A Modified Delphi Study: Performance Indicators to Support the Australian Paramedic Professional Capability Tool (APPCAT)

Rebecca Houli

(Bachelor of Paramedicine, Diploma of Paramedical Science (Ambulance), Diploma Vocational Education and Training, Certificate IV Training and Assessment)

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Abstract

Background

Work-Integrated Learning (WIL) is a cornerstone of paramedicine education, providing students with real-world experience. Undergraduate students should be assessed against the Professional Capabilities for Registered Paramedics (PCFRP) to ensure readiness for safe and professional practice. Since 2018, paramedicine has been regulated under the Australian Health Practitioner Regulation Agency (AHPRA), requiring national standards. However, unlike other allied health disciplines, paramedicine lacks a validated, standardised WIL assessment tool that aligns with accreditation and professional registration requirements.

The Australian Paramedic Professional Capability Tool (APPCAT) is being developed to address this gap, using the PCFRP framework of five domains and 23 capabilities. Yet, the PCFRP is not conveyed in language suited to WIL or education, limiting its direct use. To bridge this gap, performance indicators (PIs) need to be developed that are observable, contextual and measurable. A performance indicator tool can support supervisors in conducting consistent evaluations and assist students in understanding expectations of safe and professional practice.

Objective

This study sought expert consensus to develop PIs that enable supervisors to assess undergraduate students' attainment of professional practice against the PCFRP. The tool was intentionally designed to be concise (2–3 pages) and user-friendly, with 4–8 indicators per capability. Drawing from established allied health practices, the study aimed to provide a practical and nationally applicable framework for WIL assessment. This approach bridges the gap between theoretical registration frameworks and practical WIL assessment requirements.

Methods

A modified Delphi methodology was used with participants, comprising paramedicine academics from all Australian states and one New Zealand region. The process allowed anonymity, iterative feedback, and group-informed responses. Surveys were conducted in multiple rounds using Qualtrics, with indicators selected and ranked against the PCFRP descriptors. Statistical measures (frequency, median, mean) and an ≥80% consensus threshold guided adoption, while items with ≥70% and qualitative feedback were reconsidered in moderation meetings. Independent moderation in the final round ensured clarity, national applicability and final consensus.

Results

The participants were academics registered with AHPRA, half of whom also remained clinically operational. Their professional experience ranged from 6 to >21 years, and their qualifications included paramedicine, education, nursing, psychology, epidemiology, and health policy. This breadth of experience provided a robust foundation for consensus.

Across four Delphi rounds, an initial 475 indicators were refined to 182, aligned with the 23 PCFRP capabilities. Each capability was supported by 5–11 indicators (average 8), creating a tool that is comprehensive yet concise.

Conclusion

This study contributes to paramedicine education by developing a consensus-based tool for assessing undergraduate students' professional capabilities during WIL. Through a rigorous Delphi process, the performance indicators achieved strong content validity, ensuring they are observable, contextualised, and nationally relevant. The tool provides clear guidance for supervisors and students, supporting consistency and transparency in assessment. While further research is needed to establish reliability and predictive validity in practice, this work lays a robust foundation for national harmonisation, standardisation, and alignment with accreditation and registration standards in paramedicine education,

thereby supporting clearer expectations and contributing to better preparation of students for professional practice.

Student Declaration: Thesis Examination

Master of Applied Research

I, *Rebecca Houli*, declare that the *Master of Applied Research* thesis entitled *A Modified Delphi Study: Performance Indicators to Support the Australian Paramedic Professional Capability Tool (APPCAT)* is no more than 50,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

I have conducted my research in alignment with the *Australian Code for the Responsible Conduct of Research* and *Victoria University's Higher Degree by Research Policy and Procedures.*

Ethics Declaration

All research procedures reported in the thesis were approved by the VU Human Research Ethics Committee (VUHREC), HRE23-089.

Generative Artificial Intelligence

This thesis has been edited for clarity of expression, punctuation and grammar using the *Grammarly tool.* This use complies with VU guidelines on use of editors in HDR theses and overall, VU policy on use of AI in research.

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Signature  Date 20/11/2025

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“Collaboration allows us to know more than we are capable of knowing by ourselves.” – Paul Solarz

The APPCAT and performance indicators were informed by the significant research contributions and established Allied Health practices, from Nursing, Midwifery, Physiotherapy, and Speech pathology. I extend my appreciation to the Allied Health discipline consultants, whose expertise and insights were instrumental in shaping the APPCAT project for Paramedicine.

If I have seen further, it is by standing on the shoulders of giants – Isaac Newton

Finally, I wish to thank my family and friends, who encouraged me, were proud of me, and most of all believed in me.

“Educating the mind without educating the heart is no education at all.” – Aristotle

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Abbreviations

Abbreviation	Definition
AHPRA	Australian Health Practitioner Regulation Agency
AMSAT	Australian Midwifery Standards Assessment Tool
ANSAT	Australian Nursing Standards Assessment Tool
APP	Assessment of Physiotherapy Practice
APPCAT	Australian Paramedic Professional Capability Assessment Tool
CAA	Council of Ambulance Authorities
PAC	Paramedicine Accreditation Committee
PBA	Paramedicine Board of Australia
PI	Performance Indicator
PCFRP	Professional Capabilities for Registered Paramedics
WIL	Work Integrated Learning

Keywords:

Work-integrated learning, performance indicators, professional capabilities, for registered paramedics, accreditation, undergraduate paramedicine assessment, standardised assessment, national harmonisation and safety.

Link:

Professional Capabilities for Registered Paramedics

https://www.paramedicineboard.gov.au/Professional-standards/Professional-capabilities-for-registered-paramedics.aspx

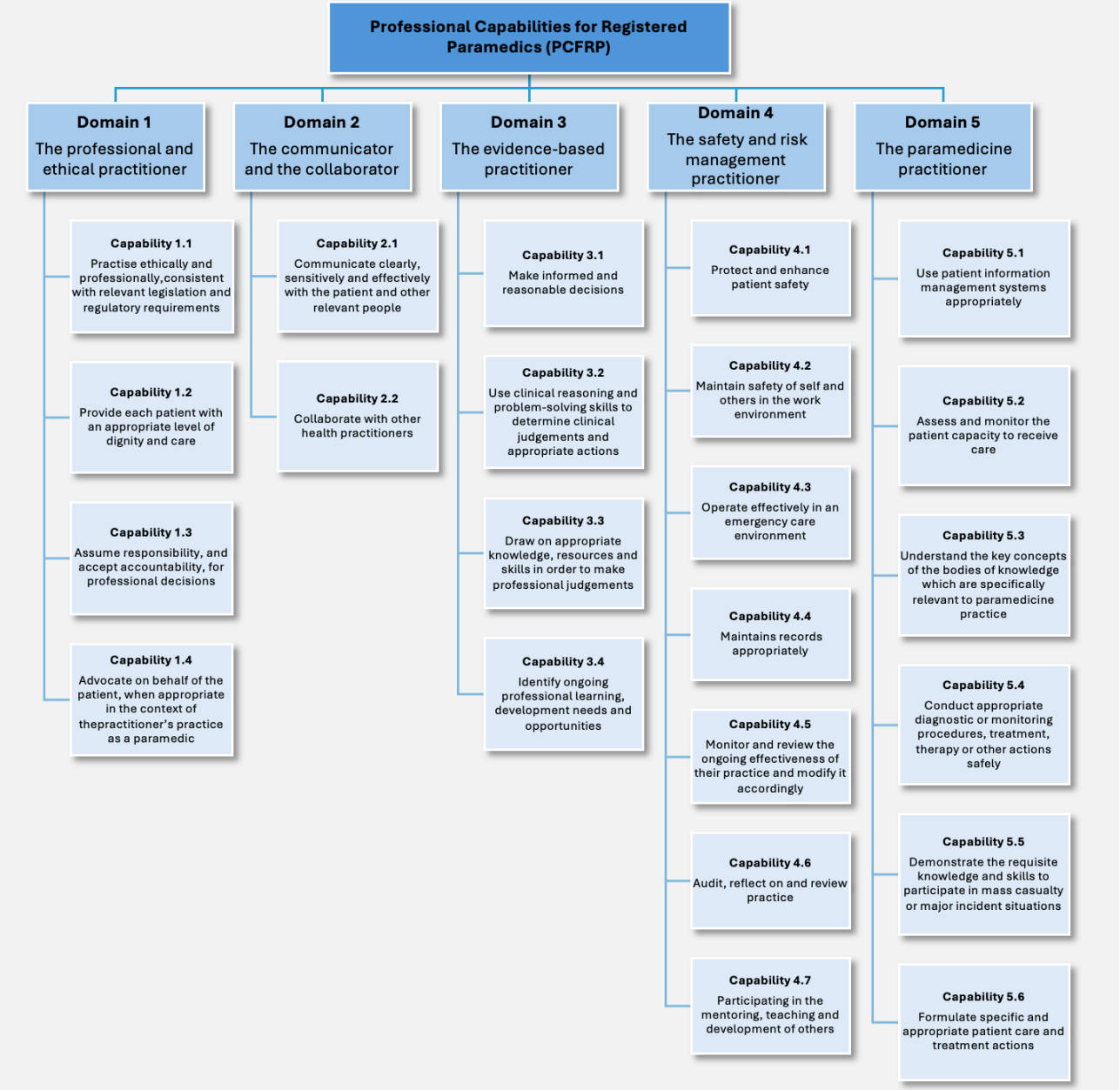

Figure I: Professional Capabilities for Registered Paramedics
This figure presents the five domains of the Professional Capabilities for Registered Paramedics, with each domain containing its respective capabilities. The framework outlines the professional, ethical, communicative, evidence-based, safety, and professional practice expectations required of registered paramedics in Australia.

Chapter 1: Introduction

1.1 What is Already Known

Work-Integrated Learning (WIL) is a fundamental component of paramedicine education, enabling students to gain practical experience in real-world settings (Johnson et al., 2021). To ensure students are prepared for safe and professional practice, their performance during WIL should be assessed against the Professional Capabilities for Registered Paramedics (PCFRP).

Since 2018, paramedicine has been a regulated profession under the Australian Health Practitioner Regulation Agency (AHPRA), requiring adherence to national standards and laws. However, unlike other allied health disciplines that utilise validated WIL tools aligned with professional registration and accreditation standards, paramedicine lacks a validated, nationally standardised assessment tool for evaluating student performance during WIL placements. This gap highlights the need for a standardised, validated framework to ensure consistency in assessment practices (Paramedicine Accreditation Committee, 2020).

1.2 Problem or Issue

The Australian Paramedic Professional Capability Tool (APPCAT) has been developed as a national WIL tool to evaluate paramedicine students' performance during WIL by referencing the PCFRP. The PCFRP framework comprises of 5 domains and 23 capabilities: *Professional and Ethical Conduct, Professional Communication and Collaboration, Evidence-Based Practice and Professional Learning, Safety, Risk Management and Quality Assurance, and Paramedicine Practice* (Paramedicine Board of Australia, 2021). However, the PCFRP framework is not written in language suited for educational settings, nor is it inherently designed for assessment purposes, which limits its direct application for evaluating students during WIL. Supervisors and students may

lack the experience in educational practices or capability-based terminology, making it challenging to assess student performance objectively (McCarthy & Murphy, 2008). Additionally, student evaluation often relies on professional judgment and interpretation, leading to variability and inconsistency in assessment outcomes (Sweet et al., 2018).

1.3 Addressing the Gap

To address these challenges, performance indicators have been developed as 'self-explanatory statements in plain language that describe observable performance' during WIL (Sweet et al., 2018) in alignment with the PCFRP. By focusing on observable behaviours rather than cognitive elements such as perceptions or thoughts, which are difficult to evidence, these performance indicators facilitate assessments that are measurable, objective, and transparent (Dalton, 2009a; Ossenberg et al., 2015).

1.4 What this Study Adds

This study aimed to achieve consensus on observable and contextual performance indicators that align with the 5 domains and 23 capabilities of the PCFRP. These indicators are designed to accompany the APPCAT, providing a practical tool for consistent and objective assessment of student performance during WIL.

The performance indicators will align with registration and accreditation standards, ultimately addressing the need for a validated and standardised WIL assessment framework, contributing to national harmonisation and safety. This unified approach ensures that students are effectively assessed for their professional readiness, equipping them for safe practice as registered paramedics. To achieve this, the thesis is structured to systematically address the identified gaps in paramedicine WIL assessment by providing a comprehensive framework for the study. It begins with a review of existing literature, drawing on established WIL assessment tools in allied health disciplines to inform the development of a robust, standardised framework for paramedicine. The subsequent sections outline the conduct and outcomes of a four-round modified Delphi

process aimed at achieving consensus on 182 observable and contextual performance indicators that align with the PCFRP. The study concludes with a critical discussion on the implications of the APPCAT tool, its potential impact on national harmonisation in paramedicine education, and recommendations for future research to further refine and validate the assessment framework.

Chapter 2: Literature Review

2.1 Framework

The primary objective of this literature review is to provide valuable insights into the utility and effectiveness of performance indicators within work integrated learning (WIL). It aims to address existing methodological gaps while critically evaluating their strengths and limitations. These insights will inform the development of a performance indicator tool for paramedicine aligned with national accreditation and professional registration standards, to enhance the evaluation of paramedicine students' professional capabilities during WIL.

While not carried out as a formal systematic review addressing a specific research question, this literature review adopted a structured narrative approach**,** incorporating systematic search and screening methods to ensure methodological transparency (see Figure 2.1). Keywords and phrases such as *“professional standards,” “professional capabilities,” “professional registration,” “performance indicators,” “behavioural cues,” “performance examples,” “accreditation,”* and *“work-integrated learning”* were used to guide the identification of potentially relevant literature. Following the initial searches, studies were screened based on titles and abstracts to determine their relevance to the focus of this review. Subsequently, full-text articles were critically appraised to assess methodological quality, validity of findings, and alignment with the research aims. This process informed the synthesis of current knowledge and supported the development of performance indicators aligned with national accreditation and professional registration

standards for evaluating paramedicine students' professional capabilities during work-integrated learning.

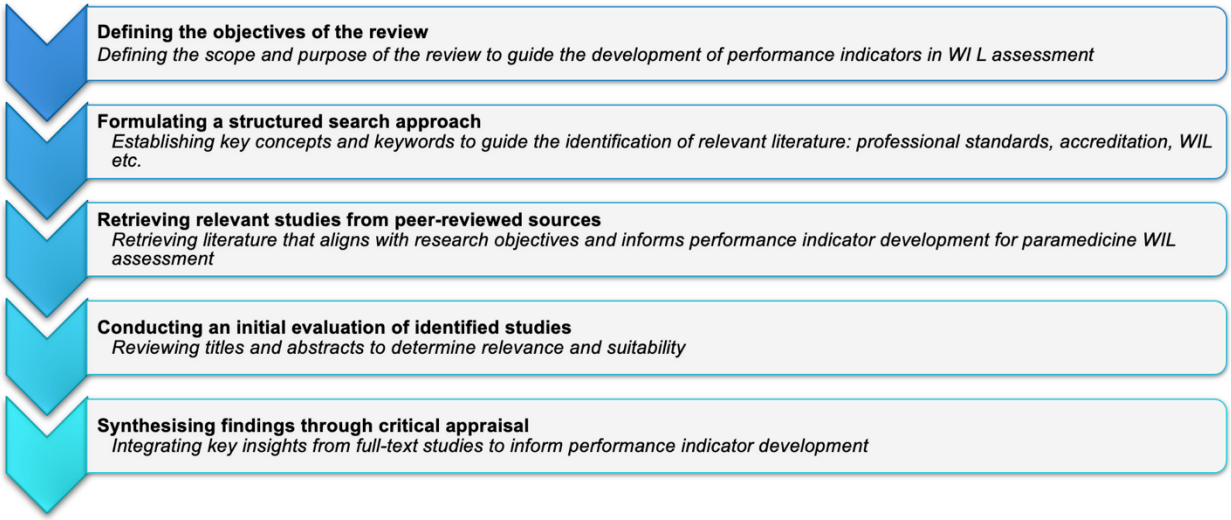

Figure 2.1: Methodology for structured narrative review
This figure presents the sequential and key stages undertaken in the narrative literature review process to inform performance indicator development, including defining objectives, structured search, study retrieval, evaluation, and synthesis.

To provide a comprehensive understanding, it is important to explore the *WIL background in paramedicine* and its foundational principles (section 2.2). However, in reviewing the literature, it was noted that there was limited evidence, based on the keyword searches in paramedicine, and therefore allied health disciplines, such as speech pathology, physiotherapy, nursing, and midwifery were included due to their similarity to paramedicine practice, professional registration with AHPRA and accreditation requirements (section 2.3). In particular, these professions and their tools have been influential in shaping WIL assessment and have been validated and refined through significant research over time.

2.2 Work-integrated Learning Background in Paramedicine

2.2.1 Transformation in paramedicine

Over the past three decades, the paramedic profession has undergone significant transformation, driven by substantial changes in clinical practices, healthcare systems, and societal expectations (Bowles et al., 2017; Williams et al., 2010). Historically, frontline paramedics were expected to strictly adhere to clinical protocols; however, contemporary practice demands that they possess a deeper understanding to support clinical decision-making (Brooks et al., 2016). As the paramedic role expands, practitioners are increasingly required to manage lower-acuity, primary care, chronic, and complex health conditions (College of Paramedics, 2017). Furthermore, paramedics need to develop a strong grasp of foundational sciences to provide effective care to socially and culturally diverse populations (Ford et al., 2014; Willis et al., 2010).

Additionally, the critical role of supporting sciences and associated attributes has been extensively documented in the literature (Lazarsfeld-Jensen, 2010; Williams et al., 2010; Willis et al., 2010). Williams et al. (2010) aimed to identify graduate attributes that align with the current and future needs of the Australian paramedic profession and found that the most essential attributes were those related to soft skills, also known as non-technical skills. These include being non-judgemental, non-discriminatory, trustworthy, caring, empathetic, self-aware, and respectful of others (Ford et al., 2014; Williams et al., 2010). Furthermore, when exploring the concept of professional practice across various professions, Higgs (2014) emphasises that it is not just about technical skill but also about broader qualities such as ethical conduct, sound decision-making, effective communication, and teamwork. Additionally, these practices are grounded in ethical principles, commitment, and continuous self-reflection, qualities that closely align with the non-technical attributes identified for paramedicine.

These evolving professional expectations and the emphasis on both technical and non-technical skills highlight the need for contemporary paramedicine education and WIL

assessment approaches to accurately measure and support these attributes, ensuring alignment with professional standards and evolving healthcare demands (Ford et al., 2014; Michau et al., 2009; O'Meara et al., 2014; Willis et al., 2010).

2.2.2 Higher education providers role in WIL

Higher education providers are responsible for educating paramedic students, typically through three-year degrees, with an expectation from industry that graduates possess the professional capabilities required to be prepared for practice upon graduation. These evolving demands within paramedicine have necessitated a re-evaluation of educational approaches, particularly in the context of WIL and WIL assessment (Ford et al., 2014; Michau et al., 2009; O'Meara et al., 2014; Willis et al., 2010). WIL is a collaborative educational approach that engages multiple stakeholders, including students, higher education providers, and industry partners, in the integration of theoretical knowledge with practical application. The success of WIL is contingent on the synergistic relationship between these stakeholders, each contributing to the creation of meaningful learning experiences (Orrell, 2011). High-quality WIL experiences are increasingly recognised as essential for developing non-technical skills such as ethical behaviour, teamwork, communication, conflict resolution, and critical reflective thinking (Helyer & Lee, 2014; Patrick et al., 2008). These programs are designed to immerse students in a diverse array of professionally relevant experiences, which is crucial for fostering the well-rounded capabilities necessary for effective paramedic practice (Sachs et al., 2016; Siggins Miller Consultants, 2012). In this context, higher education providers play a critical role in organising and overseeing WIL programs, ensuring they align with accreditation standards (Paramedicine Accreditation Committee, 2020).

2.2.3 WIL environments / settings

Due to the broad range of skills to be obtained, the pursuit of diversifying WIL experiences has driven the development of non-traditional WIL opportunities, which provide students with experiences beyond the conventional settings of emergency ambulance services within state jurisdictions (Council of Ambulance Authorities, 2018). Non-traditional WIL

activities expand the scope of student learning by incorporating placements in community agencies, allied health professions, remote areas, and culturally diverse settings. These placement settings are particularly valuable for developing the non-technical skills that are essential for paramedics to function as holistic practitioners, evident in the PCFRP.

The rise of non-traditional WIL has also been influenced by the shortage of traditional WIL placements with emergency ambulance services within state jurisdictions, necessitating innovative models that provide sound learning opportunities (Council of Ambulance Authorities, 2018; O'Meara et al., 2014). In response to these challenges, paramedicine students have, participated in international WIL placements. Some of these experiences, were conducted in countries such as the United Kingdom, Israel, Vanuatu, Canada, and Indonesia, have been formally recognised as WIL placement within their paramedic programs. These higher education providers offered financial and administrative support to undergraduate students, often facilitated through initiatives such as the New Colombo Plan Scholarship Program (Department of Foreign Affairs and Trade, n.d). These international WIL placements can equip students with valuable clinical and cultural experiences that may assist with shaping the skills and capabilities relevant for contemporary paramedicine practice (Johnson 2021; Simpson et al., 2016).

Given the need to adapt, and the expansion of WIL environments, this further highlights the importance of implementing a standardised WIL assessment tool. Such a tool should be applicable across diverse placement settings, both nationally and internationally, to ensure consistency in learning outcomes and preparedness for professional practice. Under the supervision of paramedics registered with AHPRA, this would ensure that students are meeting the required capabilities expected in the paramedic profession.

2.2.4 WIL curriculum

The expanding scope of paramedic practice in Australia has underscored the importance of aligning WIL experiences with emerging roles in primary care, mental health, and community-based services. Paramedics are increasingly engaged in primary care settings, providing health promotion, disease prevention, and chronic condition management alongside other healthcare professionals (Allied Health Professions

Australia, n.d). This shift is particularly significant in rural and remote areas, where community paramedicine programs have been discussed to address service gaps, enabling paramedics to deliver in-home care, conduct follow-up visits, and support chronic disease management (Lewis, 2024). Expanded service models not only enhance healthcare accessibility in underserved regions but also necessitate that WIL curricula adequately prepare students for the complexities of contemporary paramedic practice, reinforcing the need for robust assessment frameworks that reflect these evolving responsibilities (Australian Government Department of Health, Disability and Ageing, 2024). As such, the integration of WIL within higher education curricula must evolve to reflect these broader scopes of practice, ensuring that paramedic students are equipped with the necessary capabilities to effectively respond to complex and diverse care settings.

WIL is therefore typically integrated at strategic points throughout a student's educational journey, with the timing depending on the specific requirements of the discipline and the program structure. In many paramedicine programs, WIL is introduced to scaffold learning and provide progressive exposure to professional practice. The timing of WIL is crucial as it should align with the student's development, ensuring they are adequately prepared to engage with the complexities of real-world practice (Orrell, 2011). WIL is a valid pedagogy and offers paramedic students valuable exposure, contributing significantly to the development of professional attributes and capabilities required by registered paramedics.

2.2.5 WIL, Accreditation and Professional registration

The Paramedicine Accreditation Committee (PAC) began assessing education providers under the Health Practitioner Regulation National Law in force in each state and territory in 2021 (Paramedicine Board Australia, 2021). The overarching intention of accreditation for higher education programs in healthcare is to ensure adherence to established standards. Accreditation is crucial for ensuring the quality of education in fields such as paramedicine, where the capability of practitioners directly impacts public safety and well-being. The verification of accreditation standards provides assurance to

employers, regulatory bodies, and the public that graduates of accredited programs possess the requisite knowledge and skills, to perform their role safely and effectively (Frank et al., 2020).

Furthermore, accreditation provides a standardised structure for improving educational practices, promoting continuous enhancement in curriculum, teaching, and assessment methods, as well as student outcomes (Aldhobaib, 2024). This acts as a quality assurance indicator, safeguarding the integrity and effectiveness of higher education providers. Comparably, Alkhenizan and Shaw (2011) states "*there is consistent evidence that shows that accreditation programs improve the process of care provided by healthcare services. There is considerable evidence to show that accreditation programs improve clinical outcomes of a wide spectrum of clinical conditions. Accreditation programs should be supported as a tool to improve the quality of healthcare services*" (p.407).

However, unlike other health disciplines, paramedicine does not have a nationally standardised tool for assessing students during WIL (Weber et al., 2024). Although higher education providers have autonomy in curriculum design, there is limited validated or reliable assessment tools for evaluating WIL in paramedicine which align with the Paramedicine Accreditation Committee standards (Smith et al., 2020).

With reference to paramedicine, the accreditation standards require higher education providers to address the formal mechanism of student learning while engaging in placement. These include:

- **Standard 2.10** - Formal mechanisms exist to ensure the ongoing quality of learning and assessment during clinical placements; and
- **Standard 5.2** -Multiple valid and reliable assessment tools, modes and sampling are used throughout the program, including evaluation of student capability through direct observation of students in the practice setting. (Paramedicine Accreditation Committee, 2020).

In Australia, student performance during WIL, has primarily been assessed using ad hoc 'placement reports' which have been designed with each state jurisdictional ambulance service in mind. Additionally, each state jurisdictional ambulance service has their own clinical practice guidelines and clinical work instructions. The majority of existing WIL assessment reports do not align with the paramedic professions registration with AHPRA in 2018 or the PCFRP introduced in 2021, which is enshrined in national law. This misalignment limits the effectiveness of WIL assessments in addressing the regulatory and professional standards required for paramedic practice. Addressing this issue is crucial to ensure that WIL assessments adequately prepare students for registration and professional practice in compliance with national standards (Orrell, 2011; Sachs et al., 2016).

This highlights a clear gap in the educational framework within the paramedicine profession, and ability of education providers to appropriately assess WIL learning experiences. Indeed, Smith et al. (2020) states "*These inconsistencies and variations in practice raise questions about the integrity of student paramedic assessment and ultimately, the competence of graduate paramedics*" (p. 2). Consequently, this poses a safety risk for students, supervisors, and the community during WIL (Cameron, 2018; Hay & Fleming, 2021; Newhook, 2013).

2.2.6 WIL and safety

WIL exposes students to authentic learning opportunities in a workplace. However, it is an activity with inherent risks which may have significant consequences for students, higher education providers, the placement provider and the community (Hay & Fleming, 2021). Ensuring safe practice and minimising risks for students engaged in WIL is of importance for higher education providers worldwide. To fulfill their obligation to student welfare and duty of care, higher education providers need to establish robust systems, procedures and frameworks that support student success, both on campus and within workplace settings (Newhook, 2013). This duty is also shared with placement providers, whom are equally accountable for providing a secure and safe working environment

(Cameron, 2018; Newhook, 2013). Ultimately, comprehensively managing potential risks requires a collective approach involving all stakeholders engaged in WIL.

Furthermore, Hay and Fleming (2021) highlight the risks associated with differing expectations between students and placement providers regarding the WIL experience. Effective supervision is crucial for a meaningful WIL experience, yet its consistency is often lacking, which can compromise the student learning experience. Hence, there is a discernible risk during WIL. This can be mitigated by nationally applicable and standardised assessment framework with supporting procedures. Therefore, in this context, the implementation of the APPCAT and accompanying performance indicators assumes significance. It aids supervisors in verifying the attainment of the PCFRP and supports a consistent student experience. This verification of attainment is pivotal in safeguarding not only undergraduate students but also the wider community.

2.3 Paramedicine and Allied Health Work-Integrated Learning Tools

The need for a nationally consistent and standardised framework is not unique to paramedicine; it aligns with the development of similar tools in other allied health disciplines. The evolution of these tools began with speech pathology, marked by the development of the Competency Assessment in Speech Pathology (COMPASS®) tool in the early 2000s, followed by the validation of the Assessment of Physiotherapy Practice (APP) tool in 2008 (Dalton et al., 2009a). In 2004, Levett-Jones et al. (2011) introduced a holistic practice-based model assessing competence in authentic settings, promoting readiness for professional practice, aligning with professional guidelines from the Australian Nursing Midwifery Council. Later, nursing and midwifery introduced tools such as the Australian Nursing Standards Assessment Tool (ANSAT) and the Australian Midwifery Standards Assessment Tool (AMSAT), which were validated in the mid-2010s (Ossenberg et al., 2016: Sweet et al., 2020).

Although nursing and midwifery align with paramedicine in their focus on professional standards (which is also referred to as professional capabilities in paramedicine), significant differences exist in supervision structures and placement durations. Nursing and midwifery often utilise facilitator models. In facilitator models, a dedicated clinical facilitator typically employed by the education provider or placement organisation oversees a group of students during placement. Unlike clinical supervisors, facilitators are not simultaneously responsible for their own patient caseload, allowing them to focus entirely on student learning (Langford et al., 2024).This approach offers several benefits: continuity may be enhanced because the same facilitator monitors student performance across multiple shifts; teaching is more focused since the facilitator's role is education rather than service delivery, and students are provided with a clear go-to person for learning needs, reflection, and pastoral support. More recent research in paramedicine has shown that introducing a clinical facilitator model into ambulance placements can strengthen learning opportunities for students, support welfare and reflective practice, and improve the overall quality of placement experiences (Langford et al., 2024). This model may also contribute to consistent assessment across different placement sites.

In contrast, the supervisor model commonly used in paramedicine pairs students directly with on-road paramedics during clinical shifts. Supervisors are simultaneously responsible for delivering patient care and supporting student learning, which provides students with an authentic immersion in frontline clinical practice (Council of Ambulance Authorities 2018; Paramedicine Accreditation Committee, 2020). However, this model presents several challenges. Students may experience variability in the quality of teaching, as some supervisors are highly effective educators while others have little or no formal training in education. Inconsistencies also arise because students often rotate between multiple supervisors, each with different expectations and teaching approaches. Furthermore, the dual responsibility of patient care and teaching creates competing demands, meaning supervisors must inevitably prioritise clinical duties over educational opportunities, which can limit the time available for feedback and reflection (Hobbs et al., 2025; O'Meara et al., 2014, 2015). A recent review also highlighted that while the supervisor model remains predominant in paramedicine, students often report challenges

in receiving timely feedback and adequate support compared to other health disciplines that use facilitator-led approaches (Brown et al., 2025).

Building on this, Langford et al. (2024) emphasise the importance of examining supervision models across disciplines to address these challenges. Their discussion of the traditional preceptor model highlights its limitations in supporting students in high-pressure operational contexts and suggests the importance of structured supervision frameworks, preparation for supervisors, and clear performance expectations between students and supervisors. Importantly, they also note the potential value of interdisciplinary collaboration, suggesting that established supervision models from allied health could inform approaches more tailored to the realities of paramedicine practice (Langford et al., 2024). These insights highlight the need for WIL models that are context-specific yet adaptable, recognising the unique demands of paramedicine while drawing on transferable lessons from other health professions. In paramedicine, this also means accounting for the complexities, autonomy, and dynamic nature of practice within traditional jurisdictional ambulance service environments.

This section builds upon these insights, exploring interdisciplinary WIL tools to develop a tailored and effective approach to WIL assessment in paramedicine. Reviewing literature from allied health disciplines not only provides a foundation for the performance indicator tool development but also underscores the importance of aligning these performance indicators with professional standards, which is essential to evaluate readiness for registration and practice, as highlighted by McCarthy and Murphy (2008), Shumway and Harden (2003), and Ossenberg et al. (2015). Professional standards are central to the development of WIL tools, and these concepts will be further explored, specific to the aforementioned allied health disciplines.

2.3.1 Paramedicine

With reference to the paramedicine profession in Australia, the only related study to a WIL tool was conducted by Smith et al. (2020) titled "*Assessing Competence of Undergraduate Paramedic Student Practice: A Preliminary Evaluation of the Australasian*

Paramedic Competency Assessment Tool". While there are similarities to the aim of the current research, there are also some notable limitations. Smith et al. (2020) undertook a pragmatic mixed method approach drawing on an advisory group of six (6) industry experts from higher education providers, to offer professional advice, guidance, and feedback in the creation of a WIL assessment tool for paramedicine students. The work of Smith et al. (2020) informed the design of this study, which is aligned with ontological pragmatism and employed a mixed-methods approach via a modified Delphi study, drawing on the collective expertise of paramedicine academics from higher education providers in Australia and New Zealand.

However, one of the limitations noted within Smith et al. (2020) saw the WIL assessment tool designed from "The Australasian Competency Standards for Paramedics" which was developed by Paramedics Australasia in 2011. This was an organisation with a respected voice in shaping clinical practice, legislation and health service provisions to enhance the quality of patient care within paramedicine (Paramedics Australasia, 2011). However, paramedicine was not registered with the AHPRA at the time. This was also evident in participant feedback in Smith et al. (2020), "*the tools must reflect the AHPRA Paramedicine Board Professional Capabilities for Paramedics, as that is ultimately what will guide course accreditation and graduate registration*" (p. 6). Furthermore, this tool did not encapsulate all of competencies listed in the Paramedic Australasia standards, and this was condensed by the advisory group. It is worth noting that the literature did not specifically describe the method or rigour undertaken to condense the competencies. Importantly, there was a binary grading system where students were scored competent and not competent, and there were accompanying performance examples to support the attainment of the competencies (Smith et al., 2020).

One could argue that competencies are often more narrowly defined and focused on specific tasks or functions within a profession and therefore performance indicators are not required. In Smith et al. (2020), there were five sections of competencies, '*professional practice', 'professional relationships', 'clinical practice', 'critical evaluation of paramedic practice' and 'professional knowledge'*. However, some of the items being assessed in these sections were generalised and ambiguous. For example, "*Performs in*

accordance with service standards", "*Maintains fitness for practice*", and "*Demonstrates appropriate use of information and communication technology*". It is evident that these items are subjective rather than objective, and the consistency of interpretation by assessors is questionable and could contribute to rater bias. Additionally, Smith et al. (2020) expressed that this tool required supervisors to formulate a professional judgment, with the outcome being recorded as 'achieved competency', or 'not achieved competency'. Given the above, it is evident that there is a place for performance indicators to support assessors' professional judgments.

Further to this, Weber et al. (2024) in a recent review exploring the alignment between paramedicine's professional capabilities and competency frameworks, states "*In the context of traditional higher education, competency tends to be more implicit than explicit*" (p. 3). Capabilities are also often seen as more holistic than competencies. Capabilities encompass a wider range of attributes, including not only skills and knowledge but also attitudes, values, and cognition (Weber et al., 2024). Therefore, the current research will draw on professional capabilities taken directly from the Paramedicine Board of Australia (PBA), allowing for a more holistic assessment of student performance during WIL.

Given the limited research specific to paramedicine, the remainder of this review incorporates literature from allied health disciplines such as nursing, physiotherapy, and midwifery. These fields were selected due to the alignment of their WIL assessment tools with AHPRA requirements and comparable accreditation frameworks. Drawing on their established approaches provides a broader evidence base to substantiate the inclusion of performance indicators alongside capabilities. This cross-disciplinary perspective offers valuable insights into effective student assessment during WIL, addressing the distinct challenges of paramedicine and informing the development of a comprehensive assessment strategy.

2.3.2 Physiotherapy

In physiotherapy, research involved developing and testing the Assessment of Physiotherapy Practice (APP) instrument's validity, reliability, and sensitivity in assessing

various aspects of physiotherapy practice, linked to professional standards. The APP was developed using methodologies endorsed in the Standards for Educational and Psychological Testing (American Educational Research Association, et al., 1999) to ensure it was psychometrically sound and educatively informative. It was evident that the performance indicators were also developed with consideration of the Australian Standards for Physiotherapy.

The process involved researchers reviewing the preliminary set of performance indicators with eight panel members, which included academics and clinical supervisors. The panel members then refined the wording of these indicators, and this process resulted in a concise, one-page tool, although details of the methodology and consensus process were not extensively reported in the literature (Dalton et al., 2009a). The performance indicators are assessed through observable behaviours. The APP includes examples of behaviours across different domains, though the list is not exhaustive. These performance indicators assist educators articulate expected professional behaviours and offers students clear, practical goals for their development (Dalton et al., 2009b).

In support of this, in the qualitative evaluation think aloud interviews, teleconferences, and meetings from the first field test of the one-page tool, supervisors found the performance indicators highly valuable and useful, particularly because they were written as observable behaviours. This assisted educators[1] in providing clear feedback to students on areas where their performance was adequate and where improvement was needed (Dalton et al., 2009a, p.29). Educator comments included:

- "*Great for use at mid-unit to give formative feedback*."
- "*Excellent, very comprehensive*."
- "*Takes away the difficulty of finding the right words to give feedback*."

[1] It is important to note that, across allied health disciplines, various terms such as ‘supervisor’, ‘facilitator’ ‘educator’, and ‘assessor’ are often used. Despite the different terminologies, these roles share a common purpose: overseeing and supporting students, ensuring their professional and educational development during WIL.

- "*Very good as they clearly outline behaviours students need to demonstrate*" (Dalton et al., 2009a, p. 29).

Furthermore, in the responses to the two open-ended questions on the survey collected during field test one, "*Q11: Were there any additional performance indicators that you consider could be added to the APP*?" and "*Q12: Do you have any additional comments on the APP and Performance Indicators*?", Dalton et al. (2009a) summarised "*There were no additional performance indicators that the clinical educators wished to add*", "*Most educators (90%) found the performance indicators to be very comprehensive*", "*The APP was user friendly, comprehensive and time efficient*" and "*The educators felt confident that the score given to a student was an accurate reflection of their Performance*" (pp. 31-32).

This summary was also supported by the quantitative data from the survey question collected from the supervisors during field test one, "*Performance Indicators (PIs) useful*" and "*PIs easy to understand*" which scored a mean of 4.1 with a standard deviation of 0.8 on an agreement scale, where 5 was strongly agree, indicating overall agreement that the performance indicators were useful and understandable. Students were also surveyed, with similar results obtained (Dalton et al., 2009a, p. 38). Ultimately, performance indicators are imperative to the APP and demonstrated a positive contribution to the user experience and assessment for assessors and students during WIL.

Constructive feedback provided by participants regarding minor changes to the performance indicators included wording to be inclusive of paediatric patients and further emphasis on cultural sensitivity to ensure clarity. This quality improvement was achieved post the field testing (Dalton et al., 2009a). Drawing on foresight, in this current study, these aspects of language will be considered for the paramedicine performance indicators, in the modified Delphi survey construct, utilising free text boxes to obtain this information early.

There were some anticipated challenges noted in scoring students with regards to rater bias. The 'devil effect,' a counterpart to the 'halo effect', occurs when supervisors judge someone negatively based on one undesirable trait, leading them to perceive other traits negatively as well. Therefore, this may affect how a supervisor rates other domains of practice. To minimise this rater bias, supervisors were informed and educated via the APP resource manual, to focus on individual domains of practice and avoid letting overall impressions sway judgments (Dalton et al., 2009b). This guidance will also be incorporated into the paramedicine resource manual and the national supervisor training module, where it will be presented alongside the performance indicators.

Ultimately, the development of the APP tool offers valuable insights for paramedicine, emphasising observable behaviours, clear and concise language, and a user-friendly design. Addressing rater bias, integrating user feedback, and ensuring cultural and contextual relevance are critical strategies for developing performance indicators that enhance assessment during WIL in paramedicine.

2.3.3 Nursing and Midwifery

The development of nursing and midwifery WIL tools largely stemmed from research on APP by Dalton et al. (2009a, 2009b, 2012).

To construct performance indicators for the Australian Midwifery Standards Assessment Tool (AMSAT), four focus groups were held across three states in Australia, involving participants from four higher education providers. These groups reviewed and commented on the appropriateness of the performance indicators, ensuring content validity. The indicators were initially developed by two researchers, and refined based on iterative participant feedback, with final confirmation via email (Sweet et al., 2018). While the qualitative methodology provided valuable insights, the inclusion of quantitative analysis could have further strengthened the consensus-building process. Implementing a Delphi methodology could have further reinforced the findings by incorporating anonymity, thereby potentially enhancing the robustness of the consensus process

(Grisham, 2009; Hasson et al., 2000; Trevelyan & Robinson, 2015; Niederberger et al., 2021).

In the AMSAT post-pilot, participant feedback emphasised the importance of using the tool in conjunction with performance indicators to guide assessment and completion. Validation results indicated that performance indicator evaluation questions scored highly, demonstrating that they effectively reflected expected student behaviours, were useful in assessment, and provided valuable guidance for delivering feedback (Sweet et al., 2018). Specifically, during validation, performance indicators received high scores, with median and mode values of four (4) and five (5) out of five (5) for statements such as "*The performance indicators were reflective of expected student behaviour*" and "*The performance indicators provided guidance when delivering student feedback*" where a rating of 4 was 'Agree' and 5 'Strongly Agree' (Sweet et al., 2018, p. 65). Additionally, in the AMSAT participants emphasised the critical role of behavioural cues[2]; "*It is essential that the tool is used in conjunction with the behavioural cues*", "*Behavioural cues will naturally help to expand on my understanding of the AMSAT*" and "*I think the behavioural cues definitely help with completing the tool*" (Sweet et al., 2020, p. 143).

The progression from development to validation was further demonstrated in midwifery, where the Australian Midwifery Standards Assessment Tool (AMSAT) was aligned with the *Australian Midwife Standards for Practice (2018)*, confirming its reliability and content validity across diverse clinical settings (Sweet et al., 2020).

Comparatively, to construct the Australian Nursing Standards Assessment Tool (ANSAT), an iterative process of collaboration was undertaken with input from an expert clinical reference group, clinical facilitators, and students, ensuring alignment with professional nursing standards. Performance indicators were developed as behavioural cues to provide clear and observable examples of competence, enhancing consistency in assessment. The tool was piloted with 23 clinical assessors across two universities,

[2] It is important to note that across allied health disciplines, terms such as 'performance indicators,' 'behavioural cues,' 'behavioural exemplars,' and 'behavioural descriptors' are frequently used interchangeably.

evaluating second- and third-year nursing students in practice settings. Statistical validation confirmed the tool's reliability (Cronbach's alpha = 0.976) and sensitivity to performance differences across year levels. Feedback from assessors highlighted its usability and effectiveness in guiding formative and summative assessments, making the ANSAT a robust tool for benchmarking and standardising nursing student evaluations (Ossenberg et al., 2016; Takashima et al., 2019).

The ANSAT utilised behavioural cues designed to align professional standards with clinical practice expectations, offering assessors clear guidance on observable behaviours. Ossenberg et al. (2015) highlighted the importance of these cues in fostering clarity and consistency with regulatory standards, ultimately aiding in the assessment of a nurse's preparedness for safe practice. Additionally, these cues facilitate the translation of complex standards into practical, accessible language for students, thereby enhancing the feedback process. This was evident in the post-pilot ANSAT think-aloud interviews which highlighted valuable assessor feedback: "*Assessment items and behavioural cues were relevant to behaviours observed in the authentic practice setting*", and "*Behavioural cues assisted the translation of professional standards into everyday practice language*" (Ossenberg et al., 2016, p. 28).

Performance indicators' and 'behavioural cues' in assessment tools such as the AMSAT and ANSAT are essential in supporting the validity and reliability of WIL assessment. By clearly defining observable behaviours that align with professional standards, these tools provide assessors with a structured framework for evaluating student performance against regulatory standards. The AMSAT and ANSAT share the objective of translating complex professional standards into practical, everyday language, thereby facilitating objective, consistent, and constructive feedback (Sweet et al., 2018; Ossenberg et al., 2016). Ossenberg et al. (2015) underscores the significance of these performance indicators in creating assessments that are aligned with regulatory standards, ultimately aiding in determining a learner's readiness for safe practice, which is applicable to paramedicine.

2.3.4 Speech pathology

The speech pathology tool is known as COMPASS. Higher education providers in Australia (and many in New Zealand) that train speech pathologists for professional practice have adopted a standardised assessment tool to evaluate their students' performance in the practical components of the course. The Professional Competencies were formulated based on input from focus groups across Australia, involving higher education educators, field educators, and students using the professional standards for speech pathologists in Australia. This was also combined with the Occupational Competencies which were already outlined by the Competency Based Occupational Standards (CBOS) (McAllister, 2006). McAllister et al. (2010) explored the insights gained from assessing and validating workplace performance through competency-based ratings. The COMPASS tool fundamentally seeks to evaluate students' behaviour or performance to determine an outcome.

However, Leach et al. (2001) says that all assessment is inherently subjective and Bitzer (1999) suggests that completely objective assessment of human behaviour is impossible (as cited in McAllister, 2010). Both the American Educational Research Association (1999) and Schuwirth & Van der Vleuten (2006) emphasise the importance of judgment in assessment design. Therefore, given the humanistic nature within an authentic practice setting, the primary solution is to ensure quality judgment and observation in assessment. This necessitates that assessment formats should include components that provide sufficient information and context to guide assessors' judgments effectively. Consequently, behavioural exemplars are imperative to the assessment format and were included as a part of the COMPASS tool (McAllister et al., 2010).

In speech pathology, there are both *behavioural descriptors* and *behavioural exemplars*. Behavioural exemplars provide concrete examples that demonstrate how competencies are applied in practice. The *behavioural exemplars* are detailed and provided for each of the competencies and specified for all 3 levels of practice. Consequently, these behavioural exemplars spanned across a significant number of pages in the resource manual, unlike the condensed 2-page tools commonly found in fields such as

physiotherapy, nursing, and midwifery (McAllister et al., 2013). This construct may not be conducive in the assessment environment, as a notable portion of healthcare professionals identify time constraints and assessment complexity as major obstacles in conducting thorough clinical supervision and evaluations (Sweet et al., 2018).

In addition to the behavioural exemplars, the COMPASS rating scale employs a visual analogue scale (VAS) in which each level (novice, intermediate, and entry-level) is defined by detailed *behavioural descriptors*, thereby functioning as a behaviourally anchored rating scale when these descriptors are applied (see Figure 2.2). Compared to simple numerical or adjectival rating scales, these anchors offer greater consistency and help raters avoid relying on vague terms such as "poor," "average," or "excellent" (McAllister et al., 2010, 2013). While behaviourally anchored rating scales are not necessarily superior to other forms of assessment, their value lies in the specificity they provide when well-developed.

The development of these behavioural descriptors used in the VAS drew on literature from Anderson (1988), Benner (1984), Benner et al. (1996), Bloom's taxonomy (1956), Brasseur (1989), and Dreyfus and Dreyfus (1986), addressing areas such as managing complexity, integrating and applying knowledge, and the degree of guidance required. Similarly, across various allied health disciplines, diverse literature has been used to design assessment rating scales tailored to discipline-specific goals.

However, despite the VAS being supported by behavioural descriptors, there were some challenges. Despite receiving clear instructions, clinical supervisors did not consistently assign well-defined ratings during both formative and summative assessments. Visual examination of ratings revealed that supervisors often placed students at the lower end of a category in formative assessments and at the higher end of the same category in summative assessments. This suggested an attempt to demonstrate progress without formally moving the student into the next category. Furthermore, some supervisors placed student ratings between two categories, indicating that the three designated levels were insufficient to accurately reflect student progress. It was evident that supervisors adjusted the scale themselves, creating additional categories to better capture performance

nuances (McAllister, 2006). Therefore, using a limited number of rating points within a scale can pose challenges, as also reported by Hill et al. (2014). As Smith et al. (2003) noted, these challenges may lead to reduced sensitivity and reliability, and increase the likelihood of rating collapse, where students of varying abilities are assigned the same rating level. Further discussion and research with clinical educators regarding their intended usage of the scale could have provided clarity on rating outcomes. To mitigate this lack of clarity, additional training for clinical educators and a focus on element content was recommended (Hill et al., 2014).

Building on these insights, the APPCAT rating scale will draw on literature from the Bondy scale, originally developed for nursing. The Bondy scale offers a structured and progressive alternative to the VAS and traditional numerical scales by outlining stages of development, providing clarity and context for evaluating clinical performance. By anchoring assessment to observable levels of supervision and independence, the Bondy scale sought to reduce inconsistency and subjectivity, which addresses the challenges highlighted by McAllister (2006) in relation to the use of a 3-point VAS (see Figure 2.3 and 2.4). Adapted from this foundation, the newly designed APPCAT rating scale aims to evaluate not only the amount of supervision required but also the outcome of task performance and the safety of a student's practice, with behavioural and cognitive aspects anchoring the scale descriptions.

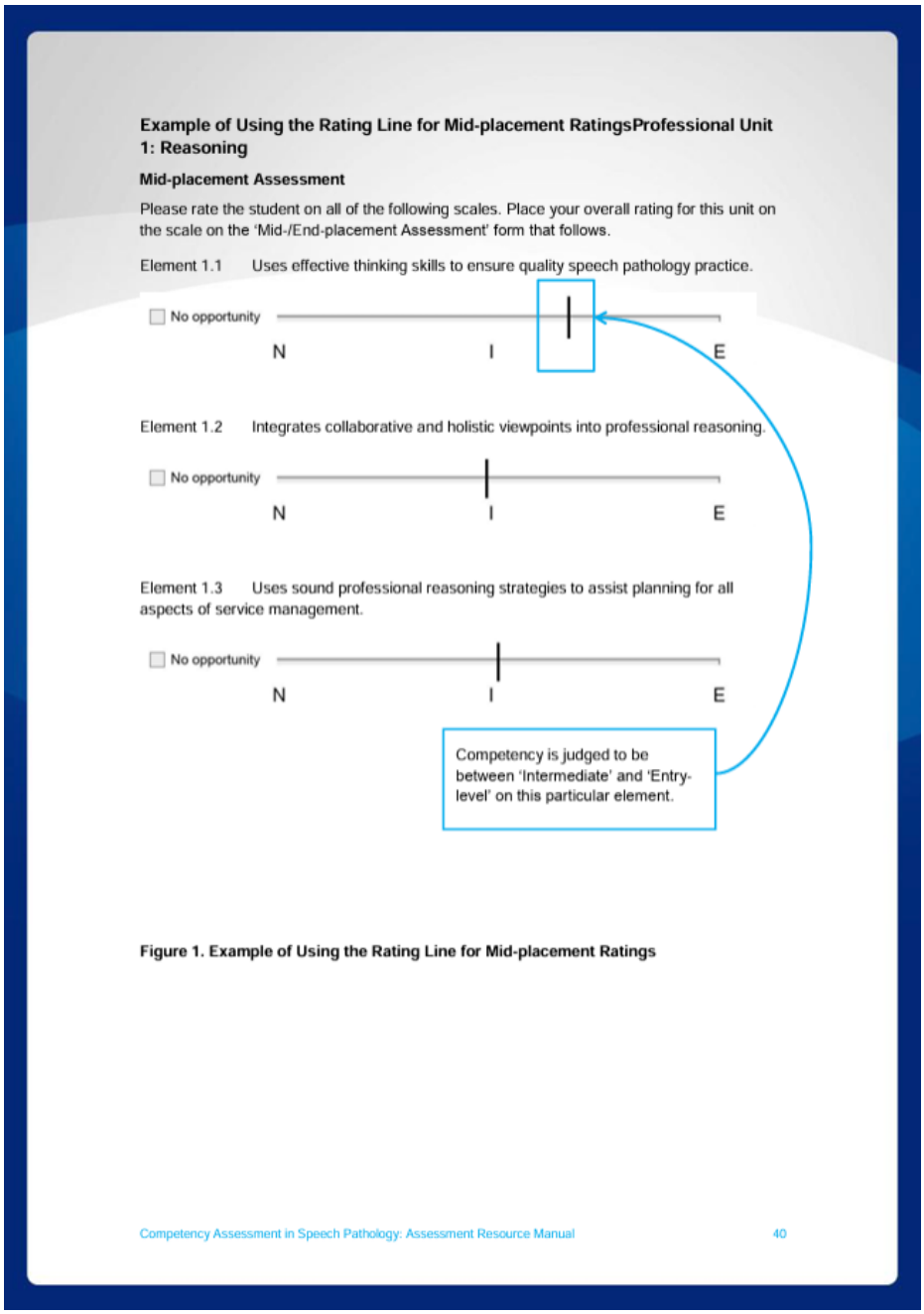

Figure 2.2: Visual analogue scale for mid-placement assessment (COMPASS®)
This figure illustrates the visual analogue scale (VAS) used to assess student competency for speech pathology students within the Professional Unit 1: *Reasoning*. The VAS provides a continuum from *Novice* (N) to *Entry-level* (E), with *Intermediate* (I) positioned between. The rating line assists assessors in placing students based on observed behaviours, allowing for nuanced evaluation of competency levels. Adapted from McAllister, S., Lincoln, M., Ferguson, A., & McAllister, L. (2013). COMPASS®: Competency assessment in speech pathology assessment resource manual (2nd ed.). Speech Pathology Australia.

FIGURE 2

CRITERIA FOR CLINICAL EVALUATION

Scale Label	Standard Procedure	Quality of Performance	Assistance
Independent	Safe Accurate Effect } Each Affect } time	Proficient; coordinated; confident Occasional expenditure of excess energy Within an expedient time period	Without supporting cues
Supervised	Safe Accurate Effect } Each Affect } time	Efficient; coordinated; confident Some expenditure of excess energy Within a reasonable time period	Occasional supportive cues
Assisted	Safe Accurate Each time Effect } Most of Affect } the time	Skillful in parts of behavior Inefficiency and uncoordination Expends excess energy Within a delayed time period	Frequent verbal and occasional physical directive cues in addition to supportive ones
Marginal	Safe but not alone Performs at risk Accurate - Not always Effect } Occasionally Affect }	Unskilled; inefficient Considerable expenditure of excess energy Prolonged time period	Continuous verbal and frequent physical cues
Dependent	Unsafe Unable to demonstrate behavior	Unable to demonstrate procedure/behavior Lacks confidence, coordination, efficiency	Continuous verbal and physical cues
X	Not observed		

Figure 2.3: Bondy 5-Point Rating Scale
This scale outlines criterion-referenced definitions for rating clinical performance, ranging from *Dependent* to *Independent*, with each level described in terms of procedure standards, quality of performance, and assistance required. *Bondy, K. N. (1983). Criterion-referenced definitions for rating scales in clinical evaluation. Journal of Nursing Education, 22(9), 376–382*

Scale label	Professional Standard	Quality of clinical performance	Assistance
1 Independent	Safe Outcome achieved Appropriate behaviour	Confident, proficient Appropriate time Accurate knowledge	Without supportive cues
2 Supervised	Safe Outcome achieved Behaviour mostly appropriate	Confident, efficient Reasonable time Occasional knowledge prompting	Occasional supportive cues
3 Assisted	Safe Outcome mostly achieved Behaviour generally appropriate	Skilful in some aspects, inefficient in others Delayed time Requires some explanation	Regular directive cues in addition to supportive cues
4 Marginal	Safe only with guidance Outcome incomplete achieved Behaviour generally appropriate	Unskilled, inefficient Prolonged time Continual knowledge prompt	Frequent directive cues
5 Dependent	Unsafe Outcome not achieved Behaviour inappropriate	Lacks confidence, efficiency Unable to complete Very limited knowledge	Continual verbal & physical directive cues

Adapted from: Bondy, K.M. (1983). Criterion – referenced definitions for rating scales in clinical evaluation. Journal of Nursing Education, 22: 376-382

Figure 2.4: Modified Bondy 5-point Rating Scale
This scale provides criterion-referenced definitions for rating clinical performance, ranging from Dependent to Independent, with each level described in terms of procedure standards, quality of performance, and level of assistance required. The modified Bondy scale is very similar to the original, but is often adapted for different health disciplines to make wording clearer or to refine the focus on the level of assistance required rather than just independence. *Adapted from Bondy, K. N. (1983). Criterion-referenced definitions for rating scales in clinical evaluation. Journal of Nursing Education, 22(9), 376–382.*

Ultimately, it is noted that quality judgement cannot be exercised in the absence of clearly defined competencies (Ilott & Murphy, 1997). Given the PCFRP is not written in educational language applicable to assessors and students, the focus in this study will prioritise performance indicators to support the scoring of students on the APPCAT. This will ensure comprehension of the requisite capabilities, and translation of performance indicators that are contextual and observable, tailored to the discipline's requirements and needs.

The development and implementation of the COMPASS tool in speech pathology provides critical insights directly applicable to paramedicine. The use of behavioural exemplars and behavioural descriptors highlights the importance of providing clear, context-rich examples to guide assessors' judgments, ensuring alignment with professional standards. Key takeaways include addressing the limitations of rating scales, ensuring clarity in assessment criteria, and providing robust training for assessors to enhance consistency and reliability. Drawing from these insights, the APPCAT will also integrate a rating scale informed by Bondy (1983), aiming to provide structured framework

for assessors while promoting consistent and progressive evaluation of student performance support by performance indicators.

2.3.5 International WIL

Internationally, the availability of comprehensive and validated tools for assessing paramedic students during WIL remains limited. In the United Kingdom, higher education providers typically develop and employ their own assessment tools, which are aligned with the standards of the Health and Care Professions Council (HCPC). Although the College of Paramedics has introduced a curriculum to guide student education, a nationally standardised WIL assessment tool has not yet been implemented across UK higher education providers (College of Paramedics, 2017).

In the United States, efforts to develop effective assessment tools for paramedic education have encountered significant challenges. One such tool, the 'Paramedic Affective Domain Tool,' was designed and used in alignment with the 2009 Emergency Medical Services (EMS) Education Standards (National Highway Traffic Safety Administration, 2009). This tool aimed to assist educators in evaluating the professional behaviours and attitudes of paramedic students. However, its validation has been limited, indicating measurement concerns and rating inconsistencies (Bowen & Williams, 2020), reflecting broader challenges in creating tools that are both reliable and adaptable to diverse educational settings.

This can be attributed to several factors identified in the literature. The subjective nature of assessing professional behaviours and attitudes often creates variability between raters, reducing reliability. A further challenge is the lack of standardisation across paramedic programs, with institutions interpreting national education standards differently (National Highway Traffic Safety Administration, 2009; Bowen & Williams, 2020). In contrast, recent developments in Australia, such as the APPCAT project, have been purposefully designed to address these barriers by promoting national standardisation, engaging stakeholders at a national level in the tool's development, and ensuring the flexibility to meet the varied needs of higher education providers and placement contexts.

Furthermore, Bowen et al. (2017), conducted a scoping review to identify existing tools for assessing professional behaviours in paramedics, revealing a substantial disconnect between curriculum requirements and the capacity to reliably measure these behaviours in practice. Their findings underscored gaps and inconsistencies in current tools, including those designed for peer and workplace-based evaluations. While their review emphasised the need for robust and standardised evaluation frameworks, it also highlighted the importance of addressing validity and reliability in future tool development. These challenges demonstrate the necessity for innovative approaches to paramedic assessment that can incorporate advanced psychometric methods and are adaptable to the evolving demands of professional practice. In response, the APPCAT, together with its performance indicators, will undergo psychometric testing using item response theory methods, such as Rasch analysis, to establish its validity and reliability.

Finally, an international nursing study conducted in Ireland by O'Connor et al. (2009) highlighted the effectiveness of a collaborative approach in assessing nursing students' competence. The study demonstrated how cooperation between multiple institutions enabled the development of a competency-based assessment tool with the aim of improving standardisation, and identified the need for assessment support for both students and educators. By fostering shared practices and implementing consistent evaluation criteria, this approach may enhance the reliability of competence assessments. Results indicated generally positive experiences of the tools operation in practice. This methodology aligns with the objectives of the performance indicator tool being developed, which seeks to ensure consistent and reliable assessment across institutions. Such parallels underscore the tool's significance and applicability in promoting standardised, high-quality evaluations within professional education contexts at a national level.

2.3.6 Summary

While it is recognised that the rater is a contributor to measurement error in performance assessment (McAllister et al., 2010), several practice-based assessment tools in allied health professions in Australia have mitigated this issue by incorporating performance

indicators (Dalton et al., 2009a; McAllister., 2006; Ossenberg et al., 2015). Each discipline has provided valuable insights into the development of structured, validated WIL assessment tools. Physiotherapy developed the Assessment of Physiotherapy Practice (APP) tool, which incorporated performance indicators based on observable behaviours, ensuring clear expectations for students and reducing subjectivity in assessment (Dalton et al., 2009a, 2009b). Nursing and Midwifery introduced the Australian Nursing Standards Assessment Tool (ANSAT) and Australian Midwifery Standards Assessment Tool (AMSAT), which employed behavioural cues to align student assessment with national professional standards, enhancing validity (Ossenberg et al., 2016; Sweet et al., 2018). Speech Pathology implemented the Competency Assessment in Speech Pathology (COMPASS) tool, incorporating behavioural descriptors and exemplars to enhance rater consistency and guide clinical educators in assessment decisions alongside the VAS (McAllister et al., 2006). However, challenges with its rating scale highlighted the importance of supervisor training and well-defined performance indicators.

Internationally, the development of assessment tools highlights both challenges and opportunities that are highly relevant to paramedicine. In the UK, the absence of a standardised WIL assessment tool, despite alignment with HCPC standards, reveals the need for nationally consistent frameworks (College of Paramedics, 2017). In the US, tools such as the ‘Paramedic Affective Domain Tool’ have had limited validation, reflecting difficulties in creating reliable and adaptable tools for diverse contexts (Bowen & Williams, 2020; National Highway Traffic Safety Administration, 2009). Bowen and Williams (2020) further emphasised gaps in assessing professional behaviours, calling for robust, standardised evaluation frameworks with strong psychometric properties. Insights from international nursing education, such as O’Connor et al.’s (2009) study in Ireland, also demonstrate the effectiveness of collaborative approaches across institutions, enhancing standardisation.

Despite advancements across allied health, paramedicine continues to lack a validated and standardised WIL assessment tool with clear performance indicators. This gap underscores the critical need for research to develop a framework that ensures consistent, transparent, and objective evaluation of student capabilities. Drawing from

both allied health and international insights, the APPCAT will integrate performance indicators aligned with national accreditation and professional registration standards, supporting assessors and students in achieving high-quality, effective, and consistent evaluations of professional practice during WIL.

2.4 Aim

This research seeks expert consensus to develop contextual and observable performance indicators that enable WIL supervisors to verify the attainment of professional practice by undergraduate paramedicine students against the PCFRP. This approach bridges the gap between theoretical registration frameworks and WIL assessment requirements Ossenberg et al., 2015; Paramedicine Board of Australia, 2021).

To address the time constraints and complexities of WIL supervision, the performance indicator tool is intentionally designed to be clear, concise (2–3 pages) and user-friendly. It aims to provide 4–8 performance indicators for each of the 23 PCFRP capabilities, drawing on established standards in allied health disciplines to ensure efficiency and practicality. The study employs validated methodologies from allied health fields, including speech pathology, nursing, and physiotherapy, and builds on evidence-based assessment practices well-documented in the literature, discussed in the previous chapter (Dalton et al., 2011, 2012; Hill et al., 2014; McAllister., 2006, Ossenberg et al., 2015, 2016, 2020; Sweet et al., 2018, 2020).

Chapter 3: Conceptual Framework

It is evident that the literature review identified the strengths and weaknesses of WIL tools across comparable allied health disciplines, which provided the foundation for this study's methodology. To tailor the WIL tool to paramedicine and ensure its applicability across Australia, achieving consensus on the performance indicators was essential. To address this, a modified Delphi study was developed using the following framework.

- Ontology – Pragmatism
- Epistemology – Mixed methods
- Methodology – Modified Delphi study
- Methods – Expert recruitment, questionnaire design, data collection using Qualtrics, statistical data analysis via an iterative process.

Pragmatism originates from the work of Peirce, James, Mead, and Dewey (Cherryholmes,1992). Pragmatism in mixed methods research, allows for the use of quantitative and qualitative approaches, drawing on the strengths of each method to better understand the research problem (Rossman & Wilson, 1985). This will provide flexibility to choose the methods, procedures and techniques of this research consistent with a pragmatic approach to methodological choice (Morgan 2007).

Pragmatic research contributes to building theory and conceptual understanding utilising mixed methods. Therefore, this research's approach integrates mixed methodology, employing a modified Delphi Survey as the chosen method. Similarly in other allied health disciplines, there is literature available for assessing undergraduate students against professional standards during WIL, which has involved mixed methods research outcomes (Ossenberg et al., 2015, 2016; Smith et al., 2020; Sweet et al., 2018).

The methodology of the research will consist of a sequential mixed methods design. The integration of mixed methods in this research will allow for research outcomes that are both evidence-based and grounded in real-world applicability. This design begins with quantitative data collection and analysis, followed by qualitative data collection. The quantitative phase establishes a foundational consensus using statistical data, while the qualitative phase provides depth and context, addressing gaps or limitations identified in the numerical findings. This will provide a more comprehensive and rich understanding to interpret the quantitative findings and allow for the development of informed recommendations, refinement or interventions prior to the finalisation of the performance indicators tool (Creswell, 2014). This sequential design ensures a rigorous and iterative

development process, culminating in a performance indicator tool for paramedicine that demonstrates content validity.

While some may argue that the Delphi technique doesn't neatly conform to the conventional classification of research methodologies, or as a tool for mixed methods, it represents a 'hybrid' approach that integrates elements from both qualitative and quantitative research methods. This technique effectively combines aspects of both methodologies to address a specific research problem (Ogbeifun et al., 2016).

The methods employed include a purposive recruitment, the design of a comprehensive selection and ranking questionnaire and the utilisation of Qualtrics for data collection. The data analysis is conducted using statistical analysis focusing on central tendencies. The research unfolded across multiple rounds, leveraging iterative refinement to obtain consensus (Keeney et al., 2011).

The Delphi technique facilitates participant interaction with others, allowing for voluntary adjustments without coercion, whilst allowing for anonymity. Through controlled feedback, participants could assess their individual submissions in the context of the group, and this method ensures that decisions are made based on well-informed participants to achieve consensus (Grisham, 2009; Hasson et al., 2000; Trevelyan & Robinson, 2015).

This research methodology and conceptual framework is also supported in O’Connor et al. (2009), where a collaborative process involving clinicians and educators at three higher education providers in Dublin, systematically reached consensus to create 'standards of practice' for each domain outlined for registration. Additionally, in Australia a similar process has been used to develop the APP, ANSAT and AMSAT (Dalton et al., 2011, 2012; Ossenberg et al., 2020; Sweet et al., 2018). Overall, this research framework involves one of the most rigorous development and analysis of performance indicators documented in the comparative literature reviewed.

Chapter 4: Methodology

4.1 Study Design

A modified Delphi methodology was utilised to establish consensus, with purposive recruitment of experienced paramedicine academics from higher education providers across all Australian states and one New Zealand provider. This methodology enabled anonymity, allowing participants to evaluate their responses against group trends without external influence. The Delphi technique is widely regarded as a robust consensus-building method across health and education research, ensuring methodological rigour and credibility (Niederberger et al., 2021). The study employed mixed-methods, drawing on quantitative and qualitative data collection to meet the research objectives. Data collection involved iterative rounds using Qualtrics surveys, where participants selected and ranked proposed performance indicators aligned with the PCFRP capability descriptors. Statistical measures, including central tendency (frequency, median, and mean), were used to identify consensus, with later rounds employing a five-point Likert scale and an ≥80% agreement threshold for adoption. Responses with ≥70-79% agreement and qualitative feedback were further reviewed during moderation meetings. Qualitative feedback complemented the quantitative data by addressing *comprehension, national applicability*, and the *addition of performance indicators*, providing insights into participants' rationale and guiding refinement. The final round included independent moderation, with two online sessions for in-depth discussion, review and refinement of the remaining performance indicators based on the qualitative feedback and consensus level reached (≥70-79% agreement). This rigorous process ensured that the final objective could be achieved:

- develop a concise, user-friendly tool containing 4–8 performance indicators per capability,
- limit the tool to 2–3 pages for practicality and efficiency in clinical supervision and evaluation, emulating allied health tools (Sweet et al., 2018), and
- final performance indicators are robust, valid, clear, and nationally applicable.

4.2 Population and Sampling

Ethics approval for the research was granted by the Victoria University Human Research Committee (application ID HRE23-089) prior to the study's commencement and conformed to the National Statement on Ethical Conduct in Human Research 2023 (National Health and Medical Research Council, Australia).

Population and sampling are essential components of a modified Delphi study, as the validity and reliability of the outcomes rely on the expertise and experience of the participants. A national Expert Reference Working Group (ERWG) had already been established as part of the national APPCAT project (Trevelyan & Robinson, 2015). The ERWG members were invited to serve as the sample population for this research. Opportunities for participation were also extended to other paramedicine education providers, with invitations and information shared via stakeholder engagement meetings. Although the term 'expert' can be subjective, participants invited to this study were academics with experience in paramedicine and higher education. They were well-versed in the Professional Capabilities for Registered Paramedics (PCFRP), and the accreditation requirements of the Paramedicine Accreditation Committee (PAC), with this knowledge being crucial to the development of the performance indicators. Therefore, purposive recruitment was centred on this.

While purposive recruitment focused on selecting academics with expertise in paramedicine and higher education, nearly half of the participants in this study also remained operational as practising paramedics. This dual representation ensured that the sample not only encompassed academic perspectives but also incorporated practical, field-based insights from those actively engaged in student supervision and clinical practice. This composition aligned with the study’s objective to capture a comprehensive understanding of WIL assessment aligned with the PCFRP and accreditation requirements of the PAC.

Given the small field of expertise available (paramedic academics in Australia) with the interest, availability, and expertise required, a concerted effort was made to invite twenty

plus (20+) participants whilst being mindful of a high attrition rate to achieve a preferred group size (Hasson et al., 2000). At a minimum, one higher education provider of accredited paramedicine programs from each state in Australia were invited to voluntarily participate, including metropolitan and regional areas, and one higher education provider from New Zealand. The Paramedic Council in New Zealand, governed by the Health Practitioners Competence Assurance Act 2003 (HPCA Act), fulfills a regulatory role comparable to that of AHPRA in Australia, with regards to accreditation and registration standards. Including a New Zealand provider added broader representation, reflecting a unified approach to paramedicine education and fostering international collaboration to advance the profession strategically. Ultimately this approach ensured national and cross-border representation, incorporating diverse perspectives and enhancing the broad applicability of this research outcomes.

A group of 20 participants were invited to voluntarily take part in four Delphi consensus rounds (three quantitative and one qualitative), with the goal of achieving a minimum of ≥80% agreement for performance indicators within the 5 domains and 23 capabilities from the Professional Capabilities for Registered Paramedics (PCFRP). Potential participants were provided with documentation outlining the study's aims, methodology, and voluntary nature, as well as the required time commitment and expectations of the multi-round Delphi process. Informed consent was obtained electronically, and participant results were anonymised through the completion of an online survey.

Demographic data was collected from participants, including details such as the academic providers state, the participants' current roles (e.g., professor, associate professor, lecturer, research fellow, PhD student, other), education level (Doctoral Degree, Professional Fellow, Master's Degree, Honours Degree, Postgraduate, Bachelor, or other), years of experience in the paramedicine field, and years in the education sector (1-3 years, 4-5 years, 6-9 years, 10+ years) (see Table 5.1).

Although knowledge could be inferred from professional qualification, years of experience, and registration, this does not ensure expertise. However, presenting this demographic information provides transparency for readers and substantiates the

participants criteria in the context of the study (Trevelyan & Robinson, 2015). This ensures the study's findings are contextualised and represent an informed consensus relevant to the research aims.

4.3 Data Collection

While there isn't a defining number to achieve consensus, there is a range that can be considered. In Keeney et al. (2011), the Delphi technique for data collection did not have strict rules regarding sample size, and 8 participants were considered an acceptable minimum size. Ogbeifun et al. (2016, p. 2) also state *the range can be "as small as three members and as large as 80*". According to Vogel et al. (2019), a minimum of 12 is sufficient and in fact too many more can provide diminishing returns. Indeed, "*Many health-related Delphi studies have a relatively small sample size, and recruit participants with particular knowledge of a condition*", rather than diluting experience and expertise for the sake of greater numbers, which emulates the design of this research (Trevelyan & Robinson, 2015, p. 425). Ultimately, the common theme in the literature demonstrates that obtaining the expertise is fundamentally more important.

The Delphi technique is valuable in situations where gathering information and obtaining feedback from experts is challenging, often due to factors such as time, geographical constraints, and maintaining anonymity (Geist, 2010). This method is "*useful when objective data is unattainable, there is a lack of empirical evidence, experimental research is unrealistic or unethical, or when the heterogeneity of the participants must be preserved to assure validity of the results*" (Hallowell & Gambatese, 2010, p. 99) *or "the issue under investigation does not lend itself to precise analytical techniques, but can benefit greatly from subjective judgments on a collective basis*" (Grisham, 2009, p. 114).

The core principle of the Delphi technique for consensus building is based on the notion that multiple individuals are less likely to arrive at incorrect conclusions, when compared to the that of a single person (Hasson et al., 2000). Additionally, the Delphi technique is reliant on informed consensus for decision-making, as opposed to basing decisions on the opinions of numerous uninformed participants (Grisham, 2009). Therefore, the data

collection in this research followed a structured and iterative process, across 4 Delphi rounds. These rounds consisted of three quantitative rounds focused on numerical data analysis and one qualitative round conducted as two moderation meetings to achieve consensus and refine the final performance indicators.

4.3.1 Prior to round 1

It is important to note that, as part of the initial phase of this research, the survey items were developed by the researcher through mapping performance indicators from allied health assessment tools, including the APP (Dalton et al., 2011, 2012), ANSAT (Ossenberg et al., 2020), and AMSAT (Sweet et al., 2018), to the Paramedicine PCFRP. This process identified alignment with non-technical skills (also known as soft skills) commonly used in allied health disciplines, which were subsequently adopted due to similarity. Additionally, the development of new performance indicators was necessary to address the specific requirements of the PCFRP. The paramedicine performance indicators were systematically organised according to the 5 domains and 23 capabilities to provide objective direction regarding the required performance of undergraduate students during WIL (Paramedicine Board of Australia, 2021).

Within the PCFRP, each of the 23 capabilities is accompanied by descriptors that outline a range of professional practice requirements (Paramedicine Board of Australia, 2021). To ensure comprehensive representation, a diverse set of performance indicators were included by the researcher to enable the participants to review and consider for selection. This process generated a total of 475 performance indicators (PIs) across the 23 capabilities. The number of PIs included for each capability varied, as some capabilities required a greater or lesser number of performance indicators based on the complexity and specificity of the associated descriptors in the PCFRP framework (Paramedicine Board of Australia, 2021).

4.3.2 Round 1

In the first round of the Delphi, the comprehensive list of 475 PIs spanning 23 capabilities of the PCFRP was presented to the participants (See Appendix - Round 1 performance indicators. *Note the participants selections post conducting this round are bolded within the text)*. Each of the 23 capabilities had a range of 13-32 performance indicators.

Within the Qualtrics survey created, participant information and objectives were outlined. Participants were advised the performance indicator tool was designed using the 5 domains and 23 capabilities from the PCFRP. Participants were advised that the "*intention of the tool will provide a non-exhaustive list of observable and contextual examples, enabling WIL supervisors to identify the required professional behaviours to support the scoring of students on the APPCAT. It will also give students a clear understanding of the performance expectations during WIL, professional practice, and that of a registered paramedic*". Participants were instructed to complete one domain at a time. An image of the PCFRP domains, capabilities and descriptors was provided above each question in the survey for their reference. Participants were asked to select their top 10 performance indicators from each capability, refining the list for round 2. The system saved their selections in case they needed to return to the previous sections.

Statistical measures were applied to analyse the data:

Frequency Analysis: Initially, frequency analysis was employed to determine the number of times each PI was included in participants' top 10 selections, without accounting for specific ranking positions (see Figure 4.1). The top 50% of PIs based on frequency were advanced to round 2. This approach emphasised the perceived importance of performance indicators rather than their specific ranking at this stage. PIs not ranked within the top 50% were considered less significant and, therefore, were excluded from the subsequent round.

The survey process commenced in October 2023, with 10 out of 12 participants completing it in its entirety. Participants were given 3–6 weeks to respond, followed by an additional 4–8 weeks of analysis. Upon the completion of Round 1, the initial list of performance indicators (PIs) was reduced to a total of 290, based on participant feedback and the statistical analysis listed above.

Round 1 data analysis (Capability 1.1)

Participant	1.1 Arrives punctually	1.1 Wears uniform appropriately / according to dress code	1.1 Wears an identification badge and identifies self	1.1 Organises self to provide effective care	1.1 Calls appropriate personnel to report intended absenc	1.1 Arrives fit to practic	1.1 Maintain personal health and well-being to ensure fitness to practice and provide safe patient care	1.1 Notifies of circumstances that may affect adequate / safe practic	1.1 Notifies an impairment, conduct, or performance of a registered health practitioner that may place the public at risk	1.1 Complies with mandatory reporting obligations for suspected abuse, neglect, or harm to vulnerable individuals	1.1 Maintains patient privacy and confidentiality (sharing information only with those involved in care	1.1 Obtains informed consent, prior to medical assessment or treatment	1.1 Provides the patient with information about risks, benefits, and alternatives in health care treatment	1.1 Respects the patients rights and autonomy, involving them in decision-making about their care	1.1 Understands and respects patient rights	1.1 Maintains appropriate professional boundaries with patients and health professionals	1.1 Practises sensitively according to cultural diversity needs / cultural contex	1.1 Provides culturally safe healthcare to patients from diverse backgrounds	1.1 Seeks assistance when task is outside capability or scope of practic	1.1 Understands the healthcare system's structure, healthcare professionals roles, including their own role within the system	1.1 Collaborates and refers to other health professionals as require	1.1 Applies ethical reasoning in health care	1.1 Applies the basic principles of bioethics, such as autonomy, beneficence, non-maleficence, and justice, to practic	1.1 Follows legal framework, policies and procedures of the health service (e.g. Practice Guidelines, WHS, and Infection Contro	1.1 Understands legal, ethical, and professional responsibilities including scope of practic	1.1 Complies with the applicable legislation governing the safe use of scheduled medicines, ensuring proper administration, storage, and docum	1.1 Safely uses scheduled medicines	1.1 Applies/ Adheres to the Ahpra Shared Code of Condu	1.1 Demonstrates knowledge of professional responsibilities and applies the PBA's Code of conduct to practic
1.								4		7	1	3		5	2	10	8		9							6				
2.				8							2	4		3		6		5	9				7	10	1				
3.				1									4					5	2	3		9		6		7			8
4.				9				8		7	2	3						4			10		6	5				1	
5.				2		1		8		9						7		6		10			5		4				3
6.									9		2	1		3				4		6	7			8		5			10
7.									9		5	3		4		6						10	2		1			7	8
8.						1				8	2	6						9		10			7	4	5			3	
9.		3			7		1				4	6					8			9			10	2	5				
10											2	3	5		4	6						7		8	1	9		10		
11									2		4	3	5	6				10					7	8		9			1
12	2	1	3	4							5	6			7		8				9	10							
FREQUENCY: Total times an item was selected (**Top 50%**)	1	2	1	5	1	2	1	3	3	4	10	10	3	5	3	5	3	7	3	5	3	4	7	8	7	4	0	4	5

Figure 4.1: Round 1 data (capability 1.1)

This figure illustrates the frequency of selection for each performance indicator within Capability 1.1, based on participant responses in Round 1. Each column represents a specific indicator, with green-highlighted cells denoting the top 50% most frequently selected. These high-frequency indicators were subsequently advanced to Round 2 for further refinement.

4.3.3 Round 2: Refinement of PIs

In the second round, the participants were presented with the 290 shortlisted PIs, with each of the 23 capabilities having a range of 7 to 20 performance indicators.

All PIs that met the inclusion criteria (top 50% most frequent responses) in round one was carried forward to round two. In instances where fewer than 10 PIs remained, all shortlisted indicators (e.g., 7, PIs) were included for further evaluation. This was applicable to capability 1.3, 3.1, 4.1, 4.3 and 4.6 due to the performance descriptor length within the PCFRP. In Round 2, participants ranked the carried-forward performance indicators (PIs) within each capability by perceived importance, with 1 being the most essential. This round aimed to prioritise and refine the results further, ensuring a comprehensive and inclusive approach aligned with the study's objectives.

Statistical measures applied to analyse the data:

Median: Each PI was assigned a score based on its ranking position. The cumulative ranking score for each item was calculated, with the lowest scores representing higher priority. The top 10 PIs were identified using the median score, as it provides a robust measure of central tendency that is less influenced by outliers and extreme values.

Mean: In capabilities where multiple PIs had identical median values, the mean score was employed to distinguish and rank the top 10 PIs for progression. A lower mean score indicated a higher priority. This occurred in capability 1.4, 3.2,3.4, 5.5 and 5.6.

Interquartile Range (IQR): The IQR was applied as a descriptive measure of consensus rather than a strict exclusion criterion. In line with established reviews, dispersion statistics such as the IQR were used to indicate the extent of agreement, rather than enforcing rigid cut-offs, particularly when assessing complex constructs like the performance indicators (Boulkedid et al., 2011; Hsu & Sandford, 2007). Items with wider IQR values were retained, as variation in responses could reasonably reflect differences in participants' professional backgrounds or practice contexts (Jorm, 2015). This approach reflects a deliberate use of

methodological flexibility, recognising that Delphi studies do not prescribe a universal IQR threshold. Instead, best practice emphasises adapting inclusion criteria to the study's objectives and providing transparent justification for methodological decisions (Hasson et al., 2000; Boulkedid et al., 2011).

Round 2 data analysis (Capability 4.4)

Participant	4.4 Use appropriate medical terminology, abbreviations, and acronyms when documenting patient information	4.4 Gathers/documents patient information (history, past history, medications and allergies)	4.4 Maintains accurate records of the patient's medical history, including previous illnesses, surgeries, medications, and allergies, ensuring the information is comprehensive and up-to-date	4.4 Captures essential information related to the patient's condition, assessments, interventions, and outcomes	4.4 Records vital signs in a clear and organized manner	4.4 Information recorded is logically structured, legible, and concise	4.4 Communicates pertinent information to other healthcare professionals involved in patient care	4.4 Documents legal or ethical considerations, such as informed consent, patient refusals, and advance directives, ensuring compliance with regulations	4.4 Demonstrates an understanding of the legal and ethical obligations related to patient confidentiality and privacy	4.4 Utilise electronic health record systems to document patient information accurately and securely	4.4 Demonstrates an understanding of the legal and ethical aspects of data ownership, storage, retention, and destruction, in accordance with relevant legislation.	4.4 Maintains patient records appropriately, ensuring accurate, confidential, and compliant documentation of patient care
1	1	4	7	3	5	6	2	10	8	9	12	11
2	3	8	11	9	10	2	4	5	12	7	6	1
3	2	3	4	5	6	7	8	9	10	11	12	1
4	2	12	10	3	4	5	7	6	8	9	11	1
5	6	1	2	3	4	5	7	9	10	12	11	8
6	12	1	2	5	3	6	10	7	8	9	11	4
7	3	9	1	4	7	8	5	2	10	6	11	12
8	4	2	1	10	11	12	5	6	7	8	3	9
9	6	5	7	3	9	4	8	10	11	12	2	1
10	7	1	9	5	4	6	2	3	11	10	12	8
11	4	1	9	3	2	5	7	10	6	11	12	8
Median (50% quartile)	4	3	7	4	5	6	7	7	10	9	11	8
Mean (average)	4.5	4.3	5.7	4.8	5.9	6.0	5.9	7.0	9.2	9.5	9.4	5.8
IQR	3.5	5.5	7	2	4	1.5	3	4	2.5	2.5	3.5	7.5

Figure 4.2: Round 2 data (capability 4.4)
This figure presents the ranking data for each performance indicator within Capability 4.4 based on participant responses in Round 2. Each column represents a specific performance indicator, with green-highlighted cells indicating the top 10 indicators selected according to the median (50th percentile). As no indicators shared equal median values, it was not necessary to apply a mean-based criterion for inclusion in the top ten. Scores are shown to illustrate the central tendency by participants. The scores, which illustrate the central tendency by participants, are accompanied by the interquartile range (IQR) as a descriptive measure of agreement. The top ten performance indicators, selected based on median and mean scores where appropriate, were advanced to Round 3 for further refinement and inclusion.

The survey commenced in December 2023, with 11 participants completing it in its entirety. Participants were given 3–6 weeks to respond, followed by an additional 4–8 weeks of analysis. Upon completion of Round 2, the list of performance indicators (PIs) was reduced and refined to a total of 221 across the 23 capabilities, based on participant feedback and statistical analysis.

4.3.4 Round 3: Agreement through Likert Scale and Qualitative feedback

In the third round, participants evaluated the remaining 221 PI's. Each capability had a range of 7-11 performance indicators.

Performance indicators were listed alongside a five-point Likert scale, where participants were asked to indicate their level of agreement regarding the adoption of each performance indicator. Responses ranged from *Strongly Agree* to *Strongly Disagree*, with an agreement threshold of ≥80% set for adoption. A level of agreement of ≥80% (either *Strongly Agree* or *Agree*) was required for adoption of the performance item, while anything ≥70-79% was tabled for discussion at the moderation meeting in Round 4. Any indicator with <70% agreement was rejected.

Free-text boxes were also included to allow participants to suggest adjustments for *comprehension, national applicability, and additional* PIs, with the option to write "N/A" if not applicable. Although the qualitative feedback provided by participants was not formally analysed, open-ended questions and free-text responses allowed participants to make adjustments, share deeper insights and elaborate on their selections. This round combined quantitative analysis (via the Likert scale) with qualitative input, enabling a comprehensive refinement process.

This round also examined the dispersion of responses. While the shift from importance (round 2) to agreement (round 3) selections provided a clearer measure of consensus, examining the median interquartile range (IQR) ensured that the analysis captured not only the strength of support for each capability but also the consistency of that support across participants. Acceptable thresholds vary by study aims and should be justified transparently (Boulkedid et al., 2011; Diamond et al., 2014; von der Gracht, 2012). In this study, an IQR ≤ 1.0 was used as a benchmark for high consensus in this round rather than as a strict inclusion cut-off. This combined focus on central tendency and dispersion reflects established Delphi best practice, enabling a more nuanced understanding of agreement and guiding the inclusion of indicators in the final framework (von der Gracht, 2012).

The survey commenced in March 2024, with 12 participants completing it in its entirety. Participants were given 3–6 weeks to respond, followed by an additional 4–8 weeks of analysis conducted. Participant feedback resulted in 219 of the 221 performance indicators (PIs) reaching consensus.

Following the results from Round 3 and incorporating the feedback from the participants regarding *additional PIs*, the researcher conducted a comprehensive mapping process. This process identified 67 similarities in total within a capability and 34 repetitions in total across capabilities. These findings, along with other recommendations from the participants qualitative feedback were summarised and re-presented to the participants for review and consideration prior to the commencement of Round 4.

During the analysis of capability 3.4, a highlighting error led to the unintentional omission of one performance indicator. After review, the item was reinstated to preserve methodological integrity and ensure a complete analysis, resulting in a total of 11 PIs for capability 3.4. This adjustment was essential to accurately reflect participant responses and maintain consistency across capabilities. Aside from this correction, all 23 capabilities were successfully reduced to 10 or fewer PIs based on the selection and ranking from earlier rounds.

4.3.5 Round 4: Moderation and Final Consensus

The final round, round 4, involved independent moderation sessions conducted over two three-hour online video conferences within a two-week period. These sessions provided the participants with an opportunity for in-depth discussion to finalise the remaining performance indicators. During this round, the participants reviewed the researchers' proposed adjustments to the performance indicators and made further modifications as needed. To achieve final consensus on the adjustments for each of the 23 capabilities, the group employed a five-point Likert scale with anonymous polling, maintaining the predetermined ≥80% agreement threshold The insights gained from these discussions were instrumental in refining the performance indicators and ensuring their alignment with the research objectives (Vogel et al., 2019).

The meetings commenced in July 2024, with 9–10 participants attending. This was followed by an additional 4-8 weeks of analysis conducted by the researcher.

After 4 rounds, the study successfully established 182 performance indicators across 23 capabilities, with a range of 5–11 performance indicators per capability and an average of 8 performance indicators per capability. This iterative and collaborative process ensured a comprehensive, set of performance indicators tailored to paramedicine WIL in alignment with the PCFRP. A summary of the overall methodology and Delphi process is shown in Figure 4.3.

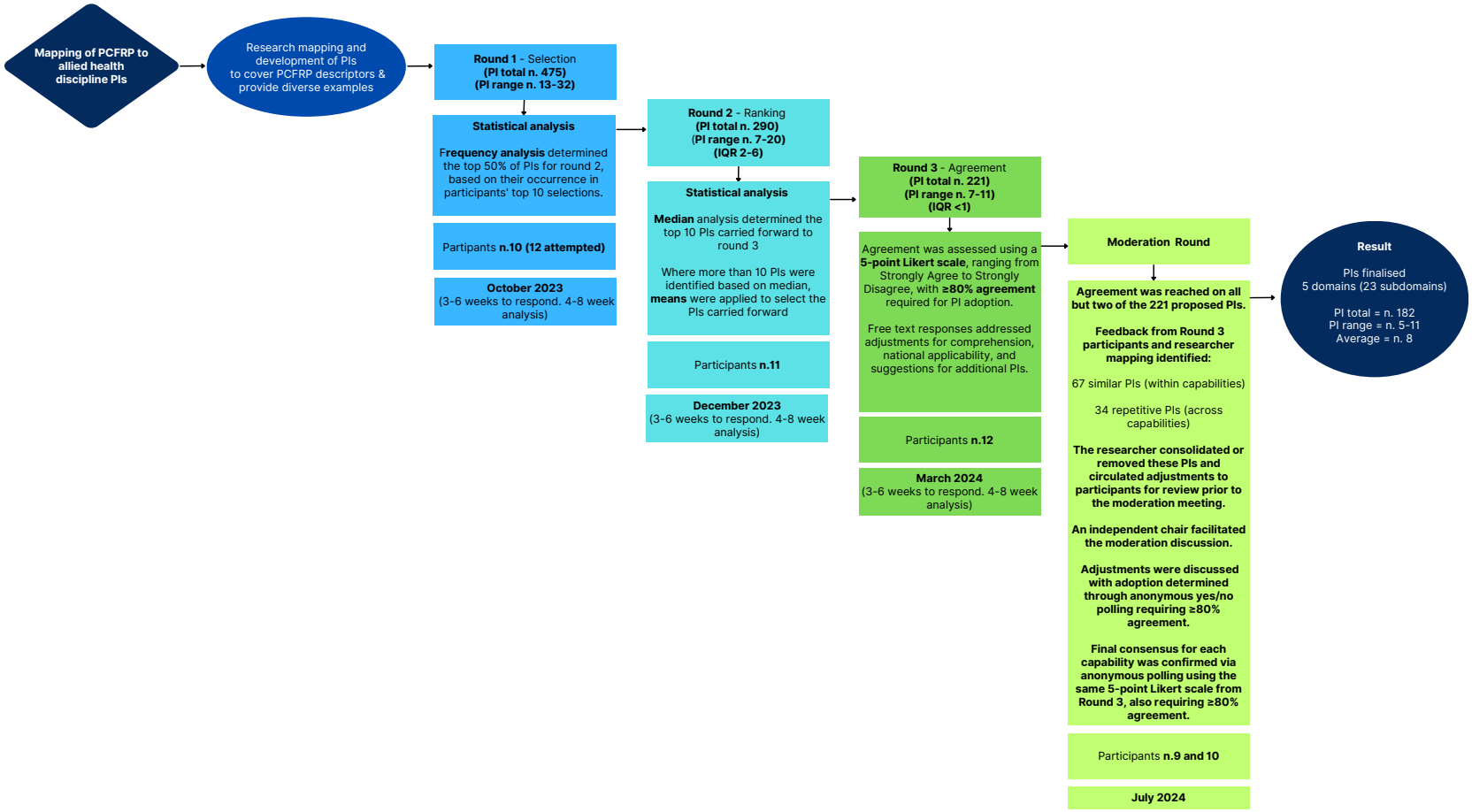

Figure 4.3: Performance Indicator study overview

The flowchart outlines the sequential phases of the performance indicator research project, from initial mapping and selection through to statistical analysis, moderation, and final consensus. The process refined 475 PIs to a final set of 182 across the 23 capabilities, incorporating participant feedback and maintaining ≥80% agreement for adoption

4.4 Summary of Methodological Approach

4.4.1 Rationale for Selecting a Modified Delphi Approach

The primary objective of this study was to achieve national consensus on observable and contextual performance indicators (PIs) to operationalise the Professional Capabilities for Registered Paramedics (PCFRP) within work-integrated learning (WIL) assessment. A modified Delphi approach was selected as it enables anonymous, iterative input from geographically dispersed experts, with controlled feedback to reduce both groupthink and dominance by influential individuals (Grisham, 2009; Hasson et al., 2000; Trevelyan & Robinson, 2015). This feature was considered essential for developing a tool designed to be nationally applicable and relevant across multiple jurisdictions. Pre-specified quantitative decision rules were employed (frequency, median, mean scores on a five-point Likert scale; ≥80% agreement for adoption; ≥70% agreement plus commentary for moderation), thereby ensuring transparent and defensible progression of items and minimising arbitrary decision-making (Keeney et al., 2011). While other allied health disciplines have used focus groups or workshop-driven processes to develop their performance indicators, the use of a modified Delphi in this study provided a structured and rigorous pathway to consensus. This reflected a methodological choice that offered additional robustness appropriate to the challenges of developing a national paramedicine tool (Ogbeifun et al., 2016; O'Connor et al., 2009). Importantly, the Delphi technique remains one of the most recognised consensus approaches in health research, further supporting its selection in this study (Niederberger et al., 2021)

4.4.2 Justification for a Pragmatic Mixed-Methods, Explanatory-Sequential Design

The study was underpinned by a pragmatic research stance, prioritising approaches that best addressed the practical problem of translating a regulatory capability framework into a concise and usable assessment tool in WIL (Cherryholmes, 1992; Morgan, 2007). A mixed methods, sequential design was adopted, where quantitative consensus thresholds were first applied, followed by qualitative refinement and clarification. This design enabled numerical results to be considered alongside qualitative feedback in the later round, ensuring that items

meeting statistical criteria were evaluated for clarity, national relevance, and contextual appropriateness before finalisation (Creswell, 2014). In this way, the design drew on methodological strengths identified in earlier studies, incorporating focus groups and workshops during the final Delphi round, conducted as moderation meetings, to support refinement and strengthen consensus.

4.4.3 Panel Composition and Sampling Rationale

Participants were purposively recruited, comprising AHPRA-registered paramedicine academics, many of whom maintained active clinical roles. The panel represented all Australian states and one New Zealand provider, thereby ensuring the inclusion of perspectives from both academic and operational contexts. This composition was considered appropriate for a tool that needed to demonstrate both educational and clinical credibility across diverse professional settings. Ethical approval and the use of anonymised online surveys facilitated candid expert participation and safeguarded participant welfare (see Table 5.1).

4.4.4 Design Decisions Aligned to the Intended Use-Case

Several deliberate design choices were made to ensure the final tool was practical and feasible within the time-pressured context of WIL supervision. The tool was restricted to 2–3 pages in length, with an average of eight performance indicators per capability, thereby striking a balance between comprehensiveness and usability. This approach avoided the pitfalls of overly lengthy assessment tools, which risk poor uptake, while also providing more structured guidance than minimalistic checklists (Ossenberg et al., 2015, 2016; Smith et al., 2020; Sweet et al., 2018). Iterative moderation was used to consolidate residual matters; two independent online moderation sessions reaffirmed the ≥80% consensus threshold. This decision improved clarity and ensured alignment while preserving a degree of anonymity and the structured convergence offered by the Delphi process (Vogel et al., 2019).

4.4.5 Rationale for Excluding Alternative Methodological Approaches

Several methodological alternatives were considered but ultimately rejected. Focus groups or workshops alone were deemed vulnerable to hierarchy effects and regional dominance, whereas the Delphi method provided anonymity and iterative convergence (Hasson et al., 2000; Niederberger et al., 2021). A single-site pilot with psychometric testing was considered premature, as consensus on content validity needed to be established nationally before items could be refined and statistically validated (Dalton et al., 2011, 2012). Similarly, a one-off nationwide survey was rejected because it lacked the iterative feedback and controlled reconsideration required for robust consensus building across 23 professional capabilities (Sweet et al., 2018).

4.4.6 Adequacy and Outcome of the Chosen Approach

The chosen methodology produced a concise, user-friendly, and nationally relevant set of performance indicators. A total of 182 indicators were retained across 23 professional capabilities (≈8 per capability), reflecting the efficiency of the Delphi process in refining a large item pool into a practical and balanced set. By combining structured decision rules, broad expert representation, and attention to usability, the modified Delphi and mixed-methods design balanced rigour with practicality, generating consensus-driven performance indicators. Thus, establishing a robust foundation for standardised paramedicine WIL assessment (Creswell, 2014).

Chapter 5: Results and Discussion

Given the iterative design of the Delphi process, where each round directly informed subsequent rounds, the results and discussion are combined in this section to deliver a cohesive narrative of the study's findings and implication. Also, some of the final outcomes of each round have been described in the previous chapter, to aid in understanding the methodological flow on to the next phase.

5.1 Participant Demographic Results

The survey conducted among the participants had representation from all Australian States and one New Zealand province. It demonstrated that all participants are registered with the Australian Health Practitioner Regulation Agency (AHPRA) or in New Zealand with the Health Practitioners Competence Assurance Act (HPCA) with 50% still actively working in clinical or operational roles. Their paramedicine experience ranged from 6 to over 21 years, with a mean experience level of 17 years. The roles of the participants varied from Lecturer to Dean, covering academic levels from Level A (lecturer) to Level E (professor). Their qualifications also varied widely, including certifications and degrees ranging from Certificate III to Doctoral Degrees. The qualifications held by the participants spanned a broad range of fields, including Paramedicine, Emergency Healthcare, Education, Health Science, Health Policy, Nursing, Psychology, Mental Health, Health and Disaster Management, Clinical Epidemiology, Business Administration, Computer Science, and Graphic/Architectural Design. This diverse, experienced and qualified sample population provided a robust foundation for the study's consensus-building process (see Table 5.1).

Table 5.1: Participant Demographics

This table summarises the demographic and professional characteristics of participants, including registration status, active roles, years of experience, academic roles, academic levels, qualifications, and fields of study.

Category	Details
Location	Australia: all states New Zealand: 1 province
Registration	Yes = 15 (100%)
Active Roles	Jurisdictional ambulance role = 8 Not applicable = 7 Allied health role = 1
Experience	21+ years = 7 18–21 years = 2 15–18 years = 2 11–15 years = 1 9–11 years = 1 6–9 years = 2 3–6 years = 0
Academic Roles*	Lecturer = 6 Senior Lecturer = 5 Discipline Lead = 5 Clinical Lead = 4 Associate Professor = 2 Professor = 1 Dean = 1
Academic Experience	3–6 years = 3 9–11 years = 3 15–18 years = 2 21+ years = 2 1–3 years = 2 11–15 years = 1 18–21 years = 1 6–9 years = 1
Highest Level of Qualifications*	Doctoral Degree (PhD) = 6 Master's Degree = 5 Graduate Certificate = 2 Bachelor's Degree = 1 Advanced Diploma = 1
Fields of Study*	Paramedicine = 15 Nursing = 2 Education = 6 Psychology = 1 Mental Health = 1 Health Science = 4 Health policy = 1 Health management / disaster management = 1 Leadership, Business & Management = 3 Epidemiology = 1 Architectural / Graphic design = 2 Computer Science = 1

* Some participants reported multiple items in this category.

5.2 Round 1 Discussion and Results

In Round 1, frequency analysis was employed as the primary statistical measure to identify the most frequently selected performance indicators. Unlike measures of central tendency such as the mean or median, frequency analysis focuses on the total number of selections for each item. This provided a simple yet effective way to capture participant consensus, as it quantified how often each performance indicator was chosen, highlighting those that emerged as top priorities (Hasson et al., 2000). This approach was particularly valuable given the large number of performance indicators.

By advancing only the top 50% of items based on frequency, the method offered a pragmatic way to refine a broad set of options during the initial stage of the Delphi process. This strategy aligns with the aim of early Delphi rounds: to establish consensus on the most relevant items before applying more complex statistical techniques (Armstrong, 2001). This consensus-driven approach effectively streamlined the indicators while minimising statistical complexity, aligning with best practices in Delphi methodology. Indicators falling outside the top 10 were excluded, reinforcing the emphasis on relevance and reducing potential distortions prior to applying more advanced statistical analyses. As a result, the performance indicator range for each capability was narrowed from 13–33 (total n = 475) to 7–20 (total n = 290) for Round 2, maintaining focus on the most frequently selected items for subsequent analysis.

The use of frequency counts in Round 1 is consistent with methodological guidelines such as the RAND Corporation's Delphi manual which supports the use of frequency counts or percentage endorsements in the early rounds to effectively identify items with strong consensus (Khodyakov et al., 2023), thereby reducing the item pool before more sophisticated statistical analyses are conducted. Similarly, the Handbook of Research Methods in Health Social Sciences underscores the importance of systematically aggregating expert input in preliminary rounds to inform subsequent analyses (Chalmers & Armour, 2019).

5.3 Round 2 Discussion and Results

The Delphi survey employed a systematic and robust approach to transforming numerous responses into actionable insights through statistical analysis. Key statistical measures used in Delphi studies include measures of central tendency, such as the mean and median, which provide a clear representation of collective judgments (Hasson et al., 2000).

In Round 2, participants ranked the remaining performance indicators (PIs) within each capability in order of importance, with 1 indicating the highest priority. Statistical analysis was then applied to further refine the PIs, focusing on identifying the most relevant indicators for progression to the next round. The total score for each PI was calculated by summing its rank values, with lower scores indicating higher importance as perceived by the participants. These totals were ordered, and median values were calculated to identify the top ten lowest-scoring PIs for advancement to Round 3. The use of the median in Delphi studies is considered best practice because it reduces the influence of outliers and extreme ratings and provides a more stable and representative measure of group consensus (Hasson et al., 2000; Keeney et al., 2011).

In cases where multiple PIs shared the by the same median value and the total number of PIs exceeded the limit of ten, the mean was employed as a secondary criterion to determine prioritisation. This application of the mean was necessary in capabilities 1.4, 3.2, 3.4, and 5.5, 5.6, where multiple PIs shared the same median value and the total exceeded ten. The mean was considered to provide an additional analytical layer, capturing the average response across participants. While the mean is susceptible to the influence of extreme values, it served as a complementary measure to the median, offering broader insights into response patterns. Integrating both the mean and median reinforced the robustness of the analysis, ensuring that both central and peripheral response tendencies were considered in the selection process (Hsu & Sandford, 2007).

Furthermore, the application of measures of central tendency, particularly the median and mean, is a well-supported approach in Delphi studies, particularly in health and education research. This strategy identifies consensus by quantifying central response tendencies,

effectively refining the item pool based on participant ratings. For instance, Ab Latif et al. (2017) applied a three-round Delphi technique to achieve consensus on concept mapping care plans and multiple-choice questions in diabetes education. The study utilised median and mean scores to refine consensus in subsequent rounds, underscoring the value of these measures in capturing collective response patterns and identifying priority items for further analysis (Ab Latif et al., 2017).

While the use of median and mean values provided a clear basis for determining which items progressed, it was also important to examine the interquartile range (IQR) across each capability, which offered additional insight into the consistency of participants' selections. Median IQR values across capabilities varied, ranging from relatively tight agreement (IQR ≈ 1.75 in capability 4.3) to highly dispersed responses (IQR ≈ 6.0 in capability 5.3). These high IQR values indicated variability in the relative ranking of certain performance indicators, particularly in capabilities such as 5.3, 1.1, 4.7, 1.4, 3.4, and 1.2.

Although the median IQR indicated variability across these capabilities (see Table 5.2), high values in early rounds do not necessarily indicate irrelevance; rather, they often reflect diversity of interpretation, differences in operational context, or the multidimensional complexity of certain indicators (Hasson et al., 2000; Keeney et al., 2011; Boulkedid et al., 2011; von der Gracht, 2012). The Delphi methodology does not mandate rigid exclusion based solely on dispersion metrics in early stages. Therefore, the IQR was used to provide an understanding of consensus, not prescriptively as a cut-off for elimination. For this reason, no items were removed on this basis and this ensured that high-importance items were retained for further refinement. This was anticipated given the nature of the survey, given the performance indicators national scope, where service delivery models, jurisdictional priorities, and local clinical pathways vary and may influence participant ratings.

Table 5.2: Median IQR by capability (round 2)
This table presents the median IQR values for each capability in Round 2. The IQR was first calculated for individual performance indicators, and then the median IQR was calculated across all indicators within that capability. Higher IQR values reflect greater variability in panellist rankings, whereas lower IQR values indicate stronger consensus. The IQR was applied as a descriptive measure rather than as an exclusion criterion.

Capabilities	Round 2 Median IQR
1.1	5.25
1.2	4.50
1.3	2.50
1.4	4.75
2.1	3.25
2.2	4.25
3.1	3.00
3.2	3.00
3.3	2.75
3.4	4.50
4.1	3.00
4.2	4.25
4.3	1.75
4.4	3.75
4.5	3.25
4.6	2.00
4.7	5.50
5.1	3.75
5.2	3.75
5.3	6.00
5.4	3.50
5.5	4.25
5.6	4.25

In addition, to enhance rigour, a randomisation technique was employed using the 'matrix table' functionality in Qualtrics to mitigate response biases, such as order effects (Tourangeau et al., 2000). Randomising the order of PIs is a well-established method in survey research to prevent systematic bias. This enhanced the objectivity and reliability of the consensus process by ensuring that evaluations were not influenced by item positioning within the survey.

Finally, it should be acknowledged that, capabilities contained fewer than ten PIs after Round 1, specifically in five of the 23 capabilities: 1.3, 3.1, 4.1, 4.3, and 4.6. This was a direct outcome of the Round 1 process, where only the top 50% of the most frequently selected PIs were carried forward. The limited number of PIs in these capabilities aligns with their narrower capability descriptors outlined in the PCFRP, which inherently required fewer PIs for adequate representation. Additionally, this reduction was consistent with the objective of developing a concise and focused tool. As such, all remaining PIs (n=221) in these capabilities were advanced to Round 3, having still undergone ranking and analysis in Round 2 to capture participant prioritisation and levels of consensus.

5.4 Round 3 discussion and results

In Round 3, the objective was to determine whether the remaining performance indicators (PIs) achieved the pre-established ≥80% agreement threshold necessary for inclusion in the final tool. To assess this, each participant rated their level of agreement using a five-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree.' Additionally, participants were provided with free-text boxes to suggest adjustments related to wording, *comprehension, national applicability*, and any *additional PIs* they perceived as missing.

The results from Round 3 demonstrated a high level of consensus, with 219 out of 221 PIs meeting the ≥80% agreement threshold. This outcome confirmed the methodological rigor of the previous rounds, underscoring the effectiveness of combining statistical analysis with iterative feedback to refine the PIs and achieve broad consensus. However, two PIs associated with capabilities 1.2 and 5.1 did not reach the threshold, achieving only 70% agreement. These items were subsequently addressed in Round 4, allowing for targeted

discussion and further refinement before finalisation. Specifically, the two PIs that did not reach the threshold were;

- Capability 5.1, *“Ensure compliance with legal and regulatory guidelines when completing, storing, accessing and sharing PHCR”*, was not adopted, as it was considered unlikely that students could reasonably be expected to address all components of this statement.
- In contrast, Capability 1.2, “Asks patients how they identify with respect to culture, ethnicity, nationality, religion, gender identity, and sexual orientation”, was later adopted during the moderation meeting, as an all-encompassing statement, reflecting its importance for ensuring inclusivity and responsiveness.

This iterative process reinforced the robustness of the final performance indicator set, highlighting the importance of systematic feedback integration in Delphi studies.

To enhance the reliability and accuracy of participant responses, careful consideration was given to the design of the 5-point Likert scale. The placement of 'Disagree' on the left side was intentionally selected to provide a clear progression across the response scale (Chan, 1991). This also aligns with the natural left-to-right reading direction common in many cultures. This configuration presents respondents with the least agreeable to the most agreeable option, fostering a logical continuum from negative to positive sentiments, while considering primacy effects. Additionally, the positioning of response options may influence respondent choices (Friedman & Amoo, 1999). Incorporating these design considerations may enhance the clarity and reliability of participant responses in Likert-scale surveys.

Moreover, consideration was given to wording for the middle response within the scale. Using 'neither disagree nor agree' instead of 'neutral' can enhance clarity and avoids ambiguity, as 'neutral' may be interpreted differently by respondents. It encourages thoughtful responses by prompting individuals to reflect on their stance, leading to better discrimination between agreement and disagreement. This phrasing also maintains consistency with the Likert scale's structure, providing a clear midpoint option that may support more precise and reliable data collection (Chyung et al., 2017).

Following the results of Round 3 and the incorporation of the participant feedback on *additional performance indicators*, a comprehensive mapping process was conducted. This process identified 67 similar PIs within a single capability and 34 PIs repeated across multiple capabilities. These findings, along with other recommendations from the participants, such as enhancing *national applicability* and improving *comprehension*, were synthesised and summarised. Although a formal thematic analysis of the qualitative data was not conducted, key feedback provided by participants through the Qualtrics survey was deidentified, summarised, and presented to the participants for discussion prior to the moderation meetings. These insights were subsequently incorporated into Round 4, ensuring that participant input was adequately addressed and integrated into the final consensus process (see Figures 5.1a, 5.1b, and 5.2).

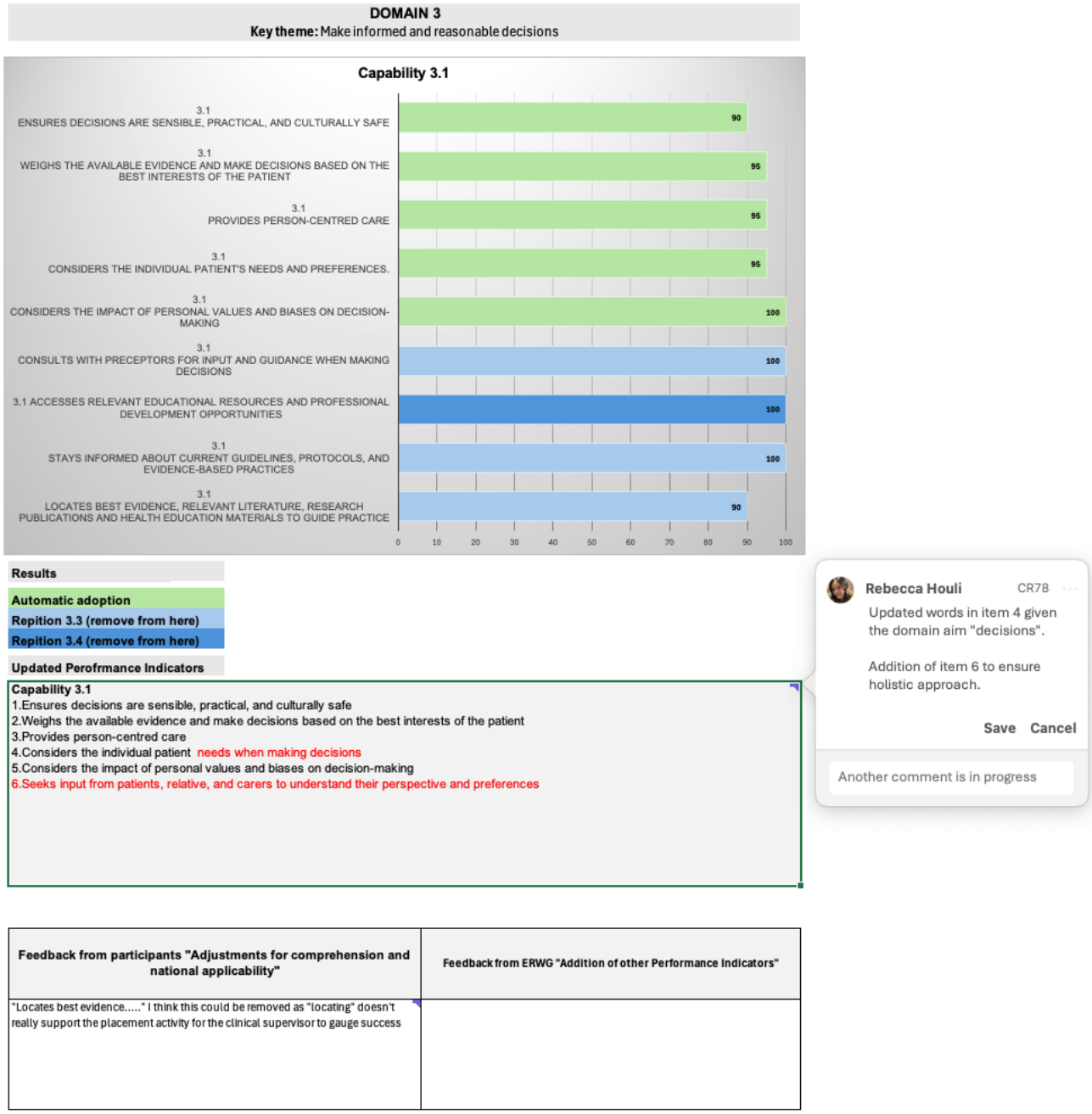

Figure 5.1a: Refinement of Performance Indicators (round 3, capability 3.1)
This figure shows the initial analysis and refinement of Performance Indicators (PIs) in capability 3.1 after Round 3 of the Delphi process. The bar graph presents the percentage of agreement for each PI. Green bars mark PIs with >80% agreement, adopted given consensus by participants. Items repeated across other capabilities (e.g., 3.3 and 3.4) were recommended for removal and are highlighted in blue. At the bottom, participant feedback addresses national applicability and suggests adding new PIs. Red text and comments show how the researcher reviewed and responded to participant feedback. These refinements informed Round 4 discussions.

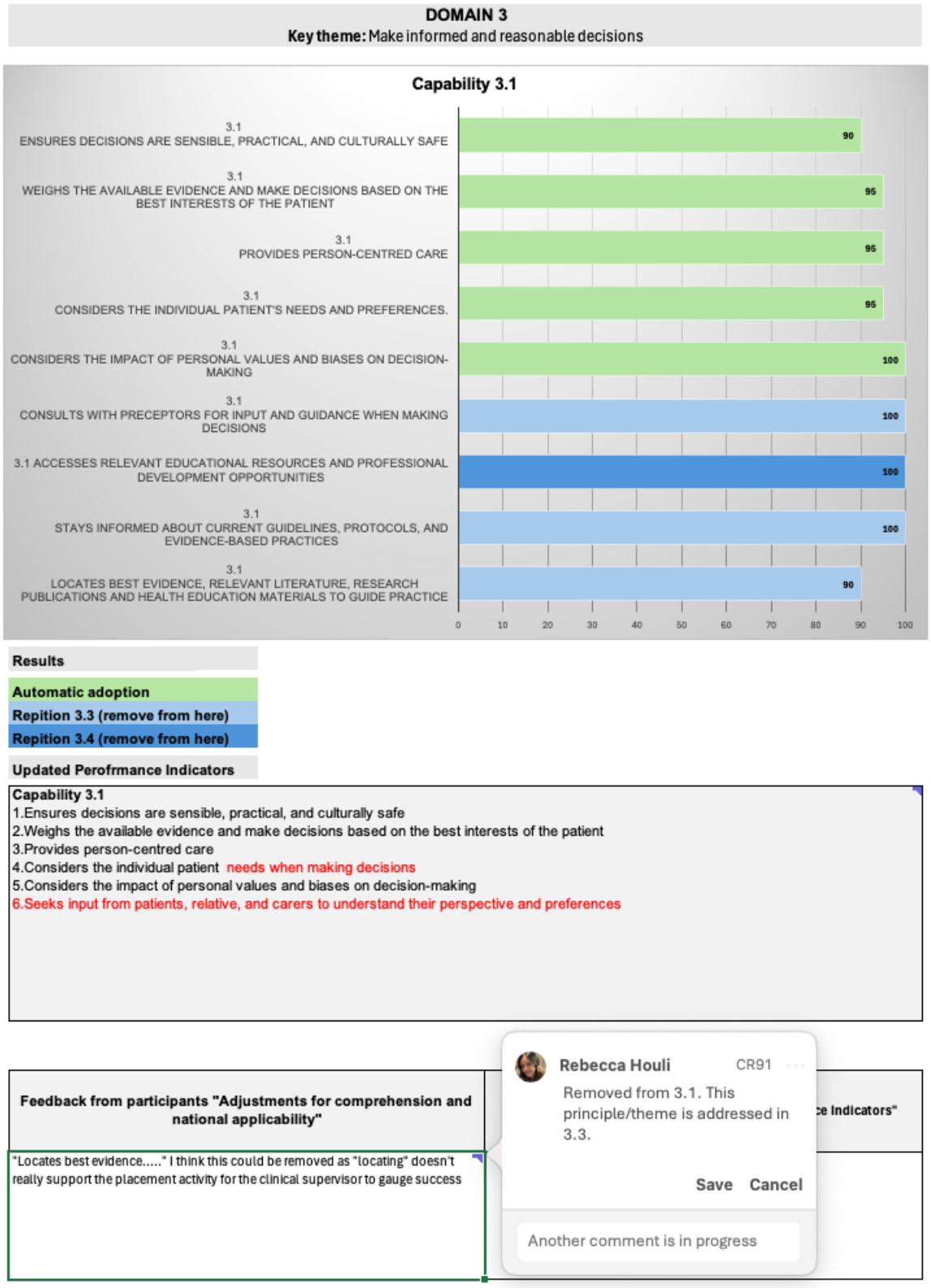

Figure 5.1b: Refinement of Performance Indicators (round 3, capability 3.1)
This figure illustrates the analysis and refinement of performance indicators in capability 3.1 following Round 3 of the Delphi process. Specifically, it demonstrates how the researcher reviewed and addressed the participant feedback, with accompanying comments in the textbox.

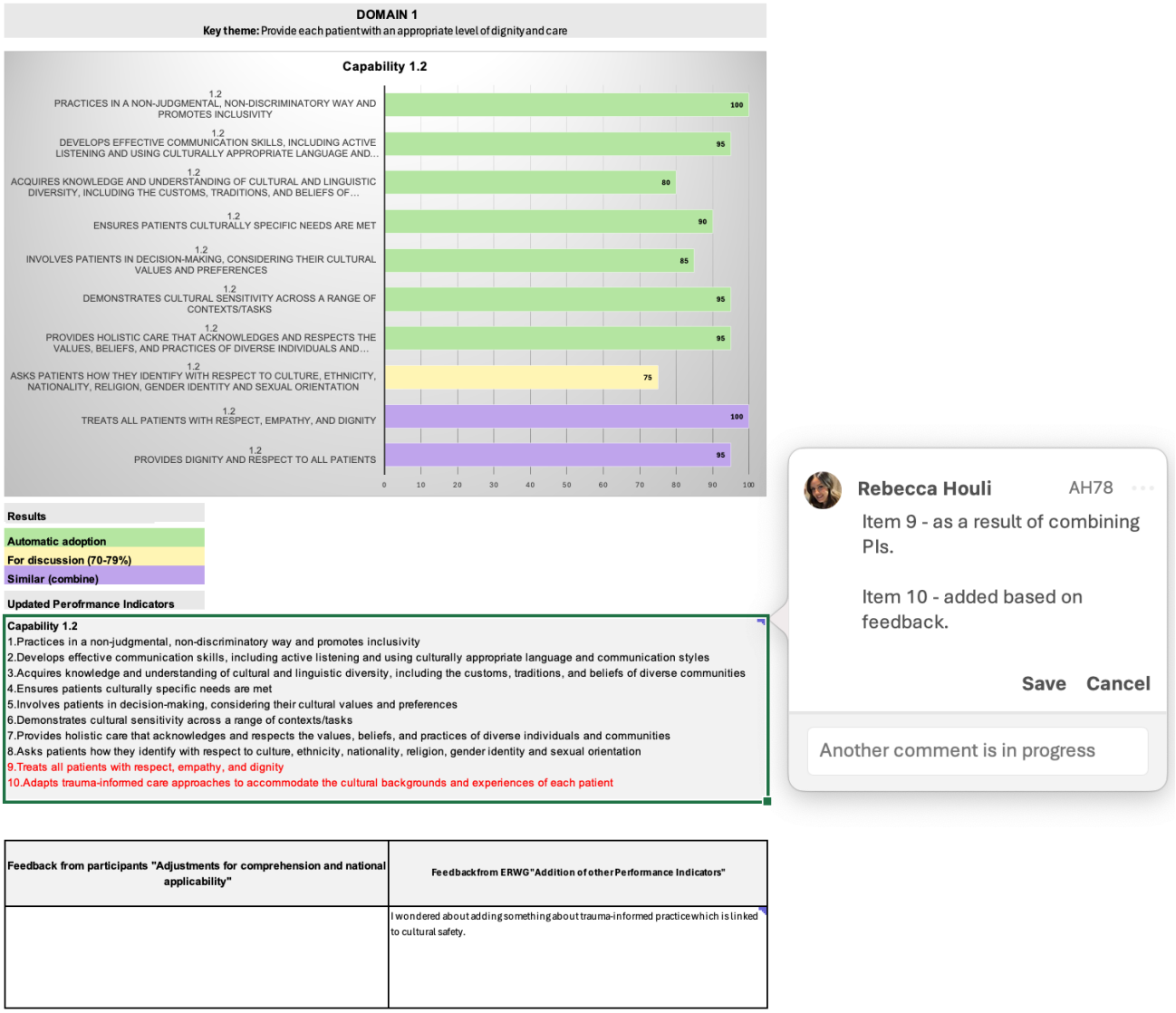

Figure 5.2: Refinement of Performance Indicators (round 3, capability 1.2)
This figure shows the initial analysis of performance indicators (PIs) in capability 1.2 after Round 3 of the Delphi process. The bar graph illustrates the percentage of agreement for each PI. Green bars mark PIs with ≥80% agreement, adopted due to strong consensus. Purple bars show PIs that were similar within the capability and combined. The yellow bar indicates a PI with lower agreement (70–79%), requiring further discussion in Round 4. At the bottom, feedback from the participants addresses national applicability and the addition of new PIs. Red text and comments demonstrate how the researcher reviewed and responded to participant feedback. These refinements informed Round 4 discussions.

Furthermore, the shift in Round 3 to an agreement-focused Likert scale reframed the panel's task from evaluating 'how important is this' to deciding 'should we adopt this'?. Further to the Likert scale, the median interquartile range (IQR) was evaluated. When comparing Round 2 to Round 3, median IQR values dropped across all capabilities (see Table 5.3). Many capabilities that exceeded 4.0 in Round 2 recorded IQRs ≤ 1.0 in Round 3. The largest

reductions were observed in capability 5.3 (6.00 → 0.13; −5.87), 1.1 (5.25 → 0.25; −5.00), 1.4 (4.75 → 0.25; −4.50), 4.7 (5.50 → 0.75; −4.75), 1.2 (4.50 → 0.25; −4.25) and 3.4 (4.50 → 0.25; −4.25). Several capabilities reached extremely low IQRs, most notably 4.1, 4.2, 5.2, 5.3, 5.4 (0.13), indicating near-unanimous agreement. These patterns reflect the expected Delphi consolidation effect, where iterative feedback, item refinement, and exposure to aggregated peer responses promote convergence in opinion (Keeney et al., 2011; Jorm, 2015; von der Gracht, 2012). The improvement suggests that the initial variability in Round 2 rankings reflected differences in interpretation or weighting of importance rather than item irrelevance; when the focus shifted to adoption readiness, those differences diminished, and consensus strengthened.

Table 5.3: Median IQR by capability (round 2 and round 3)
This table illustrates the change in consensus across capability between Round 2 (ranked importance) and Round 3 (adoption-focused Likert scale). For each capability, the IQR was first calculated for individual performance indicators, and then the median IQR was calculated across all indicators within that capability. The reduction in variability between rounds highlights the strengthening of consensus among participants. The largest improvements were observed for capabilities 5.3, 1.1, 4.7, 1.4, 3.4 and 1.2, while smaller but still meaningful improvements occurred in 1.3, 3.3, 4.3, and 4.6.

Capability	Round 2 Median IQR	Round 3 Median IQR	Reduction in IQR
1.1	5.25	0.25	5.00
1.2	4.50	0.25	4.25
1.3	2.50	0.25	2.25
1.4	4.75	0.25	4.50
2.1	3.25	0.25	3.00
2.2	4.25	0.25	4.00
3.1	3.00	0.25	2.75
3.2	3.00	0.25	2.75
3.3	2.75	0.50	2.25
3.4	4.50	0.25	4.25
4.1	3.00	0.13	2.87
4.2	4.25	0.13	4.12
4.3	1.75	0.25	1.50
4.4	3.75	0.63	3.12
4.5	3.25	0.38	2.87
4.6	2.00	0.25	1.75
4.7	5.50	0.75	4.75
5.1	3.75	0.25	3.50
5.2	3.75	0.13	3.62
5.3	6.00	0.13	5.87
5.4	3.50	0.13	3.37
5.5	4.25	0.25	4.00
5.6	4.25	0.25	4.00

Further to this the mean agreement scores from the Likert Scale were evaluated alongside the interquartile ranges (IQRs) to further substantiate consensus (see Table 5.4). Mean agreement scores ranged from 4.50 to 4.85, indicating that participants were either in agreement or strong agreement for the adoption of each performance indicator. The lowest mean score in capability 4.7 (mean = 4.50, IQR=0.75) still reflected a position closer to “strongly agree”, while the highest scores such as capability 5.2 (mean = 4.85, IQR = 0.13) and capability 5.4 (mean = 4.83, IQR = 0.13) indicated near-unanimous support.

The combination of low IQR values and high mean scores in the final round is notable. Low IQR values ≤ 1.0 confirm that ratings were tightly clustered evidencing stability in agreement, while the high mean values indicated that consensus was in favour of adoption. This dual confirmation is consistent with Delphi practice, where final consensus is supported by both measures of central tendency and dispersion. The progression from high-dispersion, importance-focused rankings in Round 2 to low-dispersion, adoption-focused agreement in Round 3 illustrates the effectiveness of the iterative Delphi process in building shared commitment to complex, context-dependent performance indicators.

Table 5.4: Mean agreement and median IQR by capability (round 3)
This table presents Round 3 results by capability showing mean agreement scores (1 = Strongly Disagree; 5 = Strongly Agree) alongside median IQR values. Several capabilities achieved both high agreement (mean ≥ 4.5) and very low dispersion (IQR ≤1), reflecting near-unanimous support and strong convergence of expert participant opinion in the final round of the Delphi process.

Capability	Round 3 Mean Agreement (Likert scale 1–5)	Round 3 Median IQR
1.1	4.63	0.25
1.2	4.55	0.25
1.3	4.67	0.25
1.4	4.75	0.25
2.1	4.68	0.25
2.2	4.75	0.25
3.1	4.81	0.25
3.2	4.78	0.25
3.3	4.63	0.50
3.4	4.61	0.25
4.1	4.81	0.13
4.2	4.85	0.13
4.3	4.81	0.25
4.4	4.63	0.63
4.5	4.60	0.38
4.6	4.82	0.25
4.7	4.50	0.75
5.1	4.55	0.25
5.2	4.85	0.13
5.3	4.75	0.13
5.4	4.83	0.13
5.5	4.65	0.25
5.6	4.83	0.25

In summary, the decision to advance all high-priority items from Round 2, regardless of IQR, was methodologically justified within established Delphi consensus practices and aligned with the objectives of developing the performance indicator framework. Delphi methodology recognises that early round variability may reflect differences in interpretation, experience, or context rather than a lack of relevance (von der Gracht, 2012). This is particularly true for multidimensional items, such as complex performance indicators, where consensus often builds gradually as shared understanding develops. By using IQR descriptively rather than prescriptively, the process-maintained inclusivity of perspectives, safeguarded against premature content loss, and enabled refinement through structured feedback (Diamond et

al., 2014). The marked IQR reductions observed in Round 3 demonstrate that this approach was effective, enabling capabilities with initial dispersion (e.g., 5.3, 1.1, 4.7, 1.4, 3.4 and 1.2) to achieve strong consensus once the focus shifted from “importance” to “adoption.” This iterative narrowing of variability is consistent with the literature, which supports methodological flexibility and the transparent reporting of decision criteria (Hasson et al., 2000; Keeney et al., 2011; Boulkedid et al., 2011; von der Gracht, 2012). The combination of low final IQRs (≤ 1.0) and high mean agreement scores (≥ 4.50) across all capabilities provides strong evidence of consensus on the APPCAT performance indicators.

5.5 Round 4 Discussion and Results

While there are no strict guidelines regarding the number of rounds in the Delphi, it suffices when the consensus level is acceptable, when there is a convergence of opinions, or when participants’ modification ceases (Ogbeifun et al., 2016). In this research, four rounds were conducted to ensure thorough exploration and refinement of participant responses. More importantly, the literature suggests a consensus range of 51% to 80% percent agreement among participants (Hasson et al., 2000). An ≥80% agreement threshold was set as the standard for achieving consensus across all rounds, as it reflects the upper limit of commonly cited ranges in the literature (Hasson et al., 2000). This high threshold was chosen to enhance the content validity of the results and to ensure that the items selected had strong consensus from participants.

Round 4 was held over two 3-hour video conferences, so that all discussions were transcribed, and contributions made via chat, video, and polls in the moderation meeting were recorded (with consent) to ensure accuracy of analysis. An independent chair moderated the meetings.

During the moderation meetings, each capability was discussed individually, incorporating recommendations from the research mapping process and the qualitative feedback provided by participants after Round 3. This included refining wording for comprehension, reviewing overlapping performance indicators, removing duplication, and strengthening alignment with the relevant capability descriptors. Participants were provided with this

documentation prior to Round 4, to aid in transparency and support structured consideration during the moderation. Proposed adjustments were discussed, and adoption was determined through anonymous yes/no polling, with a minimum threshold of ≥80% agreement (see Figures 5.1a, 5.1b and 5.2).

Furthermore, a separate anonymous poll was conducted for each of the 23 capabilities to confirm overall agreement on the final set of performance indicators within each capability. Anonymous polling was undertaken using a 5-point Likert scale, requiring ≥80% agreement for endorsement (see Table 5.5). This allowed participants to review each capability as a whole, after adjustments were made. All polls were conducted anonymously to maintain confidentiality and support unbiased responses.

Table 5.5: Final consensus polling, moderation meeting (capability 1.3)
This table illustrates the final consensus polling conducted during the moderation meeting on 5 July 2024 regarding the inclusion of all performance indicators within capability 1.3. Participants responded using a 5-point Likert scale ranging from *Strongly Disagree (1)* to *Strongly Agree (5)*. The majority selected *Agree* (78%), followed by *Strongly Agree* (22%). No participants selected *Strongly Disagree*, *Disagree*, or *Neither Disagree nor Agree.*

Meeting Topic	ID	Start Time
Moderation meeting	83806450256	05/07/2024 13:48
Question	**Answer**	**% of Votes**
Capability 1.3	Strongly disagree	**0%**
Capability 1.3	Disagree	**0%**
Capability 1.3	Neither disagree or agree	**0%**
Capability 1.3	Agree	**78%**
Capability 1.3	Strongly agree	**22%**

A total of ten participants attended both moderation video conferences. During the second session, one participant departed early. However, consensus was still achieved as the required ≥80% agreement threshold among the remaining participants was met.

To maintain data integrity and accuracy throughout all study rounds, an independent reviewer was engaged to systematically review and verify the data. The findings were subsequently presented to the participants for evaluation prior to each round. This iterative review process employed both top-down and bottom-up approaches. The top-down approach ensured alignment between the performance indicators and the PCFRP framework and descriptors, reinforcing compliance with registration standards. Conversely, the bottom-up approach incorporated quantitative data and qualitative feedback from the participants, capturing practical and experiential perspectives. By integrating these complementary approaches, the refinement process ensured that the performance indicators were both robust and practically applicable, effectively aligning with professional registration requirements and expert insights.

After beginning with 475 performance indicators for 23 Capabilities across 5 domains, the outcome of a comprehensive 4 round Delphi process with participants, consensus was achieved on 182 PI's (see Table 5.6) across the 23 capabilities (see Figure 5.3).

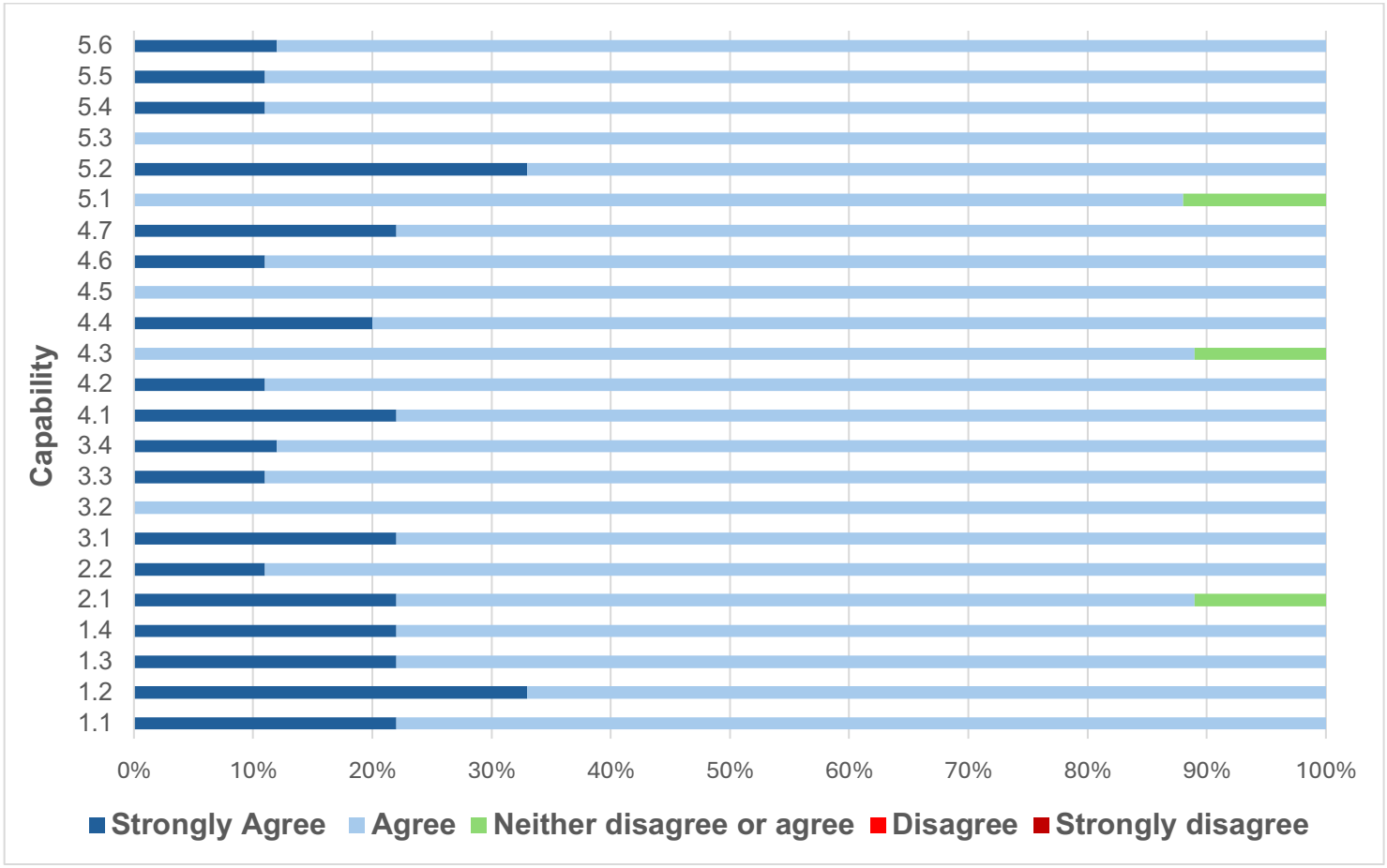

Figure 5.3: Consensus on 23 capabilities (post-moderation)
This figure illustrates the consensus achieved for each capability following the moderation meeting. A five-point Likert scale was employed for anonymous polling, with a predetermined agreement threshold of ≥80% used to finalise consensus.

Table 5.6: Progression of Performance Indicators by round

This table shows the progression of performance indicators (PIs) across four rounds for each capability. The number of PIs is tracked from the initial survey (Round 1) through refinement phases (Rounds 2 and 3) to final moderation (Round 4). The data demonstrate the reduction of PIs through each round, reflecting processes of refinement, consolidation, and consensus. The bottom section summarises the minimum, maximum, and mean number of PIs retained across all capabilities in each round, illustrating the progressive narrowing of PIs to achieve a more focused final framework meeting the study's aim.

Capability	Round 1	Round 2	Round 3	Round 4
1.1	29	15	10	9
1.2	32	20	10	10
1.3	16	9	9	7
1.4	23	15	10	8
2.1	30	20	10	11
2.2	21	11	10	9
3.1	18	9	9	6
3.2	28	19	10	8
3.3	17	10	10	6
3.4	23	13	11	10
4.1	14	8	8	7
4.2	18	10	10	10
4.3	13	8	8	7
4.4	20	12	10	5
4.5	19	12	10	7
4.6	13	7	7	7
4.7	15	12	9	7
5.1	21	13	10	6
5.2	15	10	10	9
5.3	32	16	10	10
5.4	20	15	10	6
5.5	15	12	10	10
5.6	23	14	10	7
Total PI's	**475**	**290**	**221**	**182**
Minimum no. of PI's	13	7	7	**5**
Maximum no. of PI's	32	20	11	**11**
PI Mean	21	13	10	**8**

5.6 Discussion and Learnings from Qualitative Responses

Following a comprehensive review of verbal discussions and electronic chat transcripts from the moderation meetings in Round 4, several key findings and insights emerged as valuable contributions and learnings:

5.6.1 Addressing Repetition in the PCFRP

Repetition within the *Paramedicine Capabilities for Registered Paramedics* (PCFRP) framework was identified and will be communicated to the Paramedicine Board of Australia (PBA) for consideration during the framework's scheduled five-year review cycle. As the inaugural iteration of the PCFRP, this version serves as a foundational document for defining professional capabilities within the paramedicine profession. Identifying and addressing redundancies is a critical step in refining the framework to ensure it remains clear, concise, and aligned with its intended purpose. This iterative review process underscores the importance of stakeholder engagement in the development and evolution of national frameworks, promoting continuous improvement and alignment with the dynamic nature of professional practice.

5.6.2 Integration of Patient and Family-Centred Care (PFCC)

Feedback from this study recommends incorporating contemporary terminology into the inaugural PCFRP, including the concept of patient and family-centred care (PFCC) within Domain 2 *("the communicator and collaborator*"). PFCC emphasises collaborative relationships between providers, patients, and families, and is associated with improved health outcomes, satisfaction, and quality of care through effective communication and shared decision-making (Kokorelias et al., 2019; Kwame & Petrucka, 2021)**.** In line with this, organisations such as the National Institute for Health and Care Excellence (2021) advocate for shared decision-making as a core component of good healthcare, reinforcing the principles of PFCC.

The existing capability headings in Domain 2 are consistent with PFCC principles; however, the descriptors could be enhanced to better emphasise empathy, shared decision-making, and patient and family voice. Such refinements align with recent international literature that highlights the growing relevance of family-centred care approaches in contemporary healthcare delivery (Hriberšek et al., 2024). For example:

- **Capability 2.1** (communicate clearly, sensitively, and effectively) could more explicitly highlight empathy and relational communication by framing interaction as a partnership with patients and families. This shifts the focus beyond information exchange to building trust, validating patient and family perspectives, and better supporting shared decision-making.
- **Capability 2.2** (collaborate with other health practitioners) could reinforce interprofessional teamwork and the expectation that patient and family perspectives are integrated into collaborative decision-making. This ensures family voice is a critical component of holistic care planning and that collaboration reflects both clinical expertise and lived experience of patients and their families.

These refinements would strengthen alignment with PFCC terminology while enhancing the intent of the current descriptors.

5.6.3 Standardised Scope of Practice Matrices for Work-Integrated Learning (WIL)

In relation to Domain 1 (“the professional and ethical practitioner”), it is essential that undergraduate students and placement providers are supported with a clearly defined document outlining a student’s scope of practice, developed by their respective higher education institutions for Work-Integrated Learning (WIL). This aligns with the descriptors in Domain 1, which require paramedics to practise safely within the limits of their knowledge and skills and to demonstrate accountability and professional integrity (Paramedicine Board of Australia, 2021). By explicitly outlining the skills or procedures that students are authorised to perform, such as intravenous cannulation, medication administration, and patient extrication, these documents provide a practical mechanism to ensure students act within ethical and professional boundaries while maintaining patient safety. While these clinical

skills or procedures are not always explicitly identified within the PCFRP, they remain critical to day-to-day practice in WIL settings, and the scope of practice document addresses this operational dimension. In doing so, it offers clarity for supervisors while reinforcing the principle that students are assessed against standardised professional capabilities irrespective of their individual progression through the curriculum.

This is evident in recent shifts in paramedicine education which indicate that institutions are placing greater emphasis on producing graduates who are equipped as holistic, reflective practitioners, rather than simply capable in a narrow set of individual skills or procedures. The Paramedicine Board of Australia's PCFRP also highlights the integration of knowledge, skills and professional attributes across domains, noting that "these capabilities are not a list of tasks" and emphasises the ability to "draw on and integrate the breadth of capability" rather than ticking off isolated procedural item (Paramedicine Board of Australia, 2021). Correspondingly, research in paramedic education identifies critical thinking, clinical reasoning and reflective practice as core to practitioner readiness, suggesting that curriculum design should emphasise intellectual skills, clinical decision-making, professionalism and situational awareness over purely technical tasks (Weber, et al., 2024). This support the view that individual clinical skills or procedures (such as intravenous cannulation, patient extrication or medication administration) whilst important, are embedded within a broader professional capability framework, thereby signalling a deliberate pedagogical move away from assessing skills in isolation towards preparing practice-ready practitioners.

While the emphasis in paramedicine education has shifted toward holistic professional capabilities, clearly defined scope of practice documents remains an essential complement. These documents not only promote safety but also provide a transparent understanding for paramedicine supervisors during WIL, particularly as they may not be familiar with the specific curriculum delivered across different institutions. For students, they offer clarity and confidence in knowing the boundaries of their practice during placement.

A valuable precedent is Ambulance Victoria's WIL documentation, which effectively consolidated scope of practice for students across multiple academic providers, including Australian Catholic University, Monash University, and Victoria University in a single

reference. Continuing this approach is imperative as the paramedicine profession evolves, WIL settings diversify, and scopes of practice continue to expand.

5.6.4 Generic Wording for Legal and Legislative Indicators

When considering Domain 1 *("the professional and ethical practitioner")* and Domain 4 *("the safety and risk management practitioner")* as examples, the participants determined that Performance Indicators (PIs) related to legal or legislative matters should remain generic. This approach reflects the need to accommodate variations in legal frameworks across Australian states and territories, where including specific examples may risk being inappropriate or misleading. By maintaining a non-specific stance, the PIs allows for national applicability, fostering consistency while avoiding the misrepresentation of state-specific legalities. The participants unanimous agreement highlights the importance of this strategy for legal or legislative content, striking a pragmatic balance between specificity and applicability to create a framework that is both practical and inclusive across diverse WIL settings nationally.

5.6.5 Updating Terminology from "Violence" to "Harm"

The wording of a performance indicator in capability 5.2 *("assess and monitor the patient capacity to receive care")* has been updated from 'violence' to 'harm' and now includes the term 'responds.' The revised performance indicator now states: "Recognises and responds to circumstances that involve family harm and child safety." This revision reflects a broader understanding of harm, which encompassing various forms of violence and safeguarding responsibilities. The participant discussion and feedback emphasised the importance of retaining this as a standalone performance indicator, with specific reference to New Zealand's compulsory reporting framework, which includes family harm, child protection, and family violence. Despite the absence of mandatory reporting requirements for paramedics in some states, such as Western Australia, the inclusion of this performance indicator underscores its significance in promoting comprehensive safeguarding practices across all areas of practice.

The adoption of the term 'harm' in place of 'violence' was identified by the participants as a more inclusive and comprehensive approach, aligning with safeguarding principles. As one

participant noted, “Violence obviously takes many forms, but it's about safeguarding.” The use of 'harm' facilitates the incorporation of coercive control, a concept distinct from direct violence, thereby broadening the protective scope of the performance indicator. Similarly, the addition of the term 'responds' was positively received for its action-oriented emphasis, underscoring the importance of recognising and effectively addressing instances of harm.

The discussion further extended to the broader concept of duty of care, which encompasses safeguarding responsibilities across the lifespan. Participants voiced that safeguarding extends beyond family harm and child safety to include vulnerable populations, such as the elderly in aged care facilities. Reports of abuse and neglect in aged care settings have prompted significant reforms in both Australia and New Zealand. For instance, the Royal Commission into Aged Care Quality and Safety in Australia reported that approximately 39.2% of elderly Australians in nursing homes had experienced some form of elder abuse, highlighting widespread systemic challenges within the sector (Royal Commission into Aged Care Quality and Safety, 2020). Accordingly, the performance indicator was refined as a part of Round 4 moderation to read *“Demonstrates duty of care to safeguard the wellbeing and protection of vulnerable persons.”* The revised terminology helps to ensure that the framework remains inclusive, actionable, and reflective of the diverse and evolving safeguarding challenges encountered by paramedics in their duty of care across varied populations and contexts (see Figure 5.5).

5.6.6 Clarifying Expectations for Data Generation in Work-Integrated Learning (WIL)

Discussion surrounding Capability 4.5 (monitor and review the ongoing effectiveness of their practice and modify it accordingly) focused on the descriptor, which states: *“Monitor and evaluate the quality of practice and the value of contributing to the generation of data for quality assurance and improvement programs.”* However, the suggestion to include specific Performance Indicators (PIs) sparked debate regarding the feasibility of undergraduate students effectively meeting this outcome in a WIL setting.

From a higher education provider perspective, distinguishing between actively generating data and understanding its importance represents a critical focus for undergraduate

education. While undergraduate students often have limited capacity to independently generate significant datasets in a WIL setting, they could engage in foundational activities such as enrolling patients in clinical trials or observing data collection processes. Nevertheless, due to the lack of clarity and opportunity in WIL settings surrounding this expectation, such specifics were not incorporated as explicit PI examples. This highlights an area requiring further clarification to ensure that the framework remains both practical and achievable for undergraduate assessment while continuing to align with its overarching objectives. Broader research involving industry partners, supervisors, and student stakeholders would help to clarify the expectation around the applicability of this descriptor.

5.6.7 Major Incidents

Another contentious point raised during the moderation process was related to Capability 5.5 *"Demonstrate the requisite knowledge and skills to participate in mass casualty or major incident situations."* It was acknowledged that not all students would necessarily have the opportunity to gain direct exposure to a major incident during WIL. Consequently, PIs within this capability were required to be phrased in a manner that maximised achievability for students. Rather than focusing solely on operational experience, the indicators emphasised underpinning knowledge, preparatory skills, and decision-making frameworks that students could reasonably demonstrate within available learning environments. This approach sought to balance the importance of including major incident management as an assessable capability (see Figure 5.5). Accordingly, the PIs were formulated to include the following examples:

- "Participates in training programs, drills, and exercises designed to enhance readiness and proficiency in a major incident response."
- "Familiarises themselves with the principles of the public health model for mass casualty or major incidents."
- "Reviews the specific protocols and guidelines provided by the organisation or relevant authority for responding to major incidents."

As part of the APPCAT, the scoring for capability 5.5 will be carefully reviewed to determine how students and supervisors approach situations where exposure to mass casualty or major incident events does not occur during WIL. In these circumstances, the option of recording “N/O” (No Opportunity) provides a safeguard, ensuring that students are not disadvantaged for the absence of exposure outside their control. This approach allows the tool to remain both rigorous and fair, while also capturing important data on the frequency of such opportunities across diverse WIL settings. The outcomes of this review will inform further refinements to the scoring framework and the PIs, ensuring that the assessment of this capability remains achievable, equitable, and reflective of real-world learning environments.

5.7 Final Performance Indicator Tool

Following the completion of the four-round Delphi process, the participants reached consensus on the performance indicators to be included in the APPCAT to assist in the evaluation of students during Work Integrated Learning, as shown in Figure 5.4.

Domain 1

Capability 1.1 – Practice ethically and professionally, consistent with relevant legislation and regulatory requirements

1. Understands legal, ethical, and professional responsibilities, including scope of practice
2. Follows legal framework, such as Aphra's Code of Conduct
3. Practices in accordance with applicable legislation governing the safe use of scheduled medicines
4. Applies the basic principles of bioethics, such as informed consent, autonomy, beneficence, non-maleficence, and justice to practice
5. Maintains appropriate professional boundaries with patients and health professionals
6. Complies with mandatory reporting obligations for suspected abuse, neglect, or harm to vulnerable individuals
7. Manages personal mental health and wellbeing to ensure fitness to practice
8. Organises and prepares self to provide effective care
9. Understands the structure of the health care system and the roles paramedics may play within this

Capability 1.2 – Provide each patient with an appropriate level of dignity and care

1. Treats all patients with respect, empathy, and dignity
2. Asks patients how they identify with respect to culture, ethnicity, nationality, religion, gender identity, and sexual orientation
3. Provides holistic care that acknowledges and respects the values, beliefs, and practices of diverse individuals and communities
4. Demonstrates cultural sensitivity across a range of contexts/tasks
5. Involves patients in decision-making, considering their cultural values and preferences
6. Ensures patients' culturally specific needs are met
7. Acquires knowledge and understanding of cultural and linguistic diversity, including the customs, traditions, and beliefs of diverse communities
8. Develops effective communication skills, including active listening and using culturally appropriate language and communication styles
9. Practises in a non-judgmental, non-discriminatory way and promotes inclusivity
10. Adapts trauma-informed care approaches to accommodate the cultural backgrounds and experiences of each patient

Capability 1.3 – Assume responsibility, and accept accountability, for professional decisions

1. Recognises unsafe or unprofessional practice of themselves or others
2. Takes responsibility and accountability for their actions
3. Acts within their capabilities as outlined by the education provider
4. Aligns their practice with workplace directives, policies, procedures, and guidelines
5. Applies quality framework to practice (Australian Safety and Quality Framework for Health Care)
6. Endeavours to provide high-quality patient care and patient safety
7. Demonstrates appropriate self-care and other support strategies (e.g., fatigue / stress management, peer support)

Capability 1.4 – Advocate on behalf of the patient, when appropriate in the context of the practitioner's practice as a paramedic

1. Advocates for patients and provides appropriate support
2. Actively listens to patients
3. Appropriately intervenes on the patient's behalf to ensure their concerns are addressed
4. Encourages patients' involvement in decision-making processes
5. Provides information and education to patients about their condition, treatment options, and available resources
6. Recognises when patients are in vulnerable positions and/or unable to advocate for themselves (age, disability, language barriers, mental health crisis or diminished capacity)
7. In situations where a patient's safety, well-being, or rights are at risk, takes immediate action to intervene, report, or escalate
8. Promotes the patients' rights and interests when providing care or making referrals

Domain 2

Capability 2.1 – Communicate clearly, sensitively and effectively with the patient and other relevant people

1. Greets and introduces self to patient and others
2. Recognises barriers to optimise communication
3. Demonstrates an appropriate range of communication styles (e.g., written, verbal, non-verbal)
4. Adjusts communication style based on the person's age, cultural background, language proficiency, or physical or cognitive limitations
5. Actively listens
6. Uses open-ended questions to encourage communication
7. Uses appropriate body language, facial expressions, and gestures
8. Uses appropriate non-verbal cues to convey empathy, reassurance, and respect
9. Questions effectively to gain appropriate information from patients and others
10. Engages third parties, including interpreters to facilitate effective communication as appropriate
11. Respond appropriately to patient, family, carer queries and concerns

Capability 2.2 – Collaborate with other health practitioners

1. Demonstrates an understanding of team processes
2. Fosters a positive and productive working environment
3. Works respectfully with healthcare teams and patients
4. Collaborates with other healthcare teams to ensure continuity of care
5. Familiarises oneself with the roles and responsibilities of different healthcare team and service providers
6. Liaises with and refers patients to other healthcare teams when required
7. Consults with health care teams, services providers, volunteers and emergency personnel
8. Provides an accurate handover using an evidence-based, standardised format that ensures safe, continuous care
9. Shares appropriate information and seeks input from healthcare team

Domain 3

Capability 3.1 – Make informed and reasonable decisions

1. Considers the impact of personal values and biases on decision-making
2. Considers the individual patient needs when making decisions
3. Seeks input from patients, relatives, and carers to understand their perspective and preferences
4. Provides patient, family-centred care
5. Weighs the available evidence and make decisions based on the best interests of the patient
6. Ensures decisions are sensible, practical, and culturally safe

Capability 3.2 – Use clinical reasoning and problem-solving skills to determine clinical judgements and appropriate actions

1. Uses critical thinking skills to question a patient during assessment
2. Conducts a systematic assessment and evaluates the information to formulate a diagnosis

3. Considers potential risks, benefits, and implications prior to taking action
4. Applies a logical approach to problem-solving
5. Makes informed clinical judgements based on the analysis of information collected
6. Recognises conflicting information and evidence in clinical judgements
7. Applies evidence-based practice along with critical and reflective thinking to resolve clinical challenges
8. Seeks additional information or consults with supervisor to clarify uncertainties

Capability 3.3 – Draw on appropriate knowledge, resources and skills in order to make professional judgements

1. Adapts approaches to ensure culturally safe practice
2. Demonstrates situational awareness
3. Adjusts interventions in response to emerging risks or changing situations
4. Uses information technology appropriately to support practice (e.g., telemedicine or video conferencing)
5. Ensures professional judgements are based on evidence, relevant literature, research publications, and health education materials to guide practice
6. Stays informed and maintains currency with guidelines and protocols

Capability 3.4 – Identify ongoing professional learning, development needs and opportunities

1. Evaluates and updates their knowledge and skills
2. Seeks and engages in a diverse range of learning opportunities
3. Reflects on personal strengths and limitations to identify learning and development needs
4. Takes responsibility for learning and professional development
5. Creates learning goals identified through feedback or reflection
6. Seeks support from others to improve professional practice
7. Reviews and prepares appropriate learning material before and during the placement
8. Responds in a positive manner to questions, suggestions, and/or constructive feedback about their learning and development
9. Engages collaboratively in the completion of the work integrated learning assessments
10. Shows an understanding of legal and professional obligations regarding continuing professional development (CPD)

Domain 4

Capability 4.1 – Protect and enhance patient safety

1. Verifies patient identification during assessment, treatment and transfers
2. Considers the patient's comfort, dignity, and any special needs during manual handling
3. Utilises appropriate manual handling equipment and techniques to reduce risk of injury to the patient, self, and others
4. Ensures risks associated with procedures/interventions are understood and patient consent is obtained
5. Manages and disposes of sharps safely
6. Undertakes effective hand hygiene
7. Follows aseptic techniques during procedures to minimise the risk of infection

Capability 4.2 – Maintain safety of self and others in the work environment

1. Undertakes dynamic risk assessment, regularly evaluating the environment for risks
2. Recognises potential risks/dangers associated with equipment, patient care, environmental conditions, and other aspects of care
3. Reports hazards, risks, and near misses via appropriate procedures
4. Understands the legal responsibility for ensuring a safe working environment
5. Prioritises the safety of themselves and others
6. Works safely in all work integrated learning environments including the ambulance vehicle
7. Undertakes proactive measures to prevent incidents
8. Listens actively to concerns and feedback regarding safety and takes them seriously
9. Uses appropriate PPE including donning and doffing as relevant to the task/hazard

Capability 4.3 – Operate effectively in an emergency care environment

1. Recognises when the patient is time-critical or has a specific clinical need
2. Considers the clinical condition of the patient, urgency of the situation, and environmental factors
3. Identifies whether or not there is a need for patient transport or additional resources and support (including referral pathways)
4. Considers alternative transport resources (e.g., non-emergency patient transport, aeromedical, complex patient ambulance vehicle, manual handling vehicle)
5. Collaborates with others emergency services or rescue organisations for extrication and transfer (e.g., SES, police and fire)
6. Recognises urgent and non-urgent requests for assistance

Capability 4.4 – Maintain records appropriately

1. Understands the legal and ethical obligations of patient privacy and confidentiality
2. Documents relevant legal or ethical considerations, ensuring compliance with regulations
3. Records information in a structured, legible and concise manner
4. Accurately and systematically documents information related to the patient's condition, assessments, interventions, and outcomes
5. Uses appropriate medical terminology, abbreviations, and acronyms when documenting patient information

Capability 4.5 – Monitor and review the ongoing effectiveness of their practice and modify it accordingly

1. Evaluates the proposed care or treatment
2. Monitors and/or reassesses the patient throughout the case
3. Evaluates the effectiveness of any care or treatment
4. Makes modifications to care or treatment based on re-evaluation and feedback from supervisors
5. Any modifications or cessation of care or treatment are made in consultation with the patient, based on the best available evidence
6. Demonstrates and/or describes safe treatment progression
7. Demonstrates the rationale behind decisions in a clear and concise manner

Capability 4.6 – Audit, reflect on and review practice

1. Actively seeks feedback from supervisor and patients
2. Reflects on written and verbal formative/summative feedback from supervisors
3. Incorporates the supervisor's feedback during placement/practice/patient care
4. Engages in self-reflection to evaluate personal practice
5. Understands some key performance indicators and how they are relevant to work integrated learning settings
6. Understands the rationale and importance for generating data for quality assurance, to monitor and improve paramedicine practice
7. Engages in review processes, such as peer review or clinical audits, to assess and improve the quality of care provided

Capability 4.7 – Participate in the mentoring, teaching and development of others

1. Uses downtime to engage in ongoing education with others
2. Participates in theoretical or practical training with others in the work integrated learning setting
3. Contributes to discussions and problem-solving activities within the team to address individual or group challenges
4. Engages in teaching and mentoring activities to assist others in their learning and development
5. Shares relevant information, best practices, knowledge and experiences to support others development
6. Displays leadership skills
7. Appreciates the importance of research and clinical trials and how it informs development of oneself and others

Domain 5

Capability 5.1 – Use patient information management systems appropriately

1. Participates in and/or observes the supervisor completing a patient healthcare record
2. Understands the importance of, and how to access patient healthcare records
3. Recognises that the information documented will serve as an essential reference for subsequent healthcare providers involved in patient care
4. Understands that accurate and timely documentation is essential for providing continuity of care
5. Handles sensitive information appropriately, and protects patient privacy
6. Uses patient information management systems appropriately

Capability 5.2 – Assess and monitor the patient capacity to receive care

1. Informs the patient about any interventions, potential risks, benefits, and options to receiving care
2. Obtains/assesses the patient's capacity to provide informed consent or refusal of treatment
3. Considers various factors that may impact the patient's capacity or ability to receive care (e.g., physical, psychological or medical conditions)
4. Recognises vulnerabilities faced by certain patient populations when receiving care (e.g., culturally and linguistically diverse backgrounds or Indigenous communities)
5. Identifies and responds appropriately to a changing patient condition which may impact their ability to receive treatment or care
6. Recognises the inability to proceed with a procedure or treatment due to safety, clinical, or legal reasons
7. Demonstrates duty of care to safeguard the wellbeing and protection of vulnerable persons
8. Recognises and responds to circumstances that involve family harm and child safety
9. Incorporates parents, carers, or authorised decision-makers when providing care to vulnerable patients where appropriate

Capability 5.3 – Understand the key concepts of the bodies of knowledge which are specifically relevant to paramedicine practice

1. Demonstrates an understanding of human anatomy and physiology in relation to patient care
2. Recognises the relationship between pathophysiology, and the patient's presentation
3. Identifies the functioning of body systems and relation to vital signs
4. Demonstrates an understanding of health, human growth and development, disease, disorder, and dysfunction
5. Conducts a systematic and thorough patient assessment to determine appropriate care or treatment
6. Applies knowledge of anatomy, physiology and pathophysiology to interpret data from the history, assessment, to inform patient management
7. Demonstrates knowledge of essential drug actions, the body's responses, and key pharmacology concepts for paramedic practice
8. Understands psychological and social factors, including intergenerational trauma that impact and influence an individual in health and illness
9. Uses evidence-based care tools – clinical practice guidelines and clinical skills work instructions during patient care and assessment
10. Keeps up to date with current evidence-based practice and incorporates research findings into their practice

Capability 5.4 – Conduct appropriate diagnostic or monitoring procedures, treatment, therapy or other actions safely

1. Applies knowledge of the indications and contraindications when undertaking paramedic interventions
2. Utilises assessment techniques to arrive at a safe and reasonable working diagnosis
3. Performs care that is safe for self, patient and those involved
4. Modifies practice to provide safe and appropriate care to a range of patients (e.g., paediatric, mental health, social factors, intergenerational trauma and culture)
5. Practices safely and effectively across a range of work integrated learning settings

Capability 5.5 – Demonstrate the requisite knowledge and skills to participate in mass casualty or major incident situations

1. Identifies a mass casualty incident, when patients exceed resources
2. Familiarises themselves with the principles of the public health model for mass casualty/major incidents
3. Reviews the specific protocols and guidelines provided by the organisation/relevant authority for responding to major incidents
4. Understands the roles and responsibilities of various stakeholders involved in major incidents (including paramedics, other healthcare professionals, emergency services, and public health agencies)
5. Comprehends the importance of coordination, collaboration, and communication amongst stakeholders during a major incident response
6. Understands the principles of incident command systems and resource allocation
7. Understands the principles of triage sieve and sort
8. Provides emergency care for multiple patients in a coordinated and efficient manner
9. Participate in training programs, drills, and exercises designed to enhance readiness and proficiency in a major incident response
10. Uses an evidence-based, structured and accurate assessment for communication during major incidence (e.g., METHANE)

Capability 5.6 – Formulate specific and appropriate patient care and treatment actions

1. Adapts practice to meet the needs of different patient groups
2. Engages with patients to understand their social determinants of health
3. Recognises and understands that multiple factors can influence an individual's health
4. Approaches patients' lifestyles without judgement
5. Collaborates with patients to set realistic health goals and plans care that align with their lifestyles and preferences
6. Provides appropriate health education or resources to optimise health outcomes
7. Ensures the delivery of inclusive and person-centred care

Figure 5.4: Final Performance Indicator tool for APPCAT
This figure presents the final set of Performance Indicators (PIs) included in the Australian Paramedic Professional Capabilities Assessment Tool (APPCAT) following the completion of the four-round Delphi process. The PIs are categorised according to the 5 domains and 23 capabilities. Each PI aligns with nationally recognised professional registration standards, ensuring a comprehensive and standardised approach to undergraduate paramedic education and work-integrated learning assessment.

5.8 Discussion Summary

5.8.1 Overall Finding

The central outcome of this study was the development of a nationally relevant set of 182 performance indicators (PIs) mapped to the 23 professional capabilities (Paramedicine Board of Australia, 2021). Through a modified Delphi process, consensus was achieved among paramedicine academics across Australian states and New Zealand, ensuring both geographical representation and professional credibility (Hasson et al., 2000; Grisham, 2009). The final tool strikes a balance between comprehensiveness and feasibility, offering supervisors a concise, 2–3 page tool with an average of eight contextual and observable indicators per capability. This outcome directly addresses a key gap in paramedicine education: the absence of a standardised WIL assessment framework that aligns with professional capabilities and accreditation requirements (Ossenberg et al., 2016; Sweet et al., 2018).

5.8.2 Comparison with Previous Literature

The findings of this study are broadly consistent with developments in other allied health disciplines, while also extending them in meaningful ways. Like the ANSAT in nursing (Ossenberg et al., 2016), the AMSAT in midwifery (Sweet et al., 2018), and COMPASS in speech pathology (McAllister et al., 2006), this tool employs observable performance indicators to enhance assessment consistency. However, unlike some of these earlier tools, which were often developed using focus groups or workshops, this study adopted a modified Delphi methodology (Hasson et al., 2000; Grisham, 2009). This provided a structured and rigorous pathway to consensus, reducing the influence of hierarchy and ensuring transparency in decision-making.

In terms of content, the breadth of indicators (182 across 23 capabilities) reflects the complex, autonomous, and dynamic nature of paramedic practice (Bowles et al., 2017; Brooks et al., 2016; O'Meara et al., 2014). This stands in contrast to professions such as nursing or midwifery, where supervision is frequently delivered through facilitator models (Langford et al; 2024), while paramedicine predominantly relies on a supervisor model, as previously discussed in this study. The findings also align with broader expectations in the literature, which has long emphasised the importance of assessment frameworks that are explicit, observable, and tailored to the realities of practice (Dalton et al., 2011; Ossenberg et al., 2016). Importantly, this study extends the paramedicine field by developing a tool that is not only nationally relevant but also explicitly linked to registration requirements (Paramedicine Board of Australia, 2021), thereby addressing a gap identified in both paramedicine and international literature (Bowen & Williams, 2020; Smith et al., 2020).

5.8.3 Implications for Practice

The development of this tool has several important implications. For higher education providers, the tool offers a standardised means of verifying student attainment against nationally mandated professional capabilities, thereby supporting curriculum alignment and accreditation processes (Paramedicine Accreditation Committee, 2020). For clinical supervisors, the tool provides clarity and guidance by translating broad professional capabilities into contextual observable examples, to assist with the consistency and reliability of assessment during WIL (Dalton et al., 2012). From a policy perspective, the tool contributes towards national harmonisation of paramedicine education and assessment, reducing variability between institutions and ensuring graduates are assessed against the same expectations regardless of their WIL setting (Bowen & Williams, 2020; Smith et al., 2020). Importantly, the tool also supports the provision of constructive feedback to students, helping them better understand the standards of professional practice expected of a registered paramedic (Sweet et al., 2018).

5.8.4 Strengths

A number of strengths underpin the contributions of this study. The use of a modified Delphi methodology, with pre-defined decision rules and multiple rounds, ensured rigour, transparency, and accountability in the development of the tool (Hasson et al., 2000; Grisham, 2009). The national scope of the participants, with representation from all Australian states and one New Zealand provider, enhanced the tool's relevance across jurisdictions. The final instrument is concise, feasible, and practical for supervisors while still providing a detailed framework that reduces ambiguity in assessment. Methodologically, this study demonstrated a structured and systematic approach to tool development compared with the focus-group or workshop-driven processes commonly used in other health disciplines (Dalton et al., 2011; Ossenberg et al., 2016). Collectively, these strengths support the credibility of the study and its potential contribution to both paramedicine education and practice.

5.8.5 Conclusion

This study successfully developed a concise, nationally relevant set of performance indicators to operationalise the PCFRP within WIL assessment for paramedicine students (Paramedicine Board of Australia, 2021). By employing a modified Delphi methodology and engaging experts across Australia and New Zealand (Hasson et al., 2000; Grisham, 2009), the study produced a tool that is practical for supervisors, aligned with professional capabilities, and designed to support accreditation processes. The findings extend on existing work in allied health by applying a rigorous approach to tool development (Dalton et al., 2011; Ossenberg et al., 2016) and address a critical gap in paramedicine education. Importantly, the involvement of both Australian and New Zealand experts ensured broad applicability and international relevance, reflecting a unified approach to paramedicine education. While further validation is required, the tool represents a significant step towards standardised assessment of paramedicine students in work-integrated learning (Sweet et al., 2018; Bowen & Williams, 2020).

Chapter 6: Limitations and Future Directions

The following chapter highlights some limitations of the study, including considering the positionality of the researcher as well as generalisability of the findings, culminating in suggestions for future research.

6.1 Limitations

A limitation of this study is the focus on paramedicine academic participants from higher education providers as the participants, without directly incorporating feedback from undergraduate paramedicine students and paramedic supervisors.

In routine clinical practice, operational paramedics are not commonly engaged in curriculum design, accreditation processes or standards interpretation, and therefore may not be familiar with the detailed requirements underpinning the PCFRP and PAC frameworks. Accordingly, purposive recruitment was centred on academic experts for this initial phase (Lepre et al., 2021).

Despite this, 50% of the participants also remained operational as practising paramedics, providing practical, field-based insights that align with the supervisor cohort, thereby enhancing the tool's applicability to WIL assessment within paramedicine. This aligned with the study's objective to capture a comprehensive understanding of WIL performance indicators, ensuring congruence with both the PCFRP and the PAC accreditation standards.

It is acknowledged that the absence of direct input from clinical supervisors and students limits insight into how the performance indicators may function in routine assessment practice. To address this limitation, future research will incorporate structured supervisor and student feedback on the performance indicators, as outlined in Section 6.4.1, "Supervisor and Student Feedback," which is identified as an important area for future research.

6.2 Positionality

A researcher's identity and *positionality* have the potential to impact various facets of the research, which includes the research question, study design, data collection and data analysis (Wilson et al., 2022).

To maintain transparency, openness, and reflexivity, I bring to this research endeavour 15 years of experience as a registered Advanced Life Support paramedic, coupled with 12 years immersed in vocational and higher education. I am the founder and project lead of the national APPCAT project, initiated in January 2023, which is executively sponsored by the Australasian Council of Paramedicine Deans (ACPD). The APPCAT project is chaired by the Chief Paramedic Officer (CPO) of Victoria from the Department of Health and Human Services (DHHS), Associate Professor Louise Reynolds, along with Professor Scott Devenish, Chair of the ACPD.

An expert reference working group (ERWG) was established as part of the APPCAT project. This group consists of approximately 20 academics from paramedic programs across Australia and one New Zealand province, all with extensive knowledge and experience in paramedicine, higher education and accreditation. The ERWG contributed to the design and development of a work-integrated learning (WIL) tool for paramedicine known as the APPCAT. This tool promotes national harmonisation and standardisation to ensure the safety of undergraduate paramedicine students, supervisors and the broader community during WIL. Throughout the APPCAT project I recognised the need for supporting performance indicators and have been solely responsible for conducting this research. I would like to acknowledge the participants, for their time and voluntary participation in undertaking the performance indicator modified Delphi survey and moderation round.

In addition to this, there are established terms of references which are reviewed annually. These terms of reference outline the APPCAT project, including the performance indicator tool;

- Background and context
- Objectives
- Scope
- Methodology
- Timeline
- Resources
- Ethical considerations
- Stakeholders
- Deliverables such as research, reports and publications responsibilities

It is essential that the APPCAT ERWG were invited to participate in this research, as they are familiar with the Professional Capabilities for Registered Paramedics and the Program Advisory Committee criteria. Therefore, this research drew on their strengths, knowledge, insights, and diverse perspectives. Additionally, their involvement also ensures the projects relevance and applicability to the broader paramedicine profession regardless of placement provider, duration, institutional curriculum and learning outcomes. Opportunities for participation were also extended to other paramedicine education providers, with invitations and information shared via stakeholder engagement meetings. This is evident in Wilson et al. (2022) where the involvement of paramedics in research alongside their peers or within their environment offers significant advantages in terms of participant engagement, comprehension of data, and dissemination. However, it also underscores the challenges associated with managing *dual roles* and *power dynamics*. This rationale underpinned the use of a Delphi process, incorporating anonymous ranking and polling to minimise the influence of bias as effectively as possible.

In the initial stages of *data collection*, a Qualtrics survey was used to gain consensus. This technique facilitated participant interaction with others, allowing for voluntary adjustments without coercion, mitigating power dynamics whilst maintaining anonymity (Grisham, 2009; Hasson et al., 2000; Trevelyan & Robinson, 2015). In addition to this, participant demographic characteristics were captured. This transparently informed the readers of the participants *positionality* within the context of the research question and research outcome.

With regards to *data analysis*, consideration has been given to the researcher's *dual role* and potential conflict of interest. Therefore, the research data was reviewed by a secondary person who is external and independent to the APPCAT project. Additionally quantitative approaches also reduce the subjectivity. Furthermore, an independent person led the moderation meetings in the concluding stage of the research to refine the performance indicators and achieve consensus. This approach promotes collaborative reflexivity and acknowledges that research often involves collaboration within a research team, where members can challenge each other's assumptions, ask probing questions, and provide diverse perspectives on the research process and findings. By fostering collective reflection and dialogue, collaborative reflexivity can enhance the rigor, transparency, and credibility of research, ultimately enriching the quality of the research outcomes (Urry et al., 2024).

It is evident *positionality* and *reflexivity* have been integrated into the aspects of this research design. I am committed to ensuring rigorous standards and accountability throughout this research project.

6.3 Generalisability of Findings and Significance for the Profession

It is important to recognise the generalisability of findings related to factors such as the *research design, expertise and knowledge of the participant, survey items and data analysis*.

With regards to the *research design*, this research aimed to enhance the generalisability of findings by utilising established tools such as the APP, ANSAT, and AMSAT, which reflect authentic learning practices and real-world outcomes. By mapping paramedicine performance indicators to these evidence-based tools, the research validates its outcomes against widely accepted external standards in allied health fields. This approach strengthens confidence in the generalisability and applicability of the findings by demonstrating alignment with established literature that extends beyond the immediate research context (Ferguson, 2004).

The generalisability of findings can be influenced by the *participant expertise and knowledge*. Therefore, this research endeavoured to improve the generalisability of findings by ensuring that purposive recruitment occurred, to target individuals with specific expertise and qualifications, and ensure that the study sample reflected the characteristics of the target population. As a result, the findings derived from such participants are more likely to be applicable and transferable to other settings or populations where similar levels of expertise and qualifications are present (Hasson, et al., 2000).

Additionally, if the *survey item design* is broad and subject to interpretation, this may limit the applicability of the results. Therefore, the performance indicators within the survey were designed by the researcher and are specific and defined aligning with the prescribed Professional Capabilities for Registered Paramedics (PCFRP) descriptors and the study's aim. Furthermore, it is anticipated there will likely be agreement among experts due to shared national professional capabilities and accreditation standards, increasing the generalisability of the findings. Future research will involve different stakeholders in paramedicine, including supervisors and students, to assess the generalisability of the findings, to externally enhance the content validity and findings (Ferguson, 2004).

With respect to *data analysis* and the findings, the utilisation of the median and mean in Delphi studies contributes to assessing the stability of research findings. These measures of central tendency summarise participant responses and capture the prevailing consensus. By analysing the distribution of responses around these central values, it can assess the stability and consistency of findings. Consistent findings of agreement or convergence strengthen the confidence of results (Armstrong, 2001).

The generalisability of findings and the significance of this research for the profession are clear. This study closes a critical gap by providing a tool that is applicable across all universities Australia-wide, offering a unified standard for WIL assessment in paramedicine. Given the extensive expertise and academic exposure of the participants involved, the tool is well-positioned to be widely adopted as the benchmark for assessing both technical and non-technical skills in line with the PCFRP. Its design ensures applicability despite disparities in curricula across higher education providers and can foster confidence among employers in

the preparedness of graduates. By developing and implementing a standardised WIL assessment tool in paramedicine, the profession can enhance the generalisability of educational outcomes, ensure consistency in assessment, and promote public safety. Such a tool would serve as a centralised reference point for curricula, instilling confidence in employers regarding the capabilities of graduates and ensuring that paramedics possess the necessary capabilities to deliver high-quality care.

6.4 Recommendations for Future Research

The development of performance indicators represents a foundational step prior to piloting the APPCAT. With performance indicators now established by paramedicine academics, the next phase will involve engagement with clinical supervisors and undergraduate paramedicine students to evaluate how the APPCAT and its performance indicators function in an authentic WIL assessment context. A survey will be conducted to obtain feedback on usability, clarity, and feasibility, with findings informing refinement of the tool.

Subsequently, future research on the APPCAT should undergo psychometric evaluation to establish construct validity, dimensionality, and reliability in WIL settings. However, these analyses were beyond the scope of the current study. It is also noted that approaches to inter-rater reliability evaluation vary across health profession WIL assessment tools, and such testing may present logistical and resource-related challenges within paramedicine contexts. Together, these phases of research will support the subsequent testing and validation of the APPCAT.

6.4.1 Supervisor and Student Feedback

Future research on the performance indicator tool will incorporate input from key stakeholders, including supervisors and undergraduate students. This approach is supported by methodologies used in the development of established allied health assessment tools.

For instance, the development of the APP included input from clinical educators through think-aloud interviews, teleconferences, and field testing, which contributed to refining performance indicators and confirming their usability (Dalton et al., 2009a). The AMSAT also engaged stakeholders, with focus groups comprising academics and clinical educators from four higher education providers across three states, ensuring content validity through iterative feedback (Sweet et al., 2018). Similarly, the ANSAT development involved collaboration with expert clinical reference groups, clinical facilitators, and students from multiple universities to ensure the tool's alignment with professional standards and its practical application in clinical settings (Ossenberg et al., 2016). In speech pathology, the development of COMPASS drew on input from focus groups involving higher education educators, field educators, and students to define professional competencies and behavioural exemplars, demonstrating comprehensive stakeholder engagement (McAllister et al., 2010). These examples highlight the importance of involving both supervisors and students to ensure tools are not only psychometrically robust but also relevant and user-friendly.

To address this limitation, future research will actively engage key end users, systematically collect feedback from undergraduate students and supervisors through a post-pilot survey. This feedback will be sought during actual use of the APPCAT and Performance Indicators within authentic WIL assessment contexts, as usability, feasibility and refinement needs can be meaningfully identified during real world application, rather than the initial design stage, which requires familiarity with accreditation standards, curriculum frameworks, and the interpretation of professional capability requirements. This iterative process will refine and strengthen the tool, ensuring the PIs remain both usable and feasible in practice, and genuinely responsive to the realities of supervision and student WIL evaluation.

6.4.2 APPCAT Validity

The APPCAT will undergo pilot testing to establish its validity through Rasch analysis. Rasch analysis is a robust statistical tool employed in psychometric testing to evaluate and enhance the measurement properties of assessment instruments, such as questionnaires and performance tests (Boone, 2016). Rooted in Item Response Theory (IRT), this method

transforms qualitative observations, into quantitative data on a common interval scale. By applying Rasch analysis, researchers can ensure that the APPCAT is psychometrically sound, demonstrating validity and reliability, while accurately measuring the latent traits it is designed to assess (Mohamad Hamzah et al., 2019; Farlie et al., 2021).

This methodology has been successfully applied to validate allied health WIL assessment tools, such as the APP, ensuring the development of robust evaluation frameworks aligned with national professional standards (Dalton et al., 2009a). For example, the APP utilised Rasch analysis to refine its performance indicators and validate its capacity to assess a comprehensive range of clinical competencies, aligning with expected professional outcomes (Dalton et al., 2009a). By following these established methodologies, the APPCAT and performance indicators can pursue a similar pathway to achieve psychometric validation and alignment with professional standards.

6.4.3 APPCAT Inter-Rater Reliability

Another critical area for future research involves examining the inter-rater reliability of standardised tools and the impact of assessor training on evaluation consistency. While the development of tools such as the AMSAT and ANSAT prioritised psychometric validation, including reliability and sensitivity, future investigations should focus on testing inter-rater reliability and accounting for variables such as the individual assessors and their experience levels (Sweet et al., 2018; Ossenberg et al., 2020). Ossenberg et al. (2020) emphasised the significance of achieving consistency in evaluations through comprehensive assessor training and calibration processes. Addressing these variables would provide valuable insights into minimising discrepancies in assessments, further enhancing the reliability of WIL assessment tools. This line of inquiry is pivotal for developing evidence-based strategies to support assessor preparation and ensuring the reliability of tools in diverse WIL settings. At the same time, it is important to recognise that achieving inter-rater reliability is particularly challenging within WIL environments across allied health, given the variability of clinical contexts, placement structures, and assessor expertise. Nonetheless, establishing rigorous processes to manage assessor variance remains essential to optimising tools such as the

APPCAT and its performance indicators, thereby supporting the delivery of consistent and standardised assessments.

6.4.4 Applicability Across Diverse WIL Settings

There is opportunity to explore the application of a nationally standardised tool, such as the APPCAT and its associated performance indicators, across diverse WIL settings outside of jurisdictional ambulance services to evaluate their generalisability and effectiveness. Similar approaches have also been demonstrated in midwifery, where the Australian Midwifery Standards Assessment Tool (AMSAT) was validated against the *Australian Midwife Standards for Practice (2018)*, confirming its reliability and content validity across diverse clinical settings (Sweet et al., 2020). Weber et al. (2024) highlights, the evolving scope of practice in paramedicine necessitates ongoing updates to capability frameworks to ensure their relevance. While the APPCAT and performance indicators have been designed with diverse WIL settings in mind, future research could also investigate how nationally standardised tools can be adapted to accommodate changes in scope of practice and evolving healthcare demands, ensuring they remain effective in assessing paramedic capabilities. For example, the increasing integration of community paramedicine roles, where paramedics deliver primary care or manage chronic diseases in non-emergency settings, underscores the need for additional or revised capabilities. These may extend beyond the current professional capabilities to include more explicit skills in chronic disease management, preventive health interventions, patient self-management education, referral and care navigation and telehealth-enabled practice. To remain comprehensive and applicable, tools such as the APPCAT would need to incorporate performance indicators that assess these non-traditional skills, ensuring their utility in evaluating paramedics across diverse and dynamic practice environments.

6.4.5 National Transferability and Employability

Despite limited evidence addressing the interstate transferability of WIL assessment tools in paramedicine, this gap presents a significant opportunity for the development of standardised assessment frameworks. Implementing a nationally consistent WIL assessment framework,

as proposed in this research, could facilitate the uniform evaluation of paramedicine students across states and territories. Such standardisation has the potential to enhance the portability of qualifications and reduce barriers for graduates seeking employment across various jurisdictions and healthcare settings.

Aligning WIL assessments at a national level also supports broader objectives of professional mobility and workforce adaptability, as evidenced in allied health disciplines. For instance, nationally implemented frameworks like the ANSAT have enabled competency transitions across state borders and can build workplace capacity and appraise performance of graduate registered nurses. Similarly, the proposed paramedicine WIL assessment tool could provide a consistent mechanism for documenting student capabilities and achievements, aiding employers in making well-informed hiring decisions.

Moreover, a standardised assessment tool could further support accreditation bodies in upholding consistent educational standards, thereby strengthening the credibility of the profession and fostering public trust. While direct evidence of such applicability in paramedicine remains limited, these considerations underscore the importance of designing assessment tools with national relevance to promote workforce mobility and meet the evolving demands of the paramedicine profession.

Chapter 7: Conclusion

Work Integrated Learning (WIL) is a crucial element in the education and preparation of undergraduate paramedicine students. Despite its importance, the absence of a standardised national assessment tool for evaluating undergraduate paramedicine students during WIL is a notable concern. Effective assessment tools must be accessible, practical, and user-friendly, enabling supervisors to document evidence of student performance in alignment with professional registration and accreditation standards. Consistent and transparent assessment language can improve reliability across assessors, WIL settings, and paramedicine programs, fostering consistent evaluation practices. Accordingly, the use of consensus-based performance indicators enables supervisors to apply the professional capabilities within the WIL settings, providing observable and contextualised examples of student performance that support consistent and reliable assessment.

The methodological rigour underpinning the design of this research is evident in its use of mixed methods, which integrate robust statistical analysis and qualitative insights to construct performance indicators. Unlike many allied health disciplines that have relied solely on qualitative methods, this approach combines statistical rigor with qualitative perspectives, ensuring a comprehensive evaluation of the tool's content validity and national applicability. Overall, this research framework represents one of the most rigorous developments and analyses of performance indicators documented in the comparative literature reviewed. This dual-method approach reinforces the tool’s robustness in assessing professional capabilities within WIL contexts and establishes a significant advancement in evidence-based assessment for paramedicine education, particularly given the limited existing research in this specific field.

The purposive recruitment of participants through a modified Delphi survey further strengthened the credibility of this research. This approach supported a comprehensive understanding and ensured that the consensus-building process reflected contemporary knowledge and practices within paramedicine. While all participants held academic positions, approximately half also remained operational as paramedics, representing the supervisor

cohort and contributing valuable, field-based insights. This combination of academic and practical expertise enhanced the development of the tool, ensuring it operates as a formal mechanism for WIL assessment that aligns with accreditation and registration framework.

The standardisation achieved through the APPCAT and its accompanying performance indicators offers transformative opportunities for the paramedicine profession. This includes national benchmarking and evaluation across programs, enhanced quality assurance, streamlined accreditation processes, improved interoperability, and clear expectations for both WIL supervisors and students. Additionally, the tool can support curriculum design and inform professional development opportunities. Collectively, these benefits contribute to the enhancement of paramedicine education, assessment practices, and the future paramedic workforce in Australia. Standardisation has been a critical element in ensuring consistency, safety, and quality of care.

In summary, the research and developed tool delivers several key contributions:

- **Meeting Accreditation Standards**: The tool serves as a formal mechanism for meeting the Program Accreditation Committee standards during WIL.
- **Alignment with Professional Frameworks:** Ensures integration with the Paramedicine Board of Australia's Professional Capabilities for Registered Paramedics (PCFRP*)*, supporting student preparedness to meet the standards of safe and professional practice.
- **Performance Indicators**: Provides contextual and observable performance indicators which directly align with the PCFRP, which can facilitate the scoring, attainment and verification of student performance during WIL assessment.
- **Enhancing Assessment Processes**: Strengthens standardisation, clarity, and reliability in supervisor evaluations by providing a structured framework that minimises ambiguity and subjectivity.
- **Enhancing Transparent Learning:** Establishes clear expectations for students, promoting a structured learning experience that supports the demonstration of safe and professional practice.

This reflects a similar trajectory to the adoption of validated assessment tools in allied health disciplines such as nursing, midwifery, and physiotherapy. The unique contribution of this research lies in the creation of nationally standardised performance indicators that translate abstract professional capabilities into measurable, contextual, and observable examples of performance within Work-Integrated Learning (WIL). These indicators are integral to fostering assessments that are reliable, consistent, objective, and transparent. By aligning with national registration and accreditation standards, they provide a practical mechanism to verify undergraduate students' preparedness for professional practice. In doing so, they uphold quality, safety, and best practice for students, supervisors, and the wider community. Ultimately, the performance indicators strengthen educational quality and accountability across higher education providers, establishing the essential foundation upon which tools like the APPCAT can operate. Their development represents a pivotal advancement in paramedicine education in Australia, supporting safer, capability-aligned practice and contributing to better preparation of students for professional practice.

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Appendix

The following section presents the Performance Indicators (PIs) aligned to each capability from the Professional Capabilities for Registered Paramedics (PCFRP). The list includes all 472 PIs used in Round 1, with those selected by participants shown in bold.

Domain 1 - The professional and ethical practitioner	
Capability 1.1 Practise ethically and professionally, consistent with relevant legislation and regulatory requirements.	1. Arrives punctually 2. Wears uniform appropriately / according to dress code 3. Wears an identification badge and identifies self **4. Organises self to provide effective care** 5. Calls appropriate personnel to report intended absence 6. Arrives fit to practice 7. Maintain personal health and well-being to ensure fitness to practice and provide safe patient care 8. Notifies of circumstances that may affect adequate / safe practice 9. Notifies an impairment, conduct, or performance of a registered health practitioner that may place the public at risk **10. Complies with mandatory reporting obligations for suspected abuse, neglect, or harm to vulnerable individuals** **11. Maintains patient privacy and confidentiality sharing information only with those involved in care** **12. Obtains informed consent, prior to medical assessment or treatment** 13. Provides the patient with information about risks, benefits, and alternatives in health care treatment **14. Respects the patients' rights and autonomy, involving them in decision-making about their care** 15. Understands and respects patient rights

	16. Maintains appropriate professional boundaries with patients and health professionals 17. Practises sensitively according to cultural diversity needs / cultural context **18. Provides culturally safe healthcare to patients from diverse backgrounds** 19. Seeks assistance when task is outside capability or scope of practice **20. Understands the healthcare system's structure, healthcare professionals roles, including their own role within the system** 21. Collaborates and refers to other health professionals as required **22. Applies ethical reasoning in health care** **23. Applies the basic principles of bioethics, such as autonomy, beneficence, non-maleficence, and justice, to practice** **24. Follows legal framework, policies and procedures of the health service (e.g. Practice Guidelines, WHS, and Infection Control)** **25. Understands legal, ethical, and professional responsibilities including scope of practice** **26. Complies with the applicable legislation governing the safe use of scheduled medicines, ensuring proper administration, storage, and documentation** 27. Safely uses scheduled medicines **28. Applies/Adheres to the AHPRA Shared Code of Conduct** **29. Demonstrates knowledge of professional responsibilities and applies the PBA's Code of conduct to practice**
Capability 1.2 Provide each patient with an	**1. Provides dignity and respect to all patients** **2. Treats all patients with respect, empathy, and dignity**

appropriate level of dignity and care.	3. **Asks patients how they identify with respect to culture, ethnicity, nationality, religion, gender identity and sexual orientation** 4. **Provides holistic care that acknowledges and respects the values, beliefs, and practices of diverse individuals and communities** 5. Identifies cultural origin of the patient 6. **Demonstrates cultural sensitivity across a range of contexts/tasks** 7. Practices sensitively in the cultural context 8. Respects and accommodates cultural differences of the patient 9. **Involves patients in decision-making, considering their cultural values and preferences** 10. **Ensures patients culturally specific needs are met** 11. Considers cultural practices, preferences, and spiritual beliefs in the delivery of healthcare 12. **Acquires knowledge and understanding of cultural and linguistic diversity, including the customs, traditions, and beliefs of diverse communities** 13. **Develops effective communication skills, including active listening and using culturally appropriate language and communication styles** 14. **Seeks clarification and understanding to bridge potential language and cultural barriers** 15. **Practices in a non-judgmental, non-discriminatory way and promotes inclusivity** 16. **Provides a welcoming and supportive environment, free from racism, where patients can access safe and responsive healthcare** 17. **Provides healthcare that is accessible, responsive, and free from racism for Aboriginal and Torres Strait Islander**

	patients and patients belonging to other marginalised groups **18.** Promotes diversity, inclusivity, and cultural safety within the healthcare team **19.** Utilises community resources and partnerships to support culturally safe care. **20.** Uses interpreting services when necessary **21.** Involves family/others appropriately to ensure cultural/spiritual needs are met 22. Accommodates the role of family in Aboriginal and/or Torres Strait Islander decision making **23. Recognise the importance of self-determination and involve patients, their families, and communities in the decision-making process** **24. Seeks patient input, involvement, and feedback** 25. Collaborates with Indigenous health workers to optimise patient outcomes **26. Recognises and manages own attitudes and potential power imbalances** **27. Acknowledges potential impact of own views on patient care** **28. Reflect on personal biases, assumptions, stereotypes, and prejudices to address and mitigate them.** **29. Addresses biases, assumptions, stereotypes, and prejudices in interactions and care.** 30. Recognise the influence of personal values and beliefs on healthcare interactions and strive for impartiality 31. Maintains professional boundaries colleagues and patient **32. Advocates for equitable healthcare access and treatment for vulnerable populations**

Capability 1.3 Assuming responsibility and accept accountability for professional decisions.	**1. Communicates concerns or incidents of unsafe or unprofessional practice** 2. Identifies when own/others health or wellbeing affects safe practice 3. Advises preceptor of circumstances that may impair adequate work performance 4. Takes leave of absence when unwell or unfit to practice **5. Demonstrates appropriate self-care and other support strategies (eg: stress management, peer support)** 6. Declares own limitations and communicates this responsibly **7. Acts within capability, recognising personal and professional strengths and limitations** **8. Participates in debrief and discussion to address events** **9. Engages in ongoing self-assessment and reflection** **10. Seeks feedback from colleagues and patients to evaluate the effectiveness of practice and make necessary adjustments/improvements** 11. Ensures practice aligns with organisational policy and professional standards **12. Takes responsibility and accountability for their actions** **13. Recognises unsafe or unprofessional practice of themselves or others** 14. Aligns their practice with workplace directives, policies, procedures and guidelines. 15. Applies quality framework to practice (Australian Safety and Quality Framework for Health Care) **16. Endeavours to provide high quality care and patient safety**
Capability 1.4 Advocate on behalf of the	**1. Advocates for patients** 2. Act as a patient liaison ensuring their needs and concerns are communicated and addressed

patient when appropriate in the context of the practitioners practice as a Paramedic.	**3. Actively listens to patients** **4. Ensuring patients voices are heard and their concerns are addressed within the healthcare system** **5. Encourages patient involvement in decision-making** 6. Supports and assists the patient with choice of care **7. Supports patients in decision-making processes** 8. Supports patients to make informed choices 9. Respects patient values, beliefs, and preferences **10. Provides information and education to patients about their condition, treatment options, and available resources** 11. Advises if a patient might be at risk **12. Recognise when patients are in vulnerable positions and provide appropriate support and advocacy (age, disability, language barriers, or diminished capacity)** **13. Recognise when patients may be unable to advocate for themselves (emergencies, mental health crises, communication barriers)** **14. Recognise when it may be appropriate to intervene on the patient's behalf (safety, well-being, or rights are at risk)** **15. In situations where a patient's safety, well-being, or rights are at risk, taking immediate action to intervene, report, or escalate** **16. Promotes patient safety and well-being by identifying and addressing any instances of unsafe or substandard care** **17. Identifies signs of inadequate treatment, neglect, or breaches in professional conduct** **18. Advocates for appropriate resources and support services for patients (complex needs or marginalised backgrounds)** **19. Advocates for necessary interventions, treatments, or services that may be overlooked or delayed**

	20. Acts with integrity and in the best interests of the patient when making referrals, and providing or arranging treatment or care 21. Collaborates with healthcare teams to ensure the patient's best interests are upheld and needs are met 22. Collaborates with healthcare professionals and interdisciplinary teams to ensure holistic, patient-centred care 23. Seeks clarification or additional information when there are discrepancies or uncertainties in the patient's care
Domain 2 - The communicator and collaborator	
Capability 2.1 Communicates clearly, sensitively and effectively with the patient and other relevant people	**1. Greets and introduces self to patient and others** **2. Communicates effectively and appropriately with preceptors and patients** **3. Recognises barriers to optimise communication** **4. Demonstrates an appropriate range of communication styles (written, verbal, non-verbal, body language)** **5. Adjusts communication style based on the person's age, cultural background, language proficiency, or physical or cognitive limitations** 6. Engages third parties and interpreters when required **7. Actively listens** 8. Avoids interrupting 9. Maintains eye contact, nods, or provides verbal cues to indicate understanding and engagement **10. Uses appropriate body language, facial expressions, and gestures** **11. Uses appropriate non-verbal cues to convey empathy, reassurance, and respect** **12. Questions effectively to gain appropriate information**

	13. Uses open-ended questions to encourage communication **14. Provides clear instructions and information** **15. Confirms understanding by summarising or repeating key information** 16. Breaks down complex information into simpler terms **17. Uses suitable language & avoids jargon** **18. Responds promptly and respectfully to patient queries, concerns, and issues** **19. Communication is considerate of confidentiality and privacy** 20. Provides appropriate, positive reinforcement **21. Shows understanding and empathy during communication** 22. Encourages patients to provide information without embarrassment or hesitation **23. Undertakes evidence-based patient handover (ISBAR, IMIST AMBO)** **24. Assists with documenting patient care records** 25. Records and communicates patient outcomes where appropriate 26. Written information is clear, accurate, and easy to understand 27. Complies with organisational policy, protocols, and legislation for communication (including social media / alternative platforms) **28. Aware of cultural differences, customs, and norms, and adapts communication accordingly** 29. Uses respectful and non-discriminatory language **30. Uses inclusive language that respects the individual's identity, culture, and values**
Capability 2.2 Collaborate with other health practitioners	**1. Demonstrates an understanding of team processes** 2. Recognises and values the contributions of each team member **3. Fosters a positive and productive working environment** **4. Works respectfully with health care staff and patients**

	5. Collaborates with other healthcare team members to ensure continuity of care 6. Contributes appropriately in team meetings and discussions **7. Familiarises oneself with the roles and responsibilities of different healthcare team members and service providers** **8. Acknowledges expertise and role of other health care professionals and refers/liaises when required** 9. Understands how these roles interact with the role of a paramedic **10. Consults with registered health practitioners, accredited health professionals, volunteers, police, fire and other emergency personnel as needed** **11. Communication is timely, accurate, and relevant to the patient's care** 12. Engages in effective communication to exchange information **13. Provides comprehensive and accurate handover information for continuity of care (IBAR, IMIST AMBO)** 14. Maintains effective communication with preceptors 15. Keeps preceptor informed and asks for help when needed 16. Participates in decision-making **17. Shares relevant information and seeks input from team members when making decisions** **18. Delegates tasks appropriately based on the capabilities and qualifications of other team members** 19. Provides clear instructions and expectations for the delegated task 20. Ensures clear communication of responsibilities and expectations of delegated tasks 21. Offers support and guidance when needed

Domain 3 - The evidence-based practitioner	
Capability 3.1 Make informed and reasonable decisions	**1. Locates best evidence, relevant literature, research publications and health education materials to guide practice** **2. Stays informed about current guidelines, protocols, and evidence-based practices** 3. Consults reliable and up-to-date reference materials, research articles, or clinical databases **4. Accesses relevant educational resources and professional development opportunities** 5. Clarifies understanding and application of evidence with preceptors 6. Able to interpret evidence to guide practice 7. Shares evidence with others 8. Applies evidence to clinical practice appropriately 9. Assists patients and carers to identify reliable and accurate health information 10. Engages in collaborative discussions when decision-making **11. Consults with preceptors for input and guidance when making decisions** **12. Considers the impact of personal values and biases on decision-making** **13. Considers the individual patient's needs and preferences.** **14. Provides person-centred care** 15. Acts in the best interests of the patients **16. Weighs the available evidence and make decisions based on the best interests of the patient** 17. Makes decisions based on all relevant information **18. Ensures decisions are sensible, practical, and culturally safe**

Capability 3.2 Use clinical reasoning and problems solving skills to determine clinical judgement and appropriate actions.	1. Generates diagnostic hypotheses, identifying the priorities and urgency of further assessment and intervention 2. Determines the need for immediate treatment or intervention 3. Recognise when referral to specialised services are necessary **4. Identifies the time criticality of treatment, referral, handover, and when appropriate transport** **5. Critically appraise literature and evidence to inform clinical decision-making** **6. Incorporates the best available evidence into clinical decision-making** **7. Applies evidence-based interventions and treatments based on patient needs** **8. Reflects on their own clinical experiences, challenges and practice** 9. Evaluates the outcomes and effectiveness of their interventions **10. Makes improvements and adjustments to their practice based on evidence and patient outcomes** **11. Integrates reflective knowledge into practice**
Capability 3.3 Draws on appropriate knowledge, resources and skills in order to make professional judgements.	**1. Seeks input from patients, relatives, and carers to understand their perspectives and preferences** **2. Evaluates the outcomes and effectiveness of their interventions to make informed adjustments as necessary** **3. Continuously reflects on their own biases, assumptions, and prejudices to minimise potential cultural barriers and promote inclusive care** **4. Considers the cultural, social, and personal factors of the patient, their relative and carers in the decision-making process** **5. Adapts approaches and interventions based on the individual's cultural background, beliefs, and values**

	6. Adapts communication and care approaches to accommodate diverse cultural and linguistic needs 7. Incorporates cultural practices and customs into the care plan when appropriate **8. Demonstrates situational awareness** 9. Regularly assesses the environment for potential risks and hazards 10. Stays alert and attentive to changes in the patient's condition or the surrounding circumstances **11. Adjusts interventions and strategies in response to emerging risks or changing situations** **12. Prioritise the safety of the patient, colleagues, and oneself in all actions and decisions** **13. Uses information technology appropriately to support practice** 14. Assists patients and carers to identify reliable and accurate health information **15. Uses communication technologies, such as telemedicine or video conferencing, when appropriate** 16. Stays up to date with advancements in medical technology and digital healthcare tools 17. Accesses and navigates online databases and resources for clinical research and evidence
Capability 3.4 Identify ongoing professional learning, development needs and opportunities	**1. Shows an understanding of legal and professional obligations regarding continuing professional development (CPD)** 2. Maintains a record of learning in accordance with educational requirements 3. Keeps records of formal and informal learning and development activities

	4. Engages in the completion of the clinical placement assessment 5. Links course learning outcomes to own identified learning 6. Participate in training opportunities **7. Is proactive in seeking out and engaging with learning opportunities** **8. Seeks and engages a diverse range of experiences to develop professional skills and knowledge** **9. Takes responsibility for learning and seeks opportunities to meet learning needs** **10. Uses downtime appropriately** **11. Self identifies or seeks support from others for improvement, growth and learning needs** **12. Reflects on experiences to identify learning needs** 13. Incorporates formal and informal feedback from colleagues into practice **14. Responds in a positive manner to questions, suggestions &/or constructive feedback reviews and prepares appropriate material before and during the placement** 15. Sets personal learning goals for each shift/week and is proactive in achieving them **16. Can reflect upon feedback and devise strategies for development of knowledge and skill** **17. Develops and/or implements a plan of action in response to feedback and learning need** **18. Demonstrates self-evaluation, reflects on progress and implements appropriate changes based on reflection** 19. Plans professional development based on reflection of own practice 20. Reflects on activities completed to inform practice

	21. Continuously evaluates and update their knowledge and skills 22. Supports and encourages the learning of others 23. Continuously educates oneself about cultural competence, diversity, and best practices for adapting care to different groups
Domain 4 - The safety and risk management practitioner	
Capability 4.1 Protect and enhance patient safety	**1. Verifies patient identification during assessment treatment and interfacility transfers** **2. Ensures accurate and complete handover of patient information to and from the receiving healthcare facility** 3. Assesses the patient's condition and stability before transfer 4. Complies with manual handling and WHS policy for patient handling and transfers 5. Uses manual handling equipment appropriately (lifting cushion, slide sheet, boomerang board, multipurpose chair) **6. Uses manual handling equipment to minimise physical demands and risk of injury to self and others** 7. Uses manutention and self-protective behaviours (positioning, bracketing, bracing, counterbalance) 8. Utilises patient spontaneous movement and lifts as a last resort **9. Considers the patient's comfort, dignity, and any special needs during the move/transfer** **10. Follows aseptic techniques during procedures to minimise the risk of infection** 11. Maintains a sterile working environment **12. Undertakes effective hand hygiene** 13. Undertakes disinfection of vehicle and equipment 14. **Manages and dispose of sharps safely**

Capability 4.2 Maintain safety of self and others in the work environment	1. Aware of relevant legislation and policies pertaining to workplace health and safety 2. Understands legal responsibilities related to health and safety in the workplace **3. Understands personal responsibilities for ensuring a safe working environment** **4. Undertakes Dynamic Risk Assessment** 5. Systematically identifies safety hazards in the workplace. **6. Recognises potential risks associated with equipment, patient care, environmental conditions, and other aspects of care** 7. Identifies risks and hazards, considers changes in the environment, patient condition, or circumstances **8. Identifies risks and hazards, such as unsafe equipment, environmental risks, or ergonomic issues** **9. Reports hazards, risks, adverse events and near misses to the appropriate person** 10. Communicates openly with others about safety concerns and minimises risks 11. Adjusts practices and procedures to mitigate risks and ensure the safety of themselves and others **12. Provides care that ensures patient safety** **13. Maintains the safety of themselves and others in the work environment** **14. Works in and around the ambulance vehicle and dynamic environments safely** **15. Uses appropriate personal protective equipment (PPE) that is appropriate to the task/hazard** **16. Adheres to protocols for donning and doffing PPE, to prevent contamination and ensure its effectiveness** **17. Fosters a culture of safety within the workplace**

	18. Participates in safety training programs when the opportunity arises
Capability 4.3 Operates effectively in an emergency care environment.	**1. Recognises urgent and non-urgent requests for assistance in a low risk manner** **2. Conducts an initial assessment of an emergency scene, to ensure safety of the patient and the responders** **3. Identifies the need for additional resources and support** **4. Identifies the need for other emergency services, specialist agencies, and allied health services/ alternative healthcare pathways** **5. Considers the clinical condition of the patient, urgency of the situation, and environmental factors to refer non-urgent patients to alternative healthcare pathways** **6. Collaborates with others emergency services or rescue organisations for extrication, transfer and treatment (SES, police and fire)** **7. Considers alternative transport resources (non-emergency patient transport, aeromedical, complex patient ambulance vehicle, manual handling vehicle)** **8. Recognises when the patient is time critical or has a specific clinical need** 9. Identifies the clinical need of patients and prioritising care based on severity 10. Coordinates extrication/evacuations safely with other emergency services and specialist agencies 11. Arranges extrication, transfer or transport safely, taking into account the clinical need, time criticality and the environment 12. Formulates a plan for extrication and monitors risks and hazards adjusting the plan as needed

	13. Considers a contingency plan for extrication, transfer and transport
Capability 4.4 Maintains records appropriately	1. Uses appropriate medical terminology **2. Use appropriate medical terminology, abbreviations, and acronyms when documenting patient information** **3. Gathers/documents patient information (history, past history, medications and allergies)** 4. **Maintains accurate records of the patient's medical history, including previous illnesses, surgeries**, **medications, and allergies, ensuring the information is comprehensive and up to date** **5. Captures essential information related to the patient's condition, assessments, interventions, and outcomes** **6. Records vital signs in a clear and organised manner** 7. Is able to record patient information systematically 8. Records the medication name, dosage, route, time of administration, and any adverse reactions or patient responses 9. Provides detailed descriptions of injuries, including location, size, and associated symptoms, to assist with diagnosis and treatment decisions **10. Information recorded is logically structured, legible, and concise** 11. Participates in documenting patient care records (PCR) 12. Reviews and comprehends patient handover paperwork 13. Documents a concise and comprehensive record of the patient's condition and treatment **14. Communicates pertinent information to other healthcare professionals involved in patient care**

	15. Documents legal or ethical considerations, such as informed consent, patient refusals, and advance directives, ensuring compliance with regulations 16. Safeguards patient information **17. Demonstrates an understanding of the legal and ethical obligations related to patient confidentiality and privacy** **18. Utilise electronic health record systems to document patient information accurately and securely** **19. Demonstrates an understanding of the legal and ethical aspects of data ownership, storage, retention, and destruction, in accordance with relevant legislation.** **20. Maintains patient records appropriately, ensuring accurate, confidential, and compliant documentation of patient care**
Capability 4.5 Monitors and reviews the ongoing effectiveness of their practice and modify it accordingly.	**1. Evaluates the proposed paramedicine care plan** **2. Monitors patient throughout intervention** **3. Makes modifications to intervention based on evaluation** **4. Records and communicates outcomes where appropriate** **5. Demonstrates &/or describes safe and sensible treatment progression** 6. Treats and refers patients appropriately **7. Modifications, continuation or cessation of intervention are made in consultation with the patient, based on best available evidence** 8. Discontinues treatment in the absence of measurable benefit **9. Continuously assess and reassess the patient's condition to determine the most appropriate course of action** **10. Actively seeks and considers feedback from colleagues, supervisors, and patients** **11. Demonstrates the rationale behind decisions, in a clear and concise manner**

	12. Analyses the reasoning behind care or treatment choices, considering alternatives, and making adjustments based on evidence and best practices **13. Regularly assess and evaluate their own practice to identify areas for improvement** **14. Engages in self-assessment/reflection to evaluate the effectiveness of their practice** **15. Engage in critical reflection on patient encounters and treatment decisions** 16. Utilise evidence-based clinical guidelines and protocols as a basis for decision-making 17. Informed about the latest clinical guidelines and adapts their practice accordingly 18. Participate in continuous improvement initiatives 19. Engages in peer review processes
Capability 4.6 Audit, reflect on and review practice.	**1. Actively seeks feedback from preceptors and patients** **2. Reflects on written and verbal formative/summative feedback from preceptor** 3. Act upon preceptor feedback and actively contributes to quality improvement initiatives **4. Incorporates the preceptors feedback during placement/practice/patient care.** **5. Engages in self-reflection to evaluate personal performance** 6. Reflects on own practice and applies this to future practice 7. Reflects on patient outcomes and compares this with clinical benchmark/guideline **8. Understands some key performance indicators and how they are relevant to daily operations (e.g.: ECG in 10 minutes, turn out time, clear time)**

	9. Understands the importance of quality assurance in monitoring and improving the overall quality of paramedicine practice 10. Understands the purpose and benefits of conducting audits and reviews in assessing and improving practice quality 11. Engages in quality assurance activity opportunities **12. Engages in the review processes, such as peer review or clinical audits, to assess and improve the quality of care provided** **13.** Contributes to data collection, analysis, and reporting as part of quality assurance programs
Capability 4.7 Participate in the mentoring, teaching and development of others.	**1. Displays leadership skills** 2. Leads by example **3. Serves the profession as a positive role model and ambassador** **4. Uses downtime to engage in ongoing education and professional development activities** **5. Facilitates opportunities to apply theoretical knowledge in practical training settings** **6. Uses initiative to engage in practical training with others at station** **7. Actively engages in teaching and mentoring activities to assist others in their learning and development** **8. Offers guidance and support to others/less experienced paramedics through coaching and mentoring relationships** **9. Shares knowledge, skills, and experiences to support others growth** **10. Actively contribute to knowledge sharing within the paramedic team**

	11. Shares relevant information, best practices, and lessons learned with others to enhance overall knowledge and performance **12. Shares insights, knowledge, and expertise to assist others in their professional growth** **13. Contributes to discussions and problem-solving activities within the team to address individual, or group challenges** 14. Shares personal experiences and lessons learned to facilitate collaborative problem-solving 15. Actively engages in research activities, such as data collection, analysis, or dissemination of findings, when possible
Domain 5 -The paramedic practitioner	
Capability 5.1 Use patient information management systems	**1. Participates in or observes the preceptor completing a patient healthcare record (PHCR)** 2. Is familiar with electronic or paper-based systems used to document patient information, including their features and functionality 3. Ensures the PHCR has been received when handing over to the healthcare facility **4. Understands that accurate and timely documentation is essential for providing continuity of care and ensuring patient safety** **5. Recognises the importance of accurate and timely patient documentation.** **6. Patient information is documented clearly, comprehensively, and in a timely manner** **7. Documents patient information reflecting the patient's condition, assessments, interventions, and outcomes**

	8. Recognises PHCR contain essential information related to the patient's medical history, assessments, treatments, and outcomes **9. Understands the importance of PHCR** 10. Understands that the patient record is a critical component of the patient's healthcare record 11. Verifies patient information for accuracy and completeness **12. Ensures compliance with legal and regulatory guidelines when completing, storing, accessing, and sharing PHCR** **13. Demonstrates awareness of patient privacy and confidentiality requirements** **14. Handles sensitive information appropriately and protects patient privacy** **15. Recognise that the information documented will serve as an essential reference for subsequent healthcare providers involved in patient care** **16. Understands legal requirements for completing and maintaining health records** **17. Understands the patient information management systems used in the workplace** 18. Understand the necessity of obtaining patient consent for the collection, use, and disclosure of their health information in compliance with legal requirements 19. Verifies patient information for accuracy during data entry, including demographic details, medical history, and medication lists **20. Ensures healthcare professionals have the necessary patient information for continuity of care** **21.** Educates patients about their rights and responsibilities concerning the use of their health information, including how it will be documented and shared

Capability 5.2 Assess and monitor the patient capacity to receive care	**1. Recognises the inability to proceed with a procedure due to safety, clinical or legal reasons** 2. Understands when to withhold CPR 3. Identifies patients who are not of sound mind and are at risk to themselves or others 4. Recognises patients experiencing acute behavioural disturbances / mental health presentations **5. Recognises circumstances that involve family violence and child safety** **6. Utilise parent or guardian when providing care to children** **7. Recognises vulnerabilities faced by certain patient populations, including those from cultural or Indigenous communities** **8. Considers various factors such as medical history, pre-existing conditions, mental health issues, cognitive impairments, language barriers, and socioeconomic factors that may impact the patient's behaviour or ability to undergo a procedure** **9. Assesses the patient's capacity to provide informed consent or refuse treatment** 10. Considers the patients understanding, decision-making abilities, and legal rights **11. Informs the patient about the procedure, potential risks, benefits, and alternatives, while respecting their autonomy and right to make decisions about their own care** **12. Obtains informed consent/refusal of treatment and ensures patient safety during procedures** **13. Identifies and respond to a patient deteriorating condition, or inability to undergo a procedure or treatment** 14. Assesses and monitors the patient, consistent with duty of care

	15. **Acts with duty of care, ensuring the safety, well-being and protection of others**
Capability 5.3 Understand the key concepts of the bodies of knowledge which are specifically relevant to paramedic practice	**1. Identifies normal functioning of body systems** 2. Identifies alterations that occur during disease or injury **3. Recognises the relationship between pathophysiology and the patient's presentation** **4. Demonstrates an understanding of human anatomy and physiology** **5. Uses evidence-based care tools – clinical practice guidelines and clinical skills work instructions during patient care and assessment** **6. Up to date with current evidence-based practice and incorporates research findings into their clinical decision-making** 7. Understands research methodologies and the ability to critically appraise scientific literature 8. Completes a structured clinical approach **9. Conducts a systematic and thorough patient assessment and determines appropriate interventions** 10. Conducts assessments and observations, interprets findings, and develops patient management strategies accordingly **11. Applies knowledge of physiology and pathophysiology to interpret data from the history, assessment, and investigations to inform patient management** **12. Applies understanding of human anatomy and physiology to assess the nature of the patient's injury or illness** **13. Compares findings to normal parameters** 14. Relates patient signs and symptoms to pathology 15. Correctly uses assessment equipment and tools

	16. Prepares the necessary equipment for patient assessment (ECG monitoring, BGL) 17. Completes assessment in acceptable/efficient timeframe 18. Seeks and interprets supplementary information, (e.g. accessing other information, medical records, test results as appropriate) 19. Generates a list of problems from the patient assessment 20. Identifies main presenting problem during patient assessment 21. Justifies prioritisation of problem/s based on knowledge and clinical reasoning **22. Prioritises important assessment findings** 23. Interprets findings at each stage of the assessment to progressively negate or reinforce the hypothesis/es **24. Appropriate assessments are performed to refine diagnosis** 25. Describes the implications of assessment findings 26. Describes the presentation and expected course of common clinical conditions **27. Conducts appropriate assessment considering biopsychosocial factors that influence health** 28. Goal-oriented assessment process, accommodating physiological and social factors of the patient **29. Recognise the impact of psychological and social factors on an individual's well-being and healthcare experience** **30. Consider intergenerational trauma, mental health conditions, cultural influences, and social determinants of health** **31. Modifies assessment in response to patient profile, feedback and relevant findings (paediatric, mental health, social factors, intergenerational trauma)** **32. Possess knowledge of physiological, pharmacological, behavioural, and functional aspects related to paramedic practice**

Capability 5.4 Conduct appropriate diagnostic or monitoring procedures, treatment, therapy or other actions safely	1. Prioritise the safety of themselves, patients, and others involved in care **2. Patient care is conducted safely, accurately and consistently** **3. Adheres to safety protocols, infection control measures, and personal protective equipment (PPE) requirements** 4. Assesses and manage scene safety to minimise risks and ensure a safe working environment for all **5. Practices safely and effectively across a wide range of patient presentations and circumstances** **6. Applies their knowledge and skills to provide appropriate care to patients of different ages, conditions, and backgrounds** **7. Adapts their approach to various settings, such as pre-hospital emergencies, inter-facility transfers, or community healthcare** 8. Arrives at a reasonable working diagnosis **9. Utilises assessment techniques, patient history, and clinical judgment to formulate a preliminary diagnosis** **10. Thinks critically and uses clinical rationale to justify assessment and treatment decision** **11. Continuously reassess and refine the diagnosis as more information becomes available during patient care** 12. Positions for safe and effective interventions **13. Determines optimal patient positioning to facilitate safe and effective interventions, such as airway management, immobilisation, or medication administration** **14. Considers factors like patient comfort, injury prevention, and maintaining clear access to critical workspaces** **15. Demonstrates knowledge of indications and contraindication for paramedic interventions** **16. Undertakes appropriately indicated paramedic interventions**

	17. Considers contraindications, potential risks, and modifications necessary based on the patient's condition **18. Modifies and adapt practice to ensure cultural safety** 19. Respects and integrate cultural beliefs, practices, and values into their interactions and care plans 20. **Fosters a culturally safe environment by actively listening to patients, considering cultural diversity, and providing inclusive care that respects individual needs**
Capability 5.5 Demonstrate the requisite knowledge and skills to participate in mass casualty or major incident situations	**1. Identifies a mass causality incident, when patients exceed resources (e.g. more than 2 patients)** 2. Understands the public health model for response to major incidents **3. Familiarises themselves with the principles and components of the public health model, which includes preparedness, response, recovery and mitigation** **4. Reviews/Familiarise themselves with the specific protocols and guidelines provided by their organisation/relevant authority for responding to major incidents** **5. Understands the roles and responsibilities of various stakeholders involved in major incidents (including paramedics, other healthcare professionals, emergency services, and public health agencies)** **6. Comprehends the importance of coordination, collaboration, and communication among these stakeholders during major incident response** **7. Understands the principles of incident command systems, resource allocation, and effective communication** **8. Understands principles of triage sieve and sort** **9. Assists with triaging of patients undertaking appropriate sieve and sort process**

	10. Prioritises the treatment of patients according to their triage code **11. Provides emergency medical care for multiple patients in a coordinated and efficient manner** 12. Assists with logistical requirements of a mass casualty incident **13. Considers the unique challenges and complexities of a major incident** 14. Complies with organisational protocols and guidelines during major incident 15. **Participate in training programs, drills, and exercises designed to enhance readiness and proficiency in major incident response**
Capability 5.6 Formulate specific and appropriate patient care and treatment actions	**1. Ensure the delivery of inclusive and person-centred care** **2. Adapts practice to meet the needs of different patient groups** **3. Adapts practice to the diversity of patient populations, considering factors such as physical abilities, psychological conditions, environmental contexts, cultural backgrounds, and socio-economic circumstances** 4. Tailors' patient approach and interventions accordingly to patient various patient groups 5. Recognise that lifestyle choices and factors can influence an individual's health **6. Recognise that lifestyle choices and factors can influence an individual's health and impact the interaction between the patient and the paramedic** **7. Demonstrates sensitivity and empathy towards the patient's unique circumstances, and how lifestyle choices can affect their health outcomes**

	8. **Approach patients' lifestyles without judgment, recognising that different lifestyles are influenced by various factors and personal choice** 9. **Identifies barriers that may prevent patients from adopting healthier lifestyle choices** 10. **Engages in open and respectful conversations with patients to understand their lifestyles, habits, and routines** 11. Provides information on how certain lifestyle choices may impact health, empowering patients to make informed decisions. 12. Encourages sustainable lifestyle changes that contribute to better health outcomes 13. **Collaborates with patients to set realistic health goals that align with their lifestyles and preferences** 14. Tailor care plans to consider patients' lifestyles, taking into account factors like diet, exercise, sleep patterns, and daily routines 15. **Applies their knowledge and expertise to assess and analyse patient situations, considering relevant information to make informed judgments and decisions** 16. **Engages in critical thinking, problem-solving, and clinical reasoning to determine appropriate care** 17. **Evaluate complex situations, considering multiple factors and potential outcomes to make informed decisions** 18. **Integrates medical knowledge, logical reasoning, and problem-solving to provide comprehensive care** 19. **Collaborates with fellow healthcare professionals to discuss complex cases, seek input, and collectively arrive at well-informed decisions** 20. Incorporates the latest medical research and evidence into decision-making

	21. Make quick and accurate decisions during emergencies, applying knowledge and reasoning to rapidly evolving situations 22. Takes a logical and systematic approach to problem-solving, considering the patient's cultural background and applying culturally safe frameworks 23. Prioritising tasks during patient care to ensure safe outcomes