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Conducting Comparative Reviews of Transferable Competencies and Skills Instruction across Institutions

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Analysing how different programmes and institutions instruct transferable competencies and skills can provide educators, researchers, educational developers, and administrators with valuable models to inform their practice or programme. Yet despite their value, relatively few of these reviews are found in the literature. This chapter examines different approaches to conduct a comparative review, including literature and document reviews, surveys, interviews, and engaging with scholarly communities, and shares advantages and disadvantages of each. We consider the challenges of conducting a comparative review through a case study of our own project to understand communication instruction in engineering education in Canada. Throughout this chapter, we emphasize the relationship between purpose, method, design, and scope, and argue that a review is most successful when the researcher is adaptable and persistent. We recommend that as a community we focus efforts on facilitating scholarly conversations about transferable competencies and skills instruction, consistently mapping, archiving, and disseminating our work, as less frequent engagement complicates the review process.

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1 Introduction

Analysing how transferable competencies and skills are taught and assessed in different programmes and institutions can provide educators, researchers, educational developers, and administrators with valuable models to inform their own practice or programmes. Transferable competencies and skills, those that complement engineering practice but exist across and between engineering specialisations, are broadly applicable across learning and workplace contexts. They include skills such as critical thinking, project management, leadership, communication, and teamwork. Given their practical orientation, transferable competencies and skills are typically taught and practiced in hands-on learning environments, and pedagogical practices are often shared in papers and conference presentations focused on specific classrooms and interventions. Comparative reviews, which compare practices across modules or institutions, are less common but valuable in helping programme planners to understand trends and activities in transferable competency and skill instruction.

This chapter examines how scholars conduct comparative reviews to analyse how transferable competencies and skills are taught across modules, programmes, and institutions. For manageability, we scope this chapter to a single transferable skill: communication. However, this discussion is relevant to other transferable competencies and skills covered in this text. We begin by providing a general rationale for conducting comparative reviews and discussing the factors that impede their ease. Then we introduce comparative reviews of communication skills found in the literature and discuss the approaches taken and the challenges and advantages of each. Following this, we share a case study of our own comparative review of communication skills in engineering education in Canada to demonstrate the practical application of evaluating instruction across institutions. We conclude the chapter by considering the larger implications of the work done and methods chosen to evaluate transferable competencies and skills instruction across programmes in engineering education and provide recommendations and implications for practice.

2 Context

A comparative review of transferable competencies and skills instruction across modules, programmes and institutions may be conducted for a variety of reasons. Educators teaching or developing a new module or module sequence can draw on similar modules for ideas. Educators advocating for more focus or support in transferable skill instruction can use successful models to illustrate value and effectiveness, and advocate for change. Administrators or curriculum developers integrating more support for transferable competencies and skills will benefit from reviewing other administrative models to consider where skill integration can best be situated and supported. Meta-studies in this area can provide the most compelling evidence to shift institutional and staff attitudes about the importance of transferable competencies and skills. Yet despite the usefulness of comparative reviews, relatively few exist. This means there are few shortcuts to attaining a broad understanding of how specific transferable competencies and skills are taught; we are unlikely to find a

comparative review in the literature that fits our specific skill, needs, and context. Instead, we need to define our own goals, select appropriate methods to accomplish them, and tap into the available resources to help us conduct our review.

Several factors impede the ease with which we can conduct comparative reviews. First, transferable competencies and skills instruction in engineering is situated and supported differently across institutions. We can be fairly confident about where to find a thermodynamics class (chemical engineering) or a building science class (civil engineering), but we cannot have that same surety about where to locate — or even if we *can* locate — the instruction of leadership, communication, or other transferable competencies and skills in an engineering curriculum. Transferable competencies and skills may be integrated across the curriculum (often heavily and inequitably concentrated in first-year cornerstone or senior year capstone design modules), instructed via standalone modules within the faculty, developed in co-instructed or partnered modules taught by engineering staff and skill specialists, or delivered via 'service modules', which are housed within a faculty outside of engineering but designed to meet engineering curriculum requirements. Administratively, instruction may be the responsibility of individual engineering departments within a faculty, organized centrally in a professional skills unit — for example a communication or leadership institute — or provided via service modules offered by other faculties. The variety of instructional and administrative models for transferable competency and skill development makes any review complicated but is also why a comparative review is valuable: there are many possibilities to consider.

Second, information on instructional approaches to transferable competencies and skills is also dispersed across diverse scholarly channels, which is unsurprising given the lack of a consistent instructional home for transferable competencies and skills. Transferable competencies and skills specialists may share their work within communities focused on their niche area. For example, an engineering communication educator might present at the IEEE Professional Communication Society or publish in IEEE Transactions. They may share their work with the broader engineering education community at the European Society of Engineering Education (SEFI) or a regional engineering education conference, or with a writing and rhetoric community. The variety of scholarly channels complicates locating and reviewing instructional approaches. Another important consideration in reviewing different approaches is that the practical nature of skills instruction produces many conference presentations, but fewer journal papers. Conference proceedings are not always indexed in public databases, and therefore not always easy to locate. Furthermore, some transferable skill activities may not be shared in scholarly channels at all, especially when scholarly contributions are not an expectation of the educator's position or not aligned with their primary research interests. For example, modules may be supported by external disciplines or by administrative staff without research agendas or assigned to teaching staff with research agendas focused on other areas. As a result, there may be significant gaps in our understanding of the pedagogies of transferable competencies and skills in the engineering education landscape.

Third, discussions about transferable competencies and skills often lack a consistent language. For example, in their introduction to the *Journal of Academic Writing*, Gustafsson and Jacobs (2013) emphasize the range of specialisations and corresponding nomenclature for communication skills in higher education. For example, English or Language Studies covers an exhaustive list of subspecialisations: English as a Second Language (ESL), English as a Foreign Language (EFL), English for Academic Purposes (EAP), English for Specific Purposes (ESP), Writing Across the Curriculum or Within the Discipline (WAC/WID), and many more. They note regional influences in subcategories of genre theory, specifically Rhetorical Genre Studies (RGS) in North America, Systemic Functional Linguistics (SFL) in Australia and English Language for Specific Purposes (ESP) in Europe. While the distinction between these specialisations may be unclear to someone outside that field, each encapsulates distinct scholarly or instructional orientations. Paretti and McNair (2008) also demonstrate the contextual specificity of language. For example, in their introduction to the *IEEE Professional Transactions* Special Issue on Communication in Engineering Curricula, the authors predict a shift away from WAC/WID to Communication Across the Discipline (CXD) and Communication in the Discipline (CID), as instruction expands to cover multimodal communication. The number of niche descriptors and acronyms, coupled with the potential of these to shift with region and time, significantly complicates how we find and make sense of transferable skill activities and scholarship in this field. Overall, for all these reasons, locating up-to-date and relevant information on how transferable competencies and skills are taught and learned in engineering curricula is challenging.

3 Approaches to analysing transferable competencies and skills: communication instruction across modules and institutions

Communication instruction is a helpful example through which to examine comparative reviews of transferable competencies and skills instruction. This area has active local and international communities of scholars in engineering education, and as communication educators, the authors have studied and published on this topic.

Paretti (2008), who has published on communication for over two decades, cites the wealth of articles on the subject as evidence for its importance. Dyke Ford & Riley (2003) concur. Notably, within a North American context, much of this scholarship has been motivated by accreditation requirements. It has been over two decades since ABET — the programme responsible for accrediting engineering programmes in the United States — added communication to its accreditation requirements with the release of Engineering Criteria 2000 (Marshall et al., 2019). The Canadian Engineering Accreditation Board's (CEAB) shift to outcomes-based criteria in 2008 (Klassen & Sá, 2020), included communication in its newly structured criteria. Within the UK, the Engineering Council's UK-SPEC (United Kingdom's Standards for Professional Engineering Competencies) released its first outcomes-based guidance document for accreditation in 2003 (Engineering Council, 2025), and this too includes communication. In Europe, the significant number of regional accreditation bodies

affiliated with the European Network for Accreditation of Engineering Education (ENAEE) results in a long and varied list of guidance documents shaping engineering competency priorities (ENAEE, 2022). But here too, the importance of communication as a signifier of professional readiness motivates attention to this subject. Indeed, feedback from industry and alumni on the importance of communication skills in the workplace also motivates significant activity in this area (Reave, 2004).

As part of this section, we refer to several methodologies and methods that our reader may or may not be familiar with, particularly in Table 5.5.1. For those interested in exploring these more, we refer to these research methods textbooks: For general research methods in education, Cohen et al., (2018)., Fink (2019) on conducting literature reviews, Fowler (2014) on Survey research and Creswell & Poth (2018) on qualitative research methods, where interested educators can find these methodologies and methods defined and explained. Methods used to conduct comparative reviews published in the literature include:

- *Literature-based methods,* including narrative, confirmatory, systematic, and meta-analytic reviews of journals and conference proceedings, cluster analysis and historical reviews (e.g., Buswell et al., 2019; Hutchison et al., 2021; Leydens & Schneider, 2009; Mann et al., 2007; Paretti, 2008; Paretti et al., 2007, 2023; Patterson, 2017; Patton, 2008);
- *Surveys and questionnaires,* used to compare educator beliefs, instructional practices, barriers, or institutional norms (e.g., Buswell et al., 2019; McKenzie et al., 2004);
- *Interviews*, conducted in person, online, by phone, or email, with faculty, administrators, or programme directors (e.g., Leydens & Schneider, 2009; Marshall et al., 2019; Matusovich et al., 2012; McKenzie et al., 2004; Reave, 2004);
- *Website reviews*, including internet searches of universities, programmes, researchers/educators, research groups, relevant practice (e.g., Leydens & Schneider, 2009; Marshall et al., 2019);
- *Document reviews,* such as programme descriptions (e.g., Leydens & Schneider, 2009);
- *Engagement, observation, and disciplinary conversations within scholarly communities*, in colloquia, and formal and informal capacities (e.g., Buswell et al., 2019; Gustafsson & Jacobs, 2013; Leydens & Schneider, 2009; Marshall et al., 2019).

For a few of these methods, namely literature-based methods, surveys and interviews, researchers used a 'snowballing' approach to accrue additional participants and information via personal and professional networks, and colleague referrals (e.g., Buswell et al., 2019). Overall, many researchers employed a combination of methods.

There are also common designs for the comparative reviews, which include:

- Qualitative case studies (Bazerman & Prior, 2004; Kirsch & Sullivan, 1992; Mosenthal et al., 1983; Paretti, 2008; Winsor, 1996);
- Multi-case studies comparing institutions or programmes (e.g., Dyke Ford & Riley, 2003; Leydens & Schneider, 2009);
- Landscape studies mapping practices across institutions in national and international contexts (e.g., Hutchison et al., 2021; Marshall et al., 2019);
- Colloquia or community-based studies emphasizing disciplinary conversations and shared norms (e.g., Gustafsson & Jacobs, 2013; Leydens & Schneider, 2009);
- Mixed methods studies (e.g., Hutchison et al., 2021; Marshall et al., 2019).
- Longitudinal studies (e.g., Winsor, 1996);
- Theory-driven comparative studies guided by paradigmatic theoretical perspectives, such as Situated Learning and Activity Theory (Paretti, 2008), Genre Theory (Miller, 1984), and Motivation Theory (Matusovich et al., 2012).

Though researchers began with a set study design, many had to adapt their data collection method when initial approaches did not capture the targeted data or change how a participant could respond to their method. For example, Reave (2004) used 'surveys' that were in fact interviews and conducted these with phone calls and emails; McKenzie et al. (2004) turned interview protocols into surveys so participants could do them online. We did not notice researchers using focus groups, examining engineering accreditation documents, or conducting site visits, despite the wealth of information available via this approach (Mattucci, 2019). Nor did we notice much variation in types of research design. For example, there were no examples of narrative inquiry, participatory action research, phenomenology, or ethnographies. Researchers carefully bounded their reviews with different units of analysis, scales, populations, and foci, diverging across:

- *Unit of analysis:* modules, programmes, institutions, or disciplinary communities.
- *Scale:* single institution, multi-institutional, national, or international.
- *Populations and foci*, including:
  - communication or writing modules;
  - capstone modules (McKenzie et al., 2004);
  - writing-across-the-curriculum initiatives (Buswell et al., 2019);
  - writing and communication programme administration (Patterson, 2017);
  - 'top-ranked' institutions (Besterfield-Sacre et al., 2014; Reave, 2004);
  - English-speaking institutions (Reave, 2004);
  - students participating in internships or work experience (Winsor, 1996);
  - communication skills paired with teamwork (Matusovich et al., 2012).

Overall, studies had a pragmatic aim: to acquire information on communication skills within a set scope, often to inform module or programme design. For a comparison of methods, data captured and characterization of each method's usefulness, see Table 5.5.1.

Table 5.5.1: Methods for conducting comparative reviews

Method	*Variants*	*Data captured*	*Usefulness*	*Examples in literature*
Literature reviews (secondary data)	Narrative, systematic, confirmatory, cluster analysis, meta-analyses	Published patterns across sites/time; conceptual framing; typologies	Provides a field map, or state of the art comparison for identifying trends or gaps	Buswell et al. (2019); Hutchison et al.; (2021), Mann et al., (2007); Paretti, (2008); Paretti et al., (2007, 2023); Patterson, (2017); Patton, (2008)
Surveys (primary data)	Often paired with follow-up interviews; sometimes converted from interview protocols	comparable responses across institutions and programmes; broad coverage	Provides breadth or a standardized comparison across many respondents	Buswell et al. (2019); McKenzie et al. (2004)
Interviews (primary data)	In-person, online, phone, email	Explanations, rationales; decision logics; contextual detail	Provides depth, nuance, and interpretive comparison across cases	Leydens & Schneider (2009); Marshall et al. (2019); Matusovich et al. (2012); McKenzie et al. (2004); Reave (2004)
Website reviews (secondary data)	Structured searches; targeted site sampling; triangulated with interviews or documents	Curricula outcomes; policies; module descriptions; public-facing representations	Enables a quick comparison of multiple programmes	Leydens & Schneider (2009); Marshall et al. (2019)

Method	*Variants*	*Data captured*	*Usefulness*	*Examples in literature*
Document reviews (secondary/ internal artifacts)	Module, programme, institutional, regulatory	Policies; curricular documents; programme descriptions; internal reports; official programme structure	Provides a comparison of administrative structures or formal requirements	Leydens & Schneider (2009)
Engagement/ observation/ scholarly community conversation (primary/ participatory data)	Conference attendance; community engagement; colloquia; informal conversation; field notes	Field norms; discourse; emergent practices; community sense-making	Captures emerging and/or unpublished community-based practices and disciplinary trends	Buswell et al. (2019); Gustafsson & Jacobs (2013); Leydens & Schneider (2009); Marshall et al. (2019)

In the following subsections, we examine five of the more common methods: literature reviews, document reviews, surveys, interviews, and engaging in scholarly communities. We use representative studies from the literature and experiences within our community to evaluate their use, affordances and limitations.

3.1 Literature reviews

A literature review is likely the first strategy that comes to mind when analysing across modules, programmes and institutions. Literature reviews are useful to situate practices within context, acknowledging how these have evolved from a theory or been inspired by other practitioners. Within larger analyses, literature reviews can provide a bird's eye view of what has been published on the teaching and learning of transferable competencies and skills, and how attitudes and practices differ between regions or have evolved over time.

Although we might gravitate towards a literature review when starting a comparative review of transferable competencies and skills, it is important to acknowledge the limitations of this approach. Discussions about transferable competencies and skills take place in a variety of academic spaces. Articles about best practices for communication instruction in engineering, for example, are found in a variety of journals. Given the practical nature of skills instruction, however, we may be more

likely to find this scholarship within conference proceedings than within journals, and conference proceedings may be non-indexed or indexed in idiosyncratic ways.

Because literature on communication instruction is so widely dispersed, a comprehensive review is very difficult to achieve; it is important to acknowledge the limitations of a literature review and scope accordingly. If we are interested in understanding how communication instruction is integrated within a particular engineering context, we should look at that field's engineering education society proceedings. If we wish to understand how chemical engineering professors integrate communication into their modules, we might search chemical engineering education journals or turn to conference proceedings from a chemical engineering society. The choice of source will impact the type of information available. It is also important to acknowledge that a literature review will only capture information from practitioners actively working to disseminate their work. Non-research stream educators, who in some regions, like Canada, comprise a significant portion of communication educators, may be less motivated to publish or present their work due to a lack of financial support or performance incentives.

Paretti (2008) and Paretti et al. (2007, 2023) use literature reviews to understand how different pedagogical strategies are deployed to teach communication across engineering programmes. Their 2023 review illustrates the relationship between source and scope. By looking exclusively at papers published in the American Society for Engineering Education's (ASEE) annual conference proceedings, the authors limit the approaches discussed to those used by educators who are actively engaged in this engineering education community, and privilege American perspectives.

Hutchison et al. (2021) use a literature review to explore instructional approaches to communication and identify their theoretical grounding. Their review traces citation patterns, using Miles and Huberman's (1994) descriptive framework to identify communication theories underpinning instruction at Cornell, and tracing the use of these citations by other scholars in the field. This method constrains the number of programmes represented to a manageable number and purposefully limits the diversity of programmes: by focusing on programmes shaped by similar theories, the paper showcases like-minded scholars and educators.

Some researchers scope their literature review by focusing on a niche topic within the instruction of a given transferable competency and skill. Patterson (2017), for example, analyses the organizational structures within which communication instruction occurs, reviewing writing by and about programme administration to identify historical trends. Mann et al. (2007) review integrative communication in a biosystems design module sequence. Matusovich et al. (2012) review programmes that integrate communication and teamwork skills.

Overall, literature reviews provide you with a useful entry point by introducing key scholars, theories, and pedagogical approaches. They are limited, however, by two

factors: (1) they cannot capture all contributors and perspectives without becoming unwieldy; and (2) they amplify scholars who publish on their work with transferable competencies and skills, overlooking practitioners who do not disseminate their work in this way, or at all. As such, they are most manageable when thoughtfully scoped for a specific purpose using appropriate sources, and most meaningful when the limits of this scope are clearly understood and articulated.

3.2 Document reviews

As noted above, a shortcoming of literature reviews is their amplification of educators who publish scholarship about their practice. Using firsthand documentation to review different programmes offers a more comprehensive approach to learn about activities across many institutions and potentially captures information on instruction that is not shared in the literature.

Website reviews provide access to locate basic documentation, including module requirements and descriptions, and sometimes module educators and syllabi. A keyword search for different programmes may be a practical place to start for this type of programme analysis. For example, Liu and Tran (2022) utilized a website review to locate and analyse higher education programmes self-described as 'transdisciplinary', providing a snapshot of activities falling under this umbrella term.

While a website review promises basic access to some programme information, website conventions, as well as the range of approaches by which transferable competencies and skills are taught, complicate this method. Because transferable competencies and skills are often integrated into core engineering modules, it may be difficult to separate out the transferable skill under investigation. Given that many websites are focused on outreach — for alumni and current and prospective students — content may be promotional in nature, showcasing particular modules, activities, or centres over others, and as a result providing an incomplete picture of curricula and activities. Moreover, because transferable competencies and skills are often perceived as secondary to traditional engineering skills, such as design and problem solving, some websites are designed to cater to this dominant view of engineering, making it difficult to locate basic information on transferable competencies and skills. The process of collecting information from websites can also be inexact, with the potential, if information is found, to analyse out-of-date or archived materials.

There are other types of document review. Soliciting documents directly from module educators or administrators can provide more accurate and up-to-date information. For example, we can ask educators directly for their module syllabi or module descriptions, eliminating the need to navigate a website. While this approach may be more reliable and less time-consuming, it is most successful when we can call on an existing personal or professional network. It is also important to be aware of concerns around intellectual property when asking for module documents: establishing trust and transparency is important, and as a result this type of solicitation might be best combined with another method of information gathering, for example interviews. Accreditation documents, such as curriculum maps, can also provide a wealth of

information about how transferable competencies and skills are developed across multiple years within a programme.

Overall, a document review can provide significant information on how modules or programmes are run. While accessing documents through a website eliminates the need to engage with educators and administrators directly, it provides a filtered picture of activities, potentially obscuring important information. Soliciting documents directly from educators can provide a more complete picture and is most successful when the researcher builds trust with participants.

3.3 Surveys

Surveys are a useful method for gathering information on transferable competencies and skills directly from educators, administrators or students. Practically, the most significant time-investment when using a survey instrument is its design and interpretation, with less time spent on scheduling and connecting with individuals, as would be the case with face-to-face data gathering. These advantages make surveys a convenient tool, especially when the goal of the project is gathering broad perspectives. Nevertheless, surveys can be challenging, particularly in collecting enough responses. Most surveys require the use of an existing network of peers to help with recruitment.

Buswell et al.'s (2019) study of integrated communication in engineering illustrates the need to engage networks in survey distribution, and the flexibility that may be required to achieve meaningful response rates. The researchers sought to recruit engineering educators in order to investigate the degree to which writing practices are incorporated and assessed across the curriculum. They began by distributing their survey to engineering staff within their home institution; they next reached out to their colleagues at other institutions to help distribute the survey widely to academic staff; lastly, they distributed their survey to the American Big 10+ engineering deans' mailing list[i] to further increase their sample. Their approach resulted in 190 survey respondents, calculated as a 10.7% response rate based on the total number of engineering staff at each of the Big 10+ institutions. The team acknowledges the challenge of measuring this response given the inexact nature of the approach to distribution. If publication is a research aim, the need to track and estimate a response rate is important; but if the primary purpose of the survey is to gather data to inform practice, it makes sense to privilege the widest distribution over enabling response-rate tracking.

Another factor to consider when using a survey approach is the level of detail and time commitment required by respondents. A survey that incorporates more open-ended answers and/or reflection will yield fundamentally different qualitative data than a multiple-choice survey. The former allows participants to describe or explain their specific instructional practices, while the latter can provide a higher-level snapshot of generalized practices. It is important to weigh the estimated time commitment of a

survey against the type of data desired and response-rate results. It is also important to respect and reward your colleagues' time.

An advantage of surveying is the customizability and potential focus of the instrument, the ability to distribute widely (e.g., locally, nationally, and globally), and the relative ease with which responses can be gathered. A disadvantage is the possibility of low survey responses, which may arise from a lack of incentive to participate given the arms' length nature of surveys and an academic culture of overcommitment and time constraints.

3.4 Interviews

Interviews are an effective way to promote discussion between participants and researchers and may be particularly valuable for those interested in probing for details on how transferable competencies and skills are taught and learned in unique contexts. Using an open-ended interview, we can respond to new information, pursue unexpected ideas and observations, and engage in shared disciplinary understanding with participants. Reave (2004), in arguably the most extensive first-hand study of engineering communication instruction to date, interviewed programme administrators to develop a comprehensive analysis of approaches to instruction in 73 top Canadian and US universities. In a smaller-scale study, Marshall et al. (2019) identified and interviewed 15 communication educators in chemical engineering to gather best practices for a nascent communication module within their own institution.

Like surveying, this method works best with access to an existing network of educators who are willing to share their expertise. As in Marshall et al.'s (2019) case, connecting with colleagues through mutual contacts can reduce barriers to participation. The process of recruiting participants and conducting the interviews can also help to form a new network. For example, Marshall et al.'s interviews led to a panel presentation at a national engineering education conference and also helped form connections with educators they could consult with while developing the module.

Although interviews provide an excellent vehicle for learning deeply about educators' experience, this approach is time-consuming and requires significant commitment from both the researcher and participant. Therefore, this approach is most appropriate to engage with a smaller population than, for example, surveys. Because this method can yield a significant amount of open-ended data requiring intensive analysis, it is important to budget sufficient time for this phase.

3.5 Engaging via scholarly communities

Both surveys and interviews rely on familiarity with programmes where the transferable skill is being taught, as well as educators working within this space; they target individual experiences and provide individual responses. Engagement in scholarly communities can stimulate action or facilitate group information sharing, thus garnering broader perspectives. Special Interest Groups (SIGs), which are often

smaller conference communities oriented around a particular theme, can be particularly useful for this type of scholarly engagement. Colloquia, designed to invite experts on a topic to share their insights and ideas through more formal presentations, provide another valuable opportunity for information sharing.

Though not required, information gathered in scholarly dialogue can also be published. For example, Leydens and Schneider (2009) invited members of the Conference on College Composition and Communication's Writing Across the Engineering Curriculum SIG to report on their respective programmes, information that then shaped follow-up interviews with these participants and led to a review article in the *Journal of Engineering Education*. Gustafsson and Jacobs (2013) used two colloquia to bring together scholars in South Africa and Sweden to share their perspectives on integrating communication before sharing these in a special issue of the *Journal of Academic Writing*. It is worth noting that the international orientation of these latter colloquia is particularly unique and distinct from the regional focuses that often occur within scholarly communities. The challenge of overcoming geographic and cultural barriers to bring together a variety of perspectives is a strength of Gustafsson and Jacobs' project, but more typically a limitation of gathering information from a single scholarly community.

4 Implications for practice

From our discussion of approaches above, it is clear that there is no 'one size fits all' approach to module, programme, or institutional reviews. How an analysis is conducted will depend on the purpose, context, and available resources of the researcher. Because comparative reviews are often conducted by educators to inform their own practice, these are often more fluid than a typical research project: the researcher may shift between methods without prior planning to respond to new information and new resources. The following case study from our own research provides an illustration of the challenges and opportunities of comparative institutional programme analyses, and emphasizes the adaptability needed for this type of project.

4.1 Case study: landscape analysis of engineering communication instruction in Canada

In the fall of 2024, we undertook a mixed-methods programme analysis of engineering communication instruction in Canada to respond to a gap in the literature since Reave's 2004 review of communication in Canadian and US universities. Her review was conducted by identifying the 23 English-speaking engineering universities listed in the 1998 Gourman rankings[ii] and then contacting and interviewing their administrators to learn more about the programmes. We were drawn to the systematic and inclusive nature of Reave's approach: by connecting with administrators instead of relying on the literature, the study avoids focusing only on institutions with the most active publication records. We wished to revisit Reave's approach while also correcting a perceived limitation: by connecting with educators directly rather than with

administrators, we hoped to also understand the unique perspectives and experiences of staff working in this niche within engineering. Thus, we aimed to move beyond the paper requirements of a programme, to more fully understand the unique contexts in which communication instruction is developed and delivered.

The path to becoming a communication or writing educator in Canada differs from many international contexts. Because there is no tradition of doctoral programmes in technical communication or engineering education in Canada (thus far we only have a few formal specialisations in the latter), engineering staff specializing in transferable competencies and skills (including communication) often come from diverse disciplinary backgrounds. Through this study, we aimed to explore the relationship between educators' disciplinary training and their approach to communication instruction, while also gathering up-to-date data about communication requirements and curricular models.

Our research consisted of three phases: (1) an initial website review to classify communication activities in each programme in Canada; (2) a follow-up survey distributed to module educators at each of these programmes; and (3) qualitative interviews with a purposive sample. We share lessons learned from this study, specifically regarding the challenge of identifying and engaging educators within this analysis.

Phase 1: website review

We began by identifying 38 English-speaking accredited Engineering programmes in Canada, as listed on the Engineers Canada website. As Engineers Canada is the licensing body for accredited engineering programmes, this website provides the most up-to-date listing of institutions and their majors. Using this list we conducted an initial website review, examining departmental homepages and academic calendars to identify required communication modules or requirements. This approach was time-consuming and often inexact. A 'search all' of engineering homepages using the search term 'communication' often yielded results from the communications office, the administrative unit responsible for advancing engineering programmes by sharing research and teaching excellence. The term 'writing' similarly yielded references to writing outreach articles (e.g. '*writing* up results'), or administrative policies (e.g. 'students must provide a request in *writing*'). These searches also turned up archived pages, meaning that seemingly relevant module-related information could be several years old.

Manually finding and reviewing 'curriculum' or 'requirements' pages for each programme — essentially following the steps undertaken by prospective students looking to familiarize themselves with programme content—provided more detailed and relevant information, but even this approach was unreliable. Different webpages from the same institution contained different types of information, and not all requirements were consistently published or kept up to date. For example, we

discovered in conversation with colleagues that one institution required students to complete several communication workshops through a non-engineering writing centre; this information was not posted on its departmental websites. Additionally, the purposes of websites are not necessarily pedagogical; rather, they are mechanisms by which institutions attract potential students and staff, and as such, are largely marketing materials. More detailed information about curriculum is often contained on internal websites or learning management systems (LMS) requiring logins, making these inaccessible to those outside the institution.

Initially, we had planned to do two things with information from these websites. First, we aimed to understand the degree of instructional integration at different schools by using Reave's 2004 taxonomy, which categorized approaches to communication instruction into electives, engineering communication centres, and integrated instruction, and further differentiated types of integrated instruction into (1) partnered curriculum development (between technical and communication specialists); (2) team teaching (again between technical and communication specialists); (3) feedback from communication specialists on individual assignments; (4) communication modules added to technical modules; and (5) writing across the curriculum methods, in which communication principles are taught throughout multiple technical modules. Second, we planned to use educator information on these websites to distribute the communication survey.

Given the paucity and inconsistency of website information, both these tasks proved difficult. Our next phase, a survey, was planned from the outset, and could fill the gaps in categorizing programmes by providing more detailed information.

Phase 2: survey

We developed a survey to capture information about the types of communication modules offered or required in engineering programmes, their learning outcomes and methods of assessment, information on their administrative oversight, specifically departmental home and instructional support, as well as the experience and interests of the educator(s). The survey was split into six sections: (1) educator information; (2) module information; (3) curriculum design; (4) instructional support and preparation; (5) assessment and feedback; and (6) future engagement. As noted above, by contacting educators directly as opposed to eliciting information from administrators as Reave (2004) did, we hoped to gain a greater understanding about the educators' position and pedagogies, as well as how their module was valued and supported within the programme.

As noted, we initially attempted to use educator information from departmental websites to distribute the survey, specifically reviewing syllabi posted online or module descriptions that included educator information. Through this method, we were able to identify some educators of both standalone and integrated modules, but educator

information was not always listed and often out of date, and syllabi were not always posted. As a result, we turned to our engineering education network for help.

We successfully obtained many more survey responses by reaching out to our contacts within the engineering communication field in Canada. We attempted to connect with at least one educator at each of the 38 institutions identified by Engineers Canada and were successful in obtaining educator responses from approximately 50% of Canadian engineering programmes. However, despite our best efforts to contact staff, even personal email requests were sometimes ignored. A stronger response may have been obtained by following Buswell et al.'s (2019) approach, contacting programme coordinators to distribute a survey to staff (however, in the one case where we did try this, we did not have success in gathering additional survey responses).

As we have discussed, a well-designed survey for this type of exercise requires a balance between eliciting rich data and respecting educator time: a shorter survey may have resulted in more responses but would have provided fewer data on programme and institutional differences, as well as educator preparation, which was of significant interest to this study. In our Canadian context, many transferable competencies and skills educators come from backgrounds outside of engineering. Understanding the variety of backgrounds of educators of engineering communication was of significant interest.

However, a major weakness of our survey may have been the significant time commitment required. The survey consisted of 30 questions, ten of which required long answers. We estimated the survey completion time to be 15 minutes, given that many answers were optional. However, the average completion time was 30 minutes. To thank participants for their time we offered gift cards of Can$ 25, but this is arguably incommensurate compensation for such a lengthy survey.

Phase 3: qualitative interviews

While our initial intention was to complete qualitative interviews for this study after we collected survey responses, we found this phase unnecessary given the level of detail provided in the survey responses. Instead, similar to McKenzie et al. (2004), we offered an interview as an alternative for those who did not wish to complete the survey, and also invited interested participants to let us know if they wished to chat after completion of the survey. Four educators selected an interview instead of completing the survey. This approach was reasonable for our fairly small and close-knit engineering education community, in which even a higher response would have resulted in a manageable number of interviews, but would have been more difficult to conduct when trying to gather information from a larger pool.

Future work

Although the first round of survey requests took place over a year before writing this piece, we continue to invite educators within this community to share their insights

via the survey or through an interview, and to encourage participants to pass the invitation along. The snowballing nature of this approach is appropriate for a study in which the primary goal is knowledge sharing; however, the desire to make space for as many perspectives as possible delays the point at which we can share this information more widely with others who could benefit. The survey was closed in 2026, and we plan to share the data in a journal article. A summary of our results from Phase 1 are shared in Wilkinson et al. (2025).

5 Recommendations for practice

In this chapter we introduced a variety of approaches for analysing transferable competencies and skills across modules, programmes and institutions, emphasizing the importance of flexibility and adaptability in this type of comparative review. We have called attention to the lack of available landscape analyses in the literature, resulting in large part from the type of scholarship being produced in this area. The practical nature of transferable competencies and skills instruction invites action-based research: reporting on the failures and successes of discrete classroom practices or curricular innovations. Gustafsson and Jacobs (2013) argue, specifically regarding communication instruction, that a lack of landscape or meta-analyses makes arguments for skills instruction less persuasive. The fact that transferable competencies and skills instruction require justification at all is worth exploring further.

Unlike core engineering curricula, transferable competencies and skills are often treated as ancillary areas of instruction: content that is added to the curriculum, but fundamentally less important than technical curricula. This bias makes transferable competencies and skills instruction vulnerable to several factors. Transferable competencies and skills initiatives are vulnerable to budgetary stress, often being the first initiatives stripped away to save money or time. They are vulnerable to staffing changes: an integrated approach to instruction, which is highly effective in increasing perceived relevance, situates transferable competencies and skills within core technical curricula, meaning that relationship-building between the skill expert and technical expert is critical, and difficult to maintain when a module changes hands. The expertise of skills educators may be more vulnerable to scrutiny from engineering educators: because skills educators often have backgrounds in subjects other than engineering, they must work harder than their engineering counterparts to explain the strengths and theoretical underpinnings of their work. The fact that transferable competencies and skills are often taught by non-research staff also impacts the amount of available scholarship about their integration.

These influences contribute to a teaching and scholarly environment in which significant innovation is taking place, but in which this information is infrequently reviewed and reported. The practical and often inward-facing purposes of module, programme, or institutional analyses exempt these initiatives from the conventions that sometimes constrain traditional research projects but also mean fewer of these studies are published and widely disseminated, and without this reporting there may

be an assumption that transferable competencies and skills programming is often designed without a solid rationale. We can counter this misapprehension by more thoughtfully designing, conducting, and disseminating comparative reviews; this research is a valuable source of information as we make decisions about programme and module design, and also provides a valuable rationale as we share this decision-making with our engineering colleagues.

Overall, we found that for comparative reviews, the aim is crucial, and arguably more important than the research design; the scope is intentional and precise, and researchers must be curious, persistent, and adaptable in adding or changing methods to accrue more information. It is difficult work, as tracking transferable skill pedagogies in engineering is not done consistently, not all educators or administrators disseminate their work, and dissemination sites vary greatly. We recommend that as a community, we strive to better document, map, and archive the important work of teaching transferable competencies and skills and to develop more opportunities to engage in scholarly conversations. We should embrace opportunities to communicate and collaborate with other researchers and practitioners to understand how activities and curricula vary between institutions, and look for dissemination opportunities, including conferences and journal articles, to share this knowledge. In this way, we make pedagogical and curricular norms transparent and reduce the burden for other educators working to integrate transferable competencies and skills instruction. For more information on how to disseminate, see Chapter 5.6.

References

Bazerman, C., & Prior, P. (2004). What writing does and how it does it: An introduction to analyzing texts and textual practices. Routledge.

Besterfield-Sacre, M., Cox, M., Borrego, M., Beddoes, K., & Zhu, J. (2014). Changing engineering education: Views of U.S. faculty, chairs, and deans. Journal of Engineering Education, 103(2), 193–219. https://doi.org/10.1002/jee.20043

Buswell, N., Jesiek, B., Troy, C., Essig, R., & Boyd, J. (2019). Engineering instructors on writing: Perceptions, practices, and needs. IEEE Transactions on Professional Communication, 62(1), 55–74. https://doi.org/10.1109/TPC.2019.2893392

Big Ten Academic Alliance (2026). About the big ten academic alliance. https://btaa.org/

Cohen, L., Manion, L., & Morrison, K. (2018). Research methods in education (8th ed.). Routledge. https://doi.org/10.4324/9781315456539

Dyke Ford, J., & Riley, L. (2003). Integrating communication and engineering education: A look at curricula, courses, and support systems. Journal of Engineering Education, 92(4), 325–328. https://doi.org/10.1002/j.2168-9830.2003.tb00776.x

European Network for Accreditation of Engineering Education. (2022). Structure of ENAEE. https://www.enaee.eu/about-enaee/structure-of-enaee/#ENAEE-member-organisations.

Engineering Council. (2025). Professional engineering competence and commitment. https://www.engc.org.uk/our-role-as-regulator/setting-standards/professional-engineering-competence-and-commitment

Fink, A. (2019). Conducting research literature reviews: From the internet to paper (5th ed.). SAGE.

Fowler, F. J., Jr. (2014). Survey research methods (5th ed.). SAGE.

Gourman, J. (1998). The Gourman report: A rating of undergraduate programs in American and international universities. Random House.

Gustafsson, M., & Jacobs, C. (2013). Student learning and ICLHE: Frameworks and contexts. Journal of Academic Writing, 3(1), ii–xii. https://doi.org/10.18552/joaw.v3i1

Hutchison, A., Evans, R., & Malepati, N. (2021). A preliminary review of communication instruction in an international undergraduate engineering context. Blended learning in engineering education: Challenging, enlightening and lasting? In Proceedings of the SEFI 49th Annual Conference (pp. 937–949). https://doi.org/10.5281/zenodo.14650328

Kirsch, G., & Sullivan, P. (1992). Methods and methodology in composition research. Southern Illinois University Press.

Klassen, M., & Sá, C. (2020). Do global norms matter? The new logics of engineering accreditation in Canadian universities. Higher Education, 79, 159-174. https://doi.org/10.1007/s10734-019-00403-6

Leydens, J., & Schneider, J. (2009). Innovations in composition programs that educate engineers: Drivers, opportunities, and challenges. Journal of Engineering Education, 98(3), 255–271. https://doi.org/10.1002/j.2168-9830.2009.tb01023.x

Liu, Q., & Tran, H. (2022). Exploring transdisciplinarity in engineering education and practice: A review of literature and existing initiatives. In Proceedings of the Annual Canadian Engineering Education Association Conference. https://doi.org/10.24908/pceea.vi.15953

Mann, D., Ingram, K., Dick, K., Petkau, D., & Britton, M. (2007). An experiment in integrating communication into the biosystems engineering design trilogy. International Journal of Engineering Education, 23(4), 645–649. https://www.ijee.ie/articles/Vol23-4/s05_ijee1954.pdf

Marshall, M., Wilkinson, L., Yargeau, V., Orjuela-Laverde, M., Bloom, M., Caron, B., Meunier, L., Zilberbrant, G., Okrutny, P., Verrett, J., Schoen, M., Qi, E., Teslenko, T., Miller, K., & Golpour, H. (2019). Preparing tomorrow's engineer-communicators: A review of models for effective communication instruction. In Proceedings of the Annual Canadian Engineering Education Association Conference. https://doi.org/10.24908/pceea.vi0.13820

Mattucci, S. (2019). A snapshot of the Canadian engineering education system: Reflections from an emerging scholar trying to support national curriculum change. In

Proceedings of the Annual Canadian Engineering Education Association Conference. https://doi.org/10.24908/pceea.vi0.13734

Matusovich, H., Paretti, M., Motto, A., & Cross, K. (2012). Understanding faculty and student beliefs about teamwork and communication skills. In Proceedings of the ASEE Annual Conference & Exposition. https://doi.org/10.18260/1-2--22151

McKenzie, L., Trevisan, M., Davis, D., & Beyerlein, S. (2004). Capstone design courses and assessment: A national study. Proceedings of the ASEE Annual Conference & Exposition, 9.286.1–9.286.18. https://doi.org/10.18260/1-2--13900

Miles, M. B., & Huberman, A. M. (1994). Qualitative data analysis: An expanded sourcebook (2nd ed.). Sage.

Miller, C. R. (1984). Genre as social action. Quarterly Journal of Speech, 70(2), 151–167. https://doi.org/10.1080/00335638409383686

Mosenthal, P., Tamor, L., & Walmsley, S. (1983). Research on writing: Principles and methods. State University of New York at Albany.

Paretti, M. C. (2008). Teaching communication in capstone design: The role of the instructor in situated learning. Journal of Engineering Education, 97(4), 491–508. https://doi.org/10.1002/j.2168-9830.2008.tb00995.x

Paretti, M., Bernadier, C., & Gustafsson, M. (2023). An exploratory study mapping approaches to teaching writing in engineering. In Proceedings of the IEEE International Professional Communication Conference (pp. 44–48). https://doi.org/10.1109/ProComm57838.2023.00020

Paretti, M., McNair, L., George, D., Belanger, K., & Norris, L. (2007). Outcomes assessment as a site of integration: ABET requirements meet the Council of Writing Program Administrators. In Proceedings of the ASEE Annual Conference & Exposition. https://doi.org/10.18260/1-2--2706

Paretti, M., & McNair, L. (2008). Introduction to the special issue on communication in engineering curricula: Mapping the landscape. IEEE Transactions on Professional Communication, 51(3), 238-241. https://doi.org/10.1109/TPC.2008.2001255

Patterson, L. (2017). A tale of two pedagogical perspectives: A literature review of writing program administration within engineering programs. In Proceedings of the Annual Canadian Engineering Education Association Conference. https://doi.org/10.24908/pceea.v0i0.10374

Patton, M. D. (2008). Beyond WI: Building an integrated communication curriculum in one department of civil engineering tutorial. IEEE Transactions on Professional Communication, 51(3), 313–327. https://doi.org/10.1109/TPC.2008.2001250

Reave, L. (2004). Technical communication instruction in engineering schools: A survey of top-ranked U.S. and Canadian programs. Journal of Business and Technical Communication, 18(4), 452–490. https://doi.org/10.1177/1050651904267068

Selingo, J. (1997). A self-published college guide goes big-time, and educators cry foul. http://chronicle.com/article/A-Self-Published-College-Guide/101369/

Wilkinson, L., Seniuk-Cicek, J., Cai, X., & Lkhagvadorj, N. (2025). Mapping engineering communications in Canada: Reflections on year 1. In Proceedings of the IEEE International Professional Communication Conference (pp. 224–229). https://doi.org/10.1109/ProComm64814.2025.00050

Winsor, D. A. (1996). Writing like an engineer: A rhetorical education. Routledge.

AI statement

During the preparation of this work, the authors used Microsoft Copilot during the revision stage in order to generate formatting ideas for Table 1. After using this tool, the authors reviewed, edited, and made the content their own as needed. They take full responsibility for the content of the publication.

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[i] Big 10+ refers to the Big 10 Academic Alliance, a network of 18 leading research institutions in the United States "*dedicated to advancing the academic excellence of member institutions through national leadership, collaboration, and co-investments"* (Big Ten Academic Alliance, 2026).

[ii] The Gourman Report was a ranking of American and international undergraduate, graduate and professional programmes produced by Jack Gourman, a retired political science professor, from 1967-1998, and endorsed and distributed by the Princeton Review for their last few years (Gourman, 1998). The rankings have since been criticized for a lack of consistent and transparent evaluation criteria (Selingo, 1997).