon graduation, students should be able to “use the skills of inquiry, analysis, and information literacy to address practice issues.”⁶⁰ While the psychology standard also refers to information literacy in a section focused on practical applications, it stands out as the only standard to have an entire section labeled and dedicated to IL and IL learning outcomes.⁶¹

Interestingly, the public health, nursing, and sociology standards all mention information literacy next to other literacies. The public health standard references information literacy next to “critical and creative thinking” and “quantitative literacy”; the nursing standard closely links it to computer literacy; and the sociology standard places it next to “technology, and quantitative literacy.”⁶² The occurrence of information literacy next to other literacies aligns with previous studies that found faculty seldom view information literacy as separate from other literacies.⁶³

The Frame “Authority Is Constructed and Contextual”

A little over half the excerpts for the frame “Authority Is Constructed and Contextual” include themes of generally evaluating or analyzing sources, such as that from the ki-



Table 9.
Themes in disciplinary standards referencing the frame “Searching as Strategic Exploration” (SEARCH)

Excerpt	Theme	Example excerpt	Standard discipline
1	Generally finding information	“Information acquisition skills (i.e., written and electronic searches, databases, Internet, etc.)”	Food science
2	Strategic searching, multiple ways of searching	“Essential student skills include the ability to retrieve information efficiently and effectively by searching the chemical literature, evaluate technical articles critically, and manage many types of chemical information. Students must be instructed in effective methods for performing and assessing the quality of searches using keywords, authors, abstracts, citations, patents, and structures/substructures.”	Chemistry
3	Outcomes focused searches (relevant, interdisciplinary, credible)	“The ability to identify possibilities and locate information in other fields that have bearing on musical questions and endeavors.”	Music
4	Find information using technology and tools	“Investigations can include the ability to locate relevant sources of information about a problem and issues (e.g., using libraries, the internet, or interviews with knowledgeable sources and stakeholders); to gather relevant information from those sources; to review it (e.g., for factual inaccuracies or for bias); and eventually to synthesize and report that information (e.g., as part of a written and/or oral report).”	Environmental science
5	Find information using credible sources (i.e., databases, library, academic resources)	“Develop a comprehensive strategy for locating and using relevant scholarship (e.g., databases, credible journals) to address psychological questions.”	Psychology

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nesiology standard (see Table 4, excerpt 1).⁶⁴ Many of the excerpts require students to understand that various disciplines have different sources of expertise and to evaluate them, such as the English standard (see Table 4, excerpt 2).⁶⁵ The music, theater, and art standards all use the same phrase, describing this outcome as “the ability to respect to respect, understand, and evaluate work in a variety of disciplines.”⁶⁶

Themes of self-evaluation, a “core idea” of the Framework, appeared moderately in the “Authority Is Constructed and Contextual” excerpts, as well as in the “Information Creation as a Process” and “Research as Inquiry” passages (see Table 5, excerpt 1, and Table 7, excerpt 7). Excerpts with this theme were primarily found in applied-soft and pure-soft disciplines, including the journalism selection (excerpt 3) in Table 4.⁶⁷ Previous research argued that pure-soft disciplines prepare students to “debate perspectives.”⁶⁸ The results from this study were consistent with this description, as “Authority Is Constructed and Contextual” concepts appeared in almost every pure-soft standard, including that for psychology, which had the most references to the frame (see Tables 1 and 3). The pure-soft standards often discussed students identifying biased and accurate sources (see Table 4, excerpt 4)⁶⁹ and students understanding that authority can vary depending on cultural or social contexts and recognizing how those constructs can elicit biases (see Table 4, excerpt 5).⁷⁰ Themes around evaluating authority were also present in the pure-hard and applied-soft categories but were less common. Conversely, the only selection for this frame in the applied-hard category focused on students recognizing different levels of authority (see Table 4, excerpt 6).⁷¹

The Frame “Information Creation as a Process”

The consistent appearance of “Information Creation as a Process” concepts in pure-soft disciplines aligns with Ruth Neumann, Sharon Parry, and Tony Becher’s characterization of teaching methods in pure-soft curricula as “reiterative,” “open ended,” and allowing for “individualist interpretation.”⁷² For example, the pure-soft English standard includes multiple passages that describe the reiterative process of writing, along with students’ self-evaluation of their work (see Table 5, excerpt 1).⁷³ Many pure-soft excerpts also involve students communicating in a variety of formats and reviewing their audience or purpose to inform their information creation process. These themes also appear in other disciplinary categories but are significantly less common.

Notably, the theme of students recognizing that cultures and disciplines influence the information creation process was found only in pure-soft disciplines (see Table 5, excerpt 2).⁷⁴ The foreign language standard, for example, states that students should “acquire information and recognize the distinctive viewpoints that are only available through the foreign language and its cultures.”⁷⁵ It is surprising that more standards do not emphasize the context of how information is created, as a previous interview study with 20 faculty at two U.S. institutions found that across disciplines, faculty most often described information literacy within a “contextual theme.”⁷⁶

Excerpts from applied-hard and pure-hard standards primarily included themes already mentioned, such as the food science passage that focuses on communicating in a variety of formats (see Table 5, excerpt 3).⁷⁷ The statistics standard stood out as the only pure-hard standard to include the theme of students understanding that an informa-

tion source may be more appropriate based on its creation process (see Table 5, excerpt 4).⁷⁸ In contrast, the idea of students communicating information after reviewing the audience appeared in several pure and applied-hard standards (see Table 5, excerpt 5).⁷⁹

The Frame “Information Has Value”

One knowledge practice of the frame “Information Has Value” is for students to “give credit to the original ideas of others through proper attribution and citation.”⁸⁰ This practice is present in only pure-soft and pure-hard standards: chemistry (see Table 6, excerpt 1),⁸¹ history, and English. For example, the English standard asks that students “examine the underlying logic in commonly used citation systems.”⁸² Given the emphasis at most universities on academic honesty⁸³ along with steep penalties for plagiarism, and the research that shows many faculty see their students as inadequate at citing,⁸⁴ it is surprising that more disciplines do not incorporate giving credit to the ideas of others within their standards.

... it is surprising that more disciplines do not incorporate giving credit to the ideas of others within their standards.

The standards for music (see Table 6, excerpt 2),⁸⁵ English, nursing, journalism, and social work use legal terminology, such as *copyright*, *licensing*, *permission*, and *intellectual property*, to discuss the value of information.⁸⁶ It is not surprising that disciplines which commonly produce intellectual property, such as music, journalism, and English, would include this language in their standards. It is startling, however, that few applied-soft and no applied-hard disciplines emphasize teaching students about intellectual property rights, as applied disciplines are normally characterized as focusing on “knowledge application and integration.”⁸⁷ A handful of pure-soft standards include the theme of the contextual value of information. For example, a quotation from the English standard (see Table 6, excerpt 3) mentions the contextual value of intellectual property, an idea closely linked to the frame’s knowledge practice to “understand that intellectual property is a legal and social construct that varies by culture.”⁸⁸

Finally, over half the “Information Has Value” excerpts reference ethically conducting research or following ethical guidelines in using information, such as excerpt 4 in Table 6.⁸⁹ The standards for nursing, business, and statistics connect ethics to data use and management.⁹⁰ For example, the statistics standard states, “Students should demonstrate an awareness of ethical issues associated with sound statistical practice. As data collection becomes more ubiquitous, the potential misuse of statistics becomes more prevalent.”⁹¹

The Frame “Research as Inquiry”

A repeating theme across all disciplinary categories for this frame was students’ ability to identify research problems and ask research questions, such as excerpt 1 in Table 7.⁹² Several passages expanded this idea further and included students both identifying a problem and solving it, such as the engineering standard, which states that students should have “an ability to identify, formulate, and solve engineering problems.”⁹³ The notion of recognizing a problem and that of applying information to solve it were typically separate from each other, however. The application of information theme (see

Table 7, excerpt 2)⁹⁴ was present in all three applied-hard standards, consistent with Neumann, Parry, and Becher's description of applied-hard disciplines as interested in problem-solving and practical applications.⁹⁵

Passages focused on students using information or the inquiry process outside the classroom as professionals primarily occur in applied-soft standards, including business (see Table 7, excerpt 3),⁹⁶ child development, education, journalism, nursing, and social work.⁹⁷ Several of these reference using evidence-based practices for real-world needs, such as the nursing standard, which states students will "integrate evidence, clinical judgment, interprofessional perspectives, and patient preferences in planning, implementing, and evaluating outcomes of care."⁹⁸ Likewise, the social work standard mentions evidence-based practice in the context of the real world and describes the overall inquiry research process (see Table 7, excerpt 4).⁹⁹

The theme of knowledge application outside academia is closely related to the Framework's description of the "Research as Inquiry" frame, which states, "This process of inquiry extends beyond the academic world to the community at large, and the process of inquiry may focus upon personal, professional, or societal needs."¹⁰⁰ At first glance, the knowledge practices and dispositions of the "Research as Inquiry" frame appear to generally favor language related to knowledge acquisition and undergraduate education, areas that may be better suited to the pure-soft and pure-hard disciplines. Even so, "Research as Inquiry" concepts are more prevalent in applied-hard and applied-soft standards (see Table 3).

Two additional themes, synthesizing information and analyzing and interpreting information, are closely related to two knowledge practices in the "Research as Inquiry" frame.¹⁰¹ Synthesis of information (see Table 7, excerpt 5) occurs in all disciplinary categories.¹⁰² For example, a psychology learning outcome states that students must "create coherent and integrated oral argument based on a review of the pertinent psychological literature."¹⁰³ Alternatively, the theme of analyzing and interpreting information (see Table 7, excerpt 6) is less common in pure-soft standards and most often appears in applied-hard and pure-hard standards.¹⁰⁴

Synthesizing and analyzing information, along with the frame's emphasis on the iterative and "open or unresolved" nature of questioning, aligns with Neumann, Parry, and Becher's characterization of pure-soft knowledge as "reiterative" with "no sense of superseded knowledge."¹⁰⁵ Despite the similar language, the pure-soft category incorporates "Research as Inquiry" concepts in the lowest percentage of standards (see Table 3), with a significant portion of the excerpts derived from the English standard (see Table 1). More applied-soft standards, however, mention this frame than any other disciplinary category (see Table 3), with passages referencing the aforementioned themes, along with the idea of introspection (see Table 7, excerpt 7).¹⁰⁶

The Frame "Scholarship as Conversation"

Much of the content across all disciplinary categories refers to students as information producers, often speaking of them communicating research or disciplinary knowledge. Similarly, the "Scholarship as Conversation" frame notes that students are developing "information literate abilities" when they "see themselves as contributors to scholarship

rather than only consumers of it."¹⁰⁷ One example of students communicating research is in the chemistry standard, which connects the idea of communicating research to students understanding the disciplinary landscape (see Table 8, excerpt 1).¹⁰⁸

Neumann, Parry, and Becher assert that "soft pure subjects enhance students' ability to debate perspectives,"¹⁰⁹ an ability similar to one of the frame's knowledge practices, which states that students should "summarize the changes in scholarly perspective over time on a particular topic within a specific discipline."¹¹⁰ Themes across the pure-soft standards reflect these two topics: students identifying how ideas build upon each other both in and outside their discipline's landscape, and students seeking out and identifying multiple, sometimes interdisciplinary, perspectives.

Standards in applied-soft and pure-hard disciplines also incorporate those themes, including the applied-soft child development standard, which references the disciplinary landscape as "basic knowledge" (see Table 8, excerpt 2).¹¹¹ The environmental science standard mentions building on prior research uniquely as "mining of information from existing sources" (see Table 8, excerpt 3).¹¹² Several standards go further and detail that students should incorporate other disciplinary perspectives (see Table 8, excerpt 4).¹¹³ Other themes, such as communicating outside the classroom, appear across all disciplinary categories, including the only selection (see Table 8, excerpt 5) for this frame in an applied-hard standard.¹¹⁴

The Frame "Searching as Strategic Exploration"

While the frame "Searching as Strategic Exploration" was present most often in pure-soft standards (see Table 3), all five major themes identified for this frame appeared across all disciplinary categories (see Table 9). The most commonly identified theme was that of generally finding information, with such language as *find*, *collect*, or even *information acquisition* in a passage from the food science standard (see Table 9, excerpt 1).¹¹⁵ While less common, several standards included references to strategic searching and the outcomes of searches, such as locating credible or interdisciplinary information. The chemistry standard provided a general outline of searching and then a more detailed description of what strategic searching might look like (see Table 9, excerpt 2).¹¹⁶ Additionally, the music and theater standards used identical language to describe locating information from "other fields" (see Table 9, excerpt 3).¹¹⁷ Finally, over half the standards across all disciplinary areas discussed using specific tools or technologies, such as databases and the Internet, to search (see Table 9, excerpt 4),¹¹⁸ and several specified using credible tools and resources (see Table 9, excerpt 5).¹¹⁹ As mentioned previously, information literacy was often referenced hand-in-hand with other literacies, and this held true for several passages identified with the "Searching as Strategic Exploration" frame. One example was in the biology standard, which intertwined general searching skills with computer literacy.¹²⁰

Much of the content across all disciplinary categories refers to students as information producers, often speaking of them communicating research or disciplinary knowledge.

Limitations

The study was limited in several ways. The lack of applied-hard standards contributed to an uneven sample across disciplinary categories. Due to the philosophical nature of the Framework and differing disciplinary languages, identifying relationships between the Framework and standards was sometimes subjective and dependent on the researcher's disciplinary expertise. For instance, both researchers came from a pure disciplinary background and struggled with coding standards from applied disciplines that discuss the use of skills outside academia. Additionally, the researcher with a pure-hard background more readily coded information literacy concepts related to data or lab-based research, whereas the researcher with pure-soft experience less often saw those activities as part of information literacy. Dawes noted that librarians can use the frame's dispositions to find a "common language" between the Framework and disciplinary faculty. However, the Framework's dispositions and knowledge practices do not mention data, and previous research found that its language often does not reflect how faculty speak about IL.¹²¹

Conclusion

A critical benefit of reviewing programmatic and accreditation standards, as Saunders argues, is "the chance to influence future versions of [university] accreditation standards in regard to information literacy and the library's role."¹²² The results of this study show that only a small percentage of national disciplinary standards and accreditation documents explicitly mention *information literacy* or devote substantial coverage to Framework concepts. It is reassuring that while only four standards directly speak of *information literacy*, the majority include IL topics from two or more frames (see Table 1).¹²³ However, many standards only refer

... only a small percentage of national disciplinary standards and accreditation documents explicitly mention information literacy or devote substantial coverage to Framework concepts.

ence IL concepts for specific frames once or twice, often superficially, thus making it difficult for both librarians and disciplinary faculty to make connections between curriculum and IL mandates in university accreditation documents. As information literacy becomes further embedded into accreditation documents, adding more explicit language to standards could help librarians work with educators to plan curricula that meet IL goals in accreditation documents.

This study's findings suggest that, while the language of the Framework is flexible, it most closely aligns with pure-soft disciplinary language. The pure-soft category has the highest percentage of standards that include Framework concepts for five of the six frames (see Table 3). While a key limitation of this study was the small sample of applied-hard standards, those reviewed display minimal adoption of information literacy concepts, with four of the six frames present in only one applied-hard standard. Future studies should continue to explore how the Framework and individual frames are embedded in disciplinary standards, along with why some concepts are scarce in several disciplinary



categories. Future work might also explore how the Framework's language could evolve to more closely align with how disciplinary faculty write about information literacy and integrate it into their curriculum. Finally, additional studies might seek to identify other IL concepts that are absent from the Framework, such as lifelong learning.

Overall, the results indicate that many standards reference the Framework's information literacy concepts minimally and in a cursory manner. This study's findings could be used by librarians to identify IL concepts that are important to specific disciplines, along with language and themes to use in discussions with departments. Additionally, librarians might seek to encourage the addition of IL concepts (or revisions to present terminology) in disciplinary standards to improve discussions of information literacy at discipline and university levels, and they should do so in a way that takes into account the needs and structure of individual disciplines.

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Appendix

Pure-Hard Disciplines			
Discipline	Professional society or accreditation body	Standard title	Year
Biology (general)	National Association of Biology Teachers (NABT)	"Guidelines for the Evaluation of Four-Year Undergraduate Biology"	2008
Chemistry	American Chemical Society (ACS)	"Undergraduate Professional Education in Chemistry: ACS Guidelines and Evaluation Procedures for Bachelor's Degree Programs"	2015
Environmental science	North American Association for Environmental Education (NAAEE)	"Developing a Framework for Assessing Environmental Literacy: Executive Summary"	2011
Kinesiology	American Kinesiology Association (AKA)	"AKA Statement regarding the Undergraduate Core Curriculum in Kinesiology"	2009
Mathematics	Mathematical Association of America (MAA)	"2015 CUPM [Committee on the Undergraduate Program in Mathematics] Curriculum Guide to Majors in the Mathematical Sciences"	2015
Physics	American Association of Physics Teachers (AAPT)	"Guidelines for Self-Study and External Evaluation of Undergraduate Physics Programs"	2005
Statistics	American Statistical Association (ASA)	"Guidelines for Assessment and Instruction in Statistics Education (GAISE) College Report 2016"	2016

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Pure-Soft Disciplines			
Discipline	Professional society or accreditation body	Standard title	Year
Art	National Association of Schools of Art and Design (NASAD)	<i>National Association of Schools of Art and Design Handbook 2017–18</i>	2018
English (language and literature)	Council of Writing Program Administrators (CWPA), National Council of Teachers of English (NCTE), and National Writing Project (NWP)	“Framework for Success in Postsecondary Writing”	2011
History	American Historical Association (AHA)	“AHA History Tuning Project: 2016 History Discipline Core”	2016
Foreign language	American Council on the Teaching of Foreign Languages (ACTFL)	<i>World-Readiness Standards for Learning Languages</i>	2015
Music	National Association of Schools of Music (NASM)	<i>National Association of Schools of Music Handbook 2018–19</i>	2019
Psychology	American Psychological Association (APA)	“APA Guidelines for the Undergraduate Psychology Major”	2013
Sociology	American Sociological Association (ASA)	<i>The Sociology Major in the Changing Landscape of Higher Education: Curriculum, Careers, and Online Learning</i>	2017
Theater	National Association of Schools of Theatre (NAST)	<i>National Association of Schools of Theatre Handbook 2018–19</i>	2018



Applied-Hard Disciplines

Discipline	Professional society or accreditation body	Standard title	Year
Food science	Institute of Food Technologists (IFT)	"2011 Resource Guide for Approval and Re-Approval of Undergraduate Food Science Programs"	2016
Engineering (general)	ABET (Accreditation Board for Engineering and Technology)	"Criteria for Accrediting Engineering Programs, 2018–2019"	2018
Medicine	Association of American Medical Colleges (AAMC)	"Core Competencies for Entering Medical Students"	n.d.

Applied-Soft Disciplines

Disciplinary area	Professional society or accreditation body	Standard title	Year
Accounting	Association to Advance Collegiate Schools of Business (AACSB)	"2013 Eligibility Procedures and Accreditation Standards for Accounting Accreditation"	2018
Business administration (general)	Association to Advance Collegiate Schools of Business (AACSB)	"2018 Eligibility Procedures and Accreditation Standards for Business Accreditation"	2018
Communications	National Communication Association (NCA)	"What Should a Graduate with a Communication Degree Know, Understand, and Be Able to Do?"	2015
Criminal justice	Academy of Criminal Justice Sciences (ACJS)	"Academy of Criminal Justice Sciences Standards for College/University Criminal Justice/Criminology Baccalaureate Degree Programs"	2018
Education	Council for the Accreditation of Educator Preparation (CAEP)	"2013 CAEP Standards"	2019
Child development/ Family studies	National Association for the Education of Young Children (NAEYC)	"2010 NAEYC Standards for Initial & Advanced Early Childhood Professional Preparation Programs"	2012

Journalism and communications	Accrediting Council on Education in Journalism and Mass Communications (ACEJMC)	<i>Journalism and Mass Communications Accreditation 2018–2019</i>	2019
Nursing	American Association of Colleges of Nursing (AACN)	“The Essentials of Baccalaureate Education for Professional Nursing Practice”	2008
Public health	Association of Schools and Programs of Public Health (ASPPH)	“Undergraduate Public Health Learning Outcomes”	2011
Public administration	Network of Schools of Public Policy, Affairs, and Administration (NASPAA)	“Guidelines for Baccalaureate Degree Programs in Public Affairs/Public Administration”	2016
Social work	Council on Social Work Education (CSWE)	“2015 Educational Policy and Accreditation Standards”	2015

Note: Categorization based on Anthony Biglan, “The Characteristics of Subject Matter in Different Academic Areas,” *Journal of Applied Psychology* 57, 3 (1973): 195–203, <https://doi.org/10.1037/h0034701>; Tony Becher, “The Significance of Disciplinary Differences,” *Studies in Higher Education* 19, 2 (1994): 151–6; John C. Smart and Corinna A. Ethington, “Disciplinary and Institutional Differences in Undergraduate Education Goals,” *New Directions for Teaching & Learning* 1995, 64 (1995): 53–54, <https://doi.org/10.1002/tl.37219956408>; Thomas F. Nelson Laird, Rick Shoup, George D. Kuhn, and Michael J. Schwarz, “The Effects of Discipline on Deep Approaches to Student Learning and College Outcomes,” *Research in Higher Education* 49, 6 (2008): 475, <https://doi.org/10.1007/s11162-008-9088-5>; and Adrian Simpson, “The Surprising Persistence of Biglan’s Classification Scheme,” *Studies in Higher Education* 42, 8 (2017): 1528–29, <https://doi.org/10.1080/03075079.2015.1111323>.

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