Competitive intelligence in an AI world: Practitioners' thoughts on technological advances and the educational needs of their successors

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ABSTRACT: Information Age trends have caused the competitive intelligence (CI) industry to flourish while changing the way CI is conducted. Universities educating CI analysts are interested in knowing what knowledge and skills are necessary for future practitioners. In 2022, *Harvard Business Review* addressed this topic's relevancy, noting increases in CI departments and growing demand for analysts to sift through unconfirmed information. This study addresses the question of what skill sets are needed for future CI analysts and how do instructors prepare them for an evolving and dynamic future in CI? Over 130 CI practitioners were surveyed about recommended skills and curriculum for the next generation. Results confirmed CI's technology evolution (e.g., faster turnarounds, greater client expectations). While tech-savvy skills are essential, soft skills consistently ranked as top requirements. Findings are applicable to other disciplines that analyze data for business strategy.

KEYWORDS: artificial intelligence, big data, competitive intelligence, pedagogy

1. INTRODUCTION

Since the pandemic, the importance of intelligence in the corporate world has hit new heights. As misleading information proliferates, so does the need for CI departments to aid companies in effective decision-making (Kolbe and Morrow, 2022). Calof *et al.*'s (2018) comparative study discovered a widespread growth of CI over the last two decades with "87% of all responding organizations had some form of formal competitive intelligence structure and many organizations had multiple intelligence or intelligence type functions in their

organization" (p. 675). A sister discipline to market research, colleges have had difficulty offering CI because "most faculty members do not view the intelligence profession as a distinct discipline" (Miller, 2000, p. 65). However, university resistance to CI appears to be breaking down with the recognition of such CI activities as monitoring competitors, benchmarking, and war-gaming (Barrett, 2010).

CI skills are evolving due to technological advances. One of the most impactful is Artificial Intelligence (AI); however, the extent of its impact remains to be seen (Hoffman and Freyn, 2019). Toumi (2018) predicts, "in

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the next years, AI will change learning, teaching, and education" (p. 2). Gunderson (2019) notes that "these rapid [technological] changes require the CI field to adapt" (p. 14). Mabe *et al.* (2019) asserts on the one hand "it is important that CI skills and capabilities are well defined" to enable practitioners to "understand which skills and capabilities they should develop," but then notes "there is currently no set framework of skills and capabilities for defining the roles of CI practitioners" (p. 720). This calls into question *what* skills are necessary for CI practitioners to be proficient. To address the evolving needs of the 21st century, this study will research the following questions:

- How has technology affected the current CI environment and subsequently, the educational needs for future practitioners?
- How can educators best prepare future CI analysts?

The paper will review CI's evolution and research related to specific skills needed for the discipline. Methodology will cover survey development and distribution followed by results and further research in the field of CI pedagogy.

2. LITERATURE REVIEW

CI's evolution
The origin of CI can be traced to *Competitive Strategy* (Porter, 1980). Porter advocated both "competitor monitoring" (p. 96) and "relating a company to its environment" (p. 3). Until the mid-1990s, intelligence was portrayed as a cloak-and-dagger activity (Miller, 2000). By the late 1990's publications including *The Wall Street Journal* began to endorse intelligence drawing upon practices in the U.S. intelligence community (Miller). Former CIA analyst, Jan Herring (1999), professionalized CI by introducing the CI cycle.

Before the Information Age, "the scenery of science and technology was quite stable. Large and even small companies knew exactly their marketplace" (Dou *et al.*, 1992, p. 35). Technological developments eliminated stability, prompting the expansion of CI presence and scope. Some changes included the digitization of corporate information (Sadok *et al.*, 2019), plummeting cost of data storage (Hoffman, 2018) and corporate access to big data and AI (Ranjan and Foropon, 2021). By the start of the 21st century, 90% of the information needed by a company to monitor competitors and their industry was available in the public domain (McGonagle and Vella, 2002). A related development has been the proliferation of software designed to facilitate and expedite the work of CI practitioners (Semerkova *et al.*, 2017).

CI's evolution has seen the rise of Competitive Technical Intelligence (CTI), a branch of CI, used by companies to ensure they have "the best information possible on customer needs, technology options…and the competitive environment" (Paap, 2020, p. 41). Paap expanded CI's traditional scope from Porter's (1980) competitor focus to include *customer needs* and *technology*. In recent years, CTI has become more useful applying AI, coupled with big data, to reveal insights that were previously unattainable (Porter, 2019).

Skills—today and the future
To gain CI knowledge and skills, professionals often draw from trade organizations (e.g., SCIP: Strategic Competitive Intelligence Professionals) and academies. While universities often incorporate business, library science, and human intelligence (HUMINT) into the discipline (Hoffman and Freyn, 2019). These resources are necessary, but recent research indicates that they may be insufficient for managing the profession's demands. Applying the CI cycle as the framework (Dishman and Calof, 2008; Freyn 2017), current research will be discussed as it relates to the needs of the discipline; figure 1.

Planning
Strategic thinking is necessary to do the backward planning to conceptualize, and achieve, a desired corporate end state (Wang *et al.*, 2019); also, a key starting point for planning. Kula and Naktiyok (2021) stated, "Strategic thinking is seeing the future" (p. 54). From a CI perspective, this translates into imagining the future and having vision regarding such factors as the impact of emerging technology, the implications of competitor activities, or the effects of new regulations.

Task force approach. Collaboration is an aspect first considered during the planning stage. Paap (2020) described how CI practitioners "have expertise on data collection and analysis" and turn to the company's technical staff for expertise on technical issues (p. 44). Mabe *et al.* (2019) also stressed the importance of "relationship building (networking) skills in order to foster collaboration" (p. 724) calling them "the most required skills for CI practitioners" (p. 726).
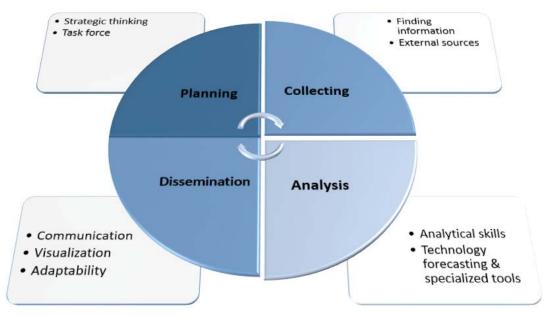
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Figure 1*. CL cucle of skills needed for future analysts.

* note this is not all encompassing but serves as a atarting point to develop the suvery and validate literature.

Collecting

Finding information. Online information that is publicly available and accessible on the *surface* web (data indexed by search engines) accounts for only four percent of what is on the Internet; far more information is available in the so-called *deep* web (Iftikhar, 2011). For CI practitioners, knowing where and how to seek information is an increasingly valuable skill.

External sources. Business intelligence practitioners access dedicated data warehouses of their company's *internal* information to provide diagnostic, prescriptive, and predictive information. CI practitioners acquire *external* information requiring a different approach because "the range of topics are too broad, and the frequency of looking at any individual area so spread out, that it is not practical to keep the database up-to-date" (Paap, 2020, p. 44). Rather than rely on databases, practitioners have "more reliance on external sources that are kept up to date by the service providers" (Paap, 2020, p. 44).

Analysis

Analytic skills. While big data may be "the new oil" (Gunderson, 2019, p. 8); like oil, data must be processed, refined, and delivered to achieve maximum value. Saddhon *et al.* (2019) asserted that, "The keys to the fortunate utilization of competitive intelligence are

analysis of information and synthesis of knowledge" (p. 156). Experienced analysts strive to professionalize analytic work to "get analysts to challenge their arguments and judgments, defend analytical positions and more effectively determine between what was fact and what was their opinion" (Walsh, 2017, p. 550).

Technology forecasting encompasses future-oriented techniques developed by the U.S. Department of Defense and The RAND Corporation to assess and predict implications of future technologies (Cho and Daim, 2013). CI practitioners tasked to forecast technological developments must build expertise in these techniques (Paap, 2020, p. 49). Papp (2020) explained that a Science & Technology CI practitioner "uses tools to assess patents, scientific literature, technical trade shows, and other sources of technical information to identify the who, where, why, and how fast new technologies are being developed or used" (p. 43). CI data may be structured, unstructured, or semi-structured, with user proficiency in different software applications required to gather, store, and process that data (Gunderson, 2019, p. 9). Porter (2009) described the value of technically analyzing patent information. While, Paap (2020) also advocated it as it "can help you identify who the players are, new developments in a particular technical area" and provide "insights on development trends" (p. 50).

Dissemination

Communication is a critical skill throughout the entire CI process. Practitioners must effectively communicate with clients to understand and accurately capture information needs (Jin and Ju, 2014). Final CI projects must be successfully communicated in writing and/or orally. Maungwa and Fourie (2018) identified poor communication skills as one of the major contributors to a CI project failure. Due to the volume of data, communication through visualization has become an expectation by clients via dashboards and other graphical data presentations (Zheng, 2017). Sarica *et al.* (2019) used the example of overlaying visualization and network-based metrics for competitive intelligence analyses.

Adaptability. CI "is characterized by numerous 'one-off' intelligence efforts" seeking information from external sources (Paap, 2020, p. 44). A plethora of open-source information is now widely and equally available to all companies in any given industry. The companies that are able to rapidly identify, analyze, and turn information into actionable intelligence will likely gain competitive advantage (Gilad and Fuld, 2016). The greatest benefit of CI is its ability to quickly adapt to changing market conditions (Gilad and Fuld).

Practitioners rely on interpersonal skills to validate requirements, function as a team, obtain information from human sources, and deliver conclusions and insights to clients. At the same time, practitioners are expected to visually depict findings and otherwise leverage technology to perform their craft. These developments prompted researchers to ask CI practitioners what they believe are the educational needs of the crop of college students who will ultimately replace them.

3. METHODOLOGY

Survey design
A survey was created based on the CI cycle and respective literature to address: 1) key evolutionary trends in CI, 2) needed skills for CI and 3) respective curriculum to prepare future analysts. Several curriculum-based questions were derived from Mercyhurst University's Business & Competitive Intelligence program (established 2009). According to Kolbe and Morrow (2022) "academic institutions, such as Mercyhurst University, are producing a new generation of private-sector focused intelligence professionals" (para 5).

Expert discussions from a CI Council webinar on the topic of preparing future analysts along with the researchers' own expertise also assisted in building factors to test (Hoffman and Freyn, 2020). To increase content and face validity, questions were reviewed by CI experts and educators to ensure questions were relevant and meaningful, unambiguous, and easy to answer from the perspective of the participant (Connell, et al., 2018). The survey offered several open-ended questions for additional insights.

Sampling frame and response rate
For valid inferences from survey data, respondents' characteristics much reflect the target population (Malhotra, 2019). To achieve this, the study included members of the CI council, SCIP and Special Librarians Association, CI division. A filter question asked professional affiliation to a CI trade association. Fifty-two percent were part of SCIP, 40% Special Librarians Association and 8% were CI Fellows or on CI boards.

Using ProQuest©, 721 individuals viewed the survey, 219 responded (30.3% response rate) and 134 were fully completed (18.6%). Fulton (2016) argued that non-response is a growing issue in organizational research and noted "if there are no systematic differences between respondents and non-respondents, then the sample remains representative of the population and can provide valid inferences" (p. 4). The researchers deemed the response rate acceptable.

Managerial and higher-level positions represented 49% of the respondent pool, while researchers/analysts reflected 47%. This offers perspectives at a strategic, operational, and tactical level (Lackman and Lanasa, 2013). For experience, the distribution was roughly 1/3 representing the categories: 3 years or less, 4-6 years and 7+ years. Respondents were equally distributed in part-time and full time positions and as sole practitioner. In terms of education, 81% had a bachelor's or higher degree.

Industries represented:
- Finance, real estate, insurance   26%
- IT (hardware, software, consulting)   22%
- Consulting   18%
- Construction or building trades   8%
- Manufacturing   7%
- Other categories   < 5%

4. RESULTS

Both quantitative and qualitative feedback were assessed to address the research questions. The following section presents the current perspective of CI's evolution, the CI cycle categories related to necessary skill sets and feedback regarding curriculum development and future skills needed.

CI's evolution
To fully assess the future of the discipline, researchers first asked practitioners to rate how CI has changed over the past decade followed by an open-ended question to gather more insight. Applying research findings, respondents rated four factors based on degree of change. Based on the mean values of the Likert scale, the impact of technology represented the most change with client/customer expectations the lowest; table I.

Table I. Factors impacting the CI discipline changes*

		Mean	Standard Deviation
1.	Impact of technology (N = 130)	3.87	.80
2.	Doing more CI tasks in-house (N = 129)	3.52	.85
3.	Nature of client taskings (N = 128)	3.52	1.04
4.	Client or customer expectations (N = 129)	3.26	.79

* *Rating: 1 = no change at all, 5 = considerable change*

Open-ended responses to w*hat do you believe has been the biggest change for you in the CI field* provided more insight. Common themes were identified based on repeated terms. Key quotes are presented:
1) Technology's impact
   - *Technology's influence over how we do our jobs. We are constantly being asked to do more, and faster. Emerging platforms and existing/evolving platforms... make our lives much easier.*
   - *The use of far more automation at the expense of HUMINT, critical thinking, and analysis.*
   - *More data analytics and scraping the web for information. A lot less reliance on HUMINT.*
2) Customer expectations
   - *Customers expecting more concrete answers due to big data and analytics despite the quality of information not changing.*
   - *Managing customer/client expectations continues to be challenging. In part, this is because of technology changes elsewhere that clients feel should make work in CI similarly easy. However, the in-depth analysis and understanding as to what data is meaningful to collect and review is still not wholly understood.*
3) Nature of Tasking
   - *The increased recognition that CI can be more than just 'stick fetching' and actually contribute to the executive mindset regarding competitor's intentions.*
4) Change in perception of CI
   - *Greater acceptance of the concept of CI having a seat at the table among top level company executives for strategic insights and implications. CI must have an internal brand champion that actively finds ways to become more influential and become a trusted business advisor.*
5) In-house CI
   - *Easier for intelligence users to collect their own material.*
   - *Clients doing more CI tasks in-house; using self-service technology; using social media; using AI-driven search engine platforms to gather and disseminate information quickly.*

CI cycle and the current environment
Planning and the decision maker. Freyn (2017) noted that the planning step in the CI process is to ensure that not all possible information and data is collected, but instead identifying the specific needs of the decision maker. Planning is reliant on two primary conditions: a) an understanding of what CI provides an organization and b) actual decision maker support whether executive, manager or client (Hoffman and Freyn, 2019). Numerous studies have argued the need for leadership support in order for the discipline to grow and evolve (Herring, 1991; Freyn, 2017). A question was asked reflecting the issues faced in the planning stage. *What do you find most challenging with respect to educating your superiors and clients as to what CI can do for them? (N = 52).* Common themes (in order of response rate) were identified along with key quotes.
1) Building an understanding of what CI is and its value.
   - *Helping them realize what kind of information can be gathered. Also, helping*

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them think about how to use competitive intelligence to strategic advantage.
- *To really have them understand the distinction between intelligence and information as well as the impact of bias.*
- *Show the importance of CI, what is CI, CI is beyond competitors and competition.*

2) Time and technology limitations offer challenges.
- *The lack of understanding regarding time-consuming tasks, as well as the need for information not usually available, which makes short-term planning hard.*
- *Combating the belief that CI knowledge and insights can be generated by technology.*
- *Getting them to understand that better quality/reports with more depth require more time.*

3) Executive reliance on own internal resources as a trade-off to CI.
- *Most successful business executives are their own best CI collector and analyst. Because knowledge is power, they are reluctant to share their intelligence outside the context of their own professional power base.*
- *Many executives continue to rely on their own internal sources and traditional methods of obtaining insights. What is challenging then is breaking into*

the mindset that someone on their team can help them get a better sense of what is going on, in the marketplace, strategically.

Collecting. A question regarding the collection step of the CI cycle identified resources most commonly used by practitioners. Company website information and third-party sources were most common followed by news media and trade publications. While HUMINT was used by only 10% of respondents identifying a shift to more data focused collecting; figure 2.

Analysis commonly includes using methodologies to evaluate collected data and information**.** Respondents first identified the percentage of structured analytic techniques (SAT) they used that were taught in college. There was an even distribution of responses with approximately 1/3 representing the categories of <40%, 41-60%, and >60%. Only 8% noted that they learned more than 80% of SAT in college indicating opportunities to build curriculum. Respondents also were to identify what SATs they currently use in practice; table II. SWOT analysis, competitor profiling and market research were most common, while future oriented technology forecasting ranked much lower. Ironically, the top methodologies have been part of the CI discipline for decades. This may indicate an opportunity to build CI curriculum incorporating new techniques that address the complexity of evolving technologies.
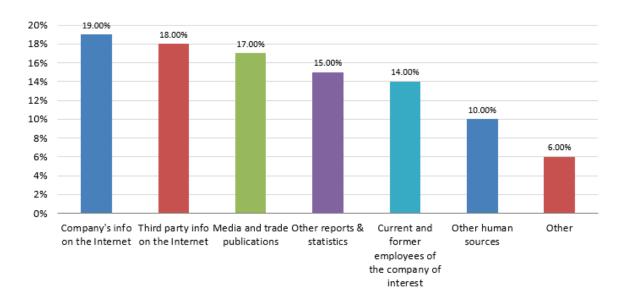

Figure 2. Common sources for research (N = 131).

Table II.. Current CI techniques used N = 130.

Structured Analytic Techniques	Total %
1. SWOT Analysis	54.6%
2. Competitor Profiling	46.9%
3. Market research & analysis	45.4%
4. Scenario planning / simulation & modeling	38.5%
5. Financial analysis	36.2%
6. Benchmarking	34.6%
7. Management profiling	33.8%
8. R&D / technology forecasting	33.1%
9. Success Factor analysis	31.5%
10. Trade show collection & analysis	29.2%
11. Win / loss	28.5%
12 Counterintelligence	23.8%
13. STEEP/PEST	23.1%
14. Other	9.2%

Table III. CI Dissemination Methods.

	Mean	SD
Frequency* (N=130)		
1. CI research reports (ad hoc tasking)	3.75	.97
2. In-depth analysis reports	3.68	.93
3. CI reports to other co. departments	3.53	.97
4. CI newsletter	3.49	1.09
5. Face-to-face presentations (N=129)	3.43	.89
6. Periodic CI reports (monthly, quarterly)	3.42	.90
7. Other	3.26	1.12
8. Online forum (N=129)	3.02	1.06
9 Electronic CI alerts	2.85	1.05
Effectiveness**		
1. Finished, written reports (N=132)	3.61	1.02
2. Face-to-face presentations (132)	3.60	1.05
3. Email to specific individuals (130)	3.53	.97
4. Phone (132)	3.52	1.12
5. Company intranet (129)	3.18	1.01
6. Email newsletter- mass (130)	3.18	.90
7. Online forum (129)	3.06	1.12
8. Printed newsletter (130)	2.97	1.03

Rating: 1 = never; 5 = very frequently.

**Rating: 1 = not effective at all; 5= very effective.*

Dissemination. Two questions addressed the dissemination of CI: 1) most common methods used and 2) effectiveness of methods. Based on frequency of use, project reports scored highest, while more technology based online forums and electronic alerts rated neutral or lower; table III. Traditional formats appear to be preferred; however, there may be opportunities to build curriculum expanding communication methods to incorporate more technology-based dissemination. Written reports and personal dissemination were rated as the most effective methods pointing to the importance of interpersonal skills. Mass communication tools like newsletters and forums rated neutral indicating direct dissemination as being more effective.

Necessary skills & building curriculum
Practitioners were provided skill sets based on the literature and asked to rate how critical these skills were for CI (1 = not critical at all; 10 = most critical). Cronbach's alpha was strong at 0.826 (Hair *et al.* 2010). One-sample t-tests indicated all skills were significantly greater than neutral (4.5) identifying them as critical; table IV. Note the table illustrates the top three variables as analytical, research and communication representing the key stages of the CI cycle.

Curriculum development questions were asked regarding courses and degrees. Courses were rated in terms of professional utility for the future analyst. Table V reflects the courses ranked based on means with top courses being BI/CI, market research, and data analytics being top rated over more traditional subjects.

Respondents rated desirability of degrees for new hires (1 = low desirability; 10 = high desirability); table VI. Based on means, more specific degrees in intelligence and in technology (i.e., IT) were rated as more desirable over more traditional degrees.

Finally, respondents provided invaluable recommendations and suggestions for future curriculum. The final questions asked *Given your professional experience and expertise, what comments or recommendations do you have regarding the educational preparation of future competitive intelligence practitioners?* See appendix for themes and key quotes.

Table IV. Critical skill sets for CI (N = 130) and (*df* = 129).

Skills	Mean	SD	t	*Sig*
1. Analytical (N = 129)	8.02	2.01	16.79	***
2. Communication Skills	7.80	1.67	15.72	***
3. Research	7.66	1.66	14.85	***
4. Human Intelligence	7.57	1.76	13.36	***
5. Adaptability	7.55	1.62	14.32	***
6. IT/Computer	7.36	1.57	13.56	***
7. Industry-specific	7.28	1.93	10.54	***
8. Presentation	7.12	1.64	11.26	***
9. Strategic	7.08	2.01	8.93	***

*** = $p < .001$

Table V. Course utility* for future professionals (N = 130) and (*df* = 129).

Course	Mean	SD
1. BI/CI course	3.95	1.1
2. Market Research	3.76	.79
3. Data Analytics	3.74	.78
4. Business	3.72	.57
5. Economics	3.64	.82
6. Statistics	3.61	.82
7. Human Intelligence Collection (N = 129)	3.60	1.0
8. Computer Programming	3.30	.95
9. Library Science (N = 129)	3.20	.99
10. Accounting	2.95	.79

* *Rating: 1 = negligible utility; 5 = high utility.*

Table VI. Desirability* of bachelor's degrees of new hires (N = 131).

Course	Mean	SD
1. Intelligence Studies (N = 129)	7.61	2.02
2. Business & Competitive Intelligence (130)	7.49	1.82
3. Information technology	6.74	2.33
4. Management	6.60	1.98
5. Library Science (130)	6.36	2.37
6. Math (130)	6.07	2.35
7. Accounting	4.99	2.16

* *Rating: 1 = low desirability; 10 = high desirability.*

5. DISCUSSION

The intent of this research was to address questions pertaining to CI's evolution with technology in the hopes of guiding educators to better prepare students. One common theme related to curriculum supported the incorporation of more specialized courses relevant to the discipline (i.e., BI/CI, Analytics) and gaining experiences prior to graduation. Beyond traditional business curriculum, open-ended feedback stressed liberal arts-based skills as being essential.

There needs to be more critical thinking and business writing preparation, especially for those just coming out of college. They need to be able to ask the questions: what do I see? Does it matter? What does X mean to our business?

[The] Key is to find the intellectually curious who can communicate well.

Ironically, more collection-based courses (i.e., HUMINT, librarian science) were rated lower with several comments regarding

HUMINT being replaced by data. Topics such as AI had led to unrealistic expectations of data having all the answers and situations of "a world where human analysts have been largely replaced by computers" (Hoffman and Freyn, 2019, p. 277). With research skills noted as a top competency, instructors may want to ensure that research is presented holistically stressing the synergistic value of data and HUMINT. In turn, this reinforces critical thinking and analytical skills.

Respondents stressed the need for students to be versed in SATs recommending more analytics focused courses. As noted in the literature, analysts are impacted by AI and navigating evolving technologies may require more advanced techniques (Hoffman and Freyn, 2019). Based on the lower ranking of futuristic SATs like technology forecasting, instructors may want to continue to build the curriculum with a focus on more technology-based techniques. Finally, communication skills were denoted as essential for a CI analyst's success. Popular methods of dissemination were mostly via reports or in person; future methods may need to incorporate more electronically based dissemination especially for executives (Nohria, 2021).

Themes, beyond curriculum, parallel the CI cycle (Dishman and Calof, 2008). Many comments reinforced the need of planning and having the research capabilities to know where and how to find resources (i.e., collecting).

The most valuable skill they can come away with is the ability to 1) Ask the RIGHT questions, 2) Know what data they need to answer those questions and where those data live, and 3) Know how to analyze those data and which tools to apply to which types of questions.

In addressing the evolution of CI, technology has had the biggest impact on the field from emerging platforms and big data to the automation at the expense of HUMINT and some interpersonal skills. With technology, CI professionals reinforced the idea that expectations are growing for more concrete and faster results. However, despite all the data, in-depth analysis of what it all means (especially AI) is still in pioneering stages. This may be the skills new analysts can to bring to the table. Most importantly, many noted CI as a growing field in general as more organizations recognize its value (Kolbe and Morrow, 2022).

6. CONCLUSION

This study gained valuable insight into the current CI environment, its challenges and its evolution with technological advances. Survey feedback supported the CI cycle regarding necessary skills from strategic thinking to research capabilities and analytical competencies. Communication skills were ranked as most valuable in the discipline, while courses and degrees were identified to aid in building future curriculum. Results indicate a shift to more focused degrees in intelligence studies over traditional business degrees.

An overarching finding in the research confirmed that although the presence of new technologies is evolving the discipline, softer skills like communication and analytical skills will never waiver in importance. These should remain a focus in curriculum development, as synergies will ensure not only a tech savvy analyst, but a successful one too.

This study serves as a starting point in building curriculum to prepare future CI analysts. Expanded research could build the framework and apply findings to any business discipline with the goal to evolve curriculum for the AI-enabled world. With the growing speed of technology along with rising expectations, this topic will only continue to increase in relevancy.

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Appendix
Practitioners' recommendations

Topic	Themes	Key Comments
Strategic thinking	**Planning**	• *Applying critical thinking skills…discerning the impact ("so what")* • *Be willing to learn and ask questions.* • *Thinking holistically and broadly.* • *Focus on strategy and how strategy helps companies combine strategy and CI methods and techniques.*
Research skills	**Collecting**	• *Information gathering education.* • *…the student who knows how build an automated collection apparatus will be able to contribute immediately.* • *It is critical that they know how to perform desktop research…where to find the most readily available, free resources.*
Analytic techniques	**Analysis**	• *Education in cutting-edge data analytics and big data techniques is useful, but don't abandon the basics.* • *Data literacy is a key item to have. A strong math/science/economics background is very good, since these draw inferences from data* • *I would recommend use structured analytic techniques…more frequently in course work.* • *Data analytics and reporting tools/languages are increasingly becoming important.* • *Focus on strategic thinking and intelligence analysis.*
CI courses & experience	**Curriculum**	• *Having a broad understanding of all business practices including accounting and marketing is…imperative to being a truly successful CI practitioner.* • *A foundation understanding of CI needs to be included in more fields of study.* • *Students need lots more time studying future sciences/foresight, practical experience in the field.* • *I need people with business acumen who also can take a problem and think about it from different angles.*