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RESEARCH REPORTS

MAPPING THE EVOLUTION OF PARAMEDICINE EDUCATION: INSIGHTS, TRENDS, AND RECOMMENDATIONS FOR PRIMARY HEALTHCARE PREPAREDNESS

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ABSTRACT

Paramedicine education faces challenges in aligning curriculum with evolving practice. Despite updates, our study reveals minimal change since 2018, especially post-transition from the Council of Ambulance Authorities to Paramedicine Board of Australia accreditation. Updates in cultural competency and interprofessional education are noted, but primary healthcare integration remains inadequate, showing a critical gap between education and practice needs. This study assesses the alignment of paramedicine curricula in Australian higher education with evolving practice scopes, focusing on essential components for primary healthcare preparedness. Using a sequential meta-synthesis approach, integrating consensus evaluation via the Delphi method (2018) and RESPIGHT care model analysis (2024), the study examines paramedic curricula from 2018 to 2024. Data from sixteen Australian higher education institutions offering paramedicine programs. Sixty-eight paramedic academics participated in the Delphi study, providing expert insights into curriculum design and alignment. Using the RESPIGHT framework, data extraction and analysis focused on key components crucial for paramedic readiness. The study evaluated alignment with contemporary practice standards and identified curriculum design gaps. Findings indicate varying degrees of alignment across institutions, with limited integration of primary healthcare components. The study highlights the need for ongoing refinement in curriculum design to meet evolving practice demands.

BACKGROUND

The relevance of curriculum in paramedicine education has long been debated, with advocates stressing the need for a contemporary and dynamic curriculum to meet the profession's evolving demands (Weber et al., 2021). Recent literature highlights that graduates must possess functional expertise and the ability to navigate uncertain environments (Ericsson et al., 2022; Reay et al., 2018). O'Meara et al. (2014) previously called for dynamic curricula that adapt to paramedicine's rapid evolution, a concern echoed across various contexts (Spelten et al., 2023).

Newton et al. (2020) reinforce the call for adaptability by emphasizing the accelerated pace of curriculum changes driven by employer demands and technological advancements. This highlights the need for swift adaptation to keep educational programs current. The paramedicine education sector is encouraged to regularly update course materials and validation processes to align with stakeholder expectations and stay abreast of clinical advancements.

Newton et al. (2020) highlight the necessity for swift curriculum adaptations due to employer demands and technological advancements. Historically, paramedic education varied significantly across training programs, prompting a shift to higher education to standardize curricula and competencies (Brooks et al., 2018). As paramedic practice evolves, especially regarding primary health care, curriculum adaptations and national standards become essential to align with contemporary healthcare delivery models (Newton et al., 2020).

Several models have been proposed to outline the professional capabilities necessary for paramedics (Newton et al., 2020; Eaton et al., 2021; Australasian College of Paramedic Practitioners, 2022), yet variability remains in the specific knowledge and skills required for paramedicine students (Shannon et al., 2022). Addressing this gap is crucial for new graduates to effectively contribute to their organizations. Integrating work experience and clinical exposure is vital for developing practical skills.

These insights are significant as they stress the importance of curriculum alignment in preparing healthcare professionals for integrated primary care roles. By addressing educational gaps, healthcare programs can improve responsiveness to healthcare system needs, leading to better patient outcomes.

The primary objective of this research was to examine the development of paramedicine program curricula in Australian higher education institutions since 2018. To achieve this objective, the study addressed the research questions focused on identifying the critical elements of an effective paramedic curriculum that adequately prepares graduates for employment in primary healthcare settings. How well do Australian higher education institutions' paramedicine curricula align with the evolving scopes of practice in paramedicine, particularly in preparing graduates for primary healthcare roles, based on an analysis from 2018 to 2024?

CONCEPT/DESCRIPTION

The research employed a sequential meta-synthesis design, which was chosen for its ability to systematically integrate and interpret findings from multiple studies coherently (Figure 1) (Butler-Henderson et al., 2020). This approach allows for a comprehensive exploration of the research topic by building upon the insights gained from each phase of the synthesis process.

In the context of the described research approach, the sequential meta-synthesis method involves synthesizing findings from multiple studies, each with its interpretations and perspectives. This aligns with the constructivist view that knowledge is constructed through the interaction of researchers with the data and the interpretations they make based on their understandings and perspectives (Mills et al., 2006).

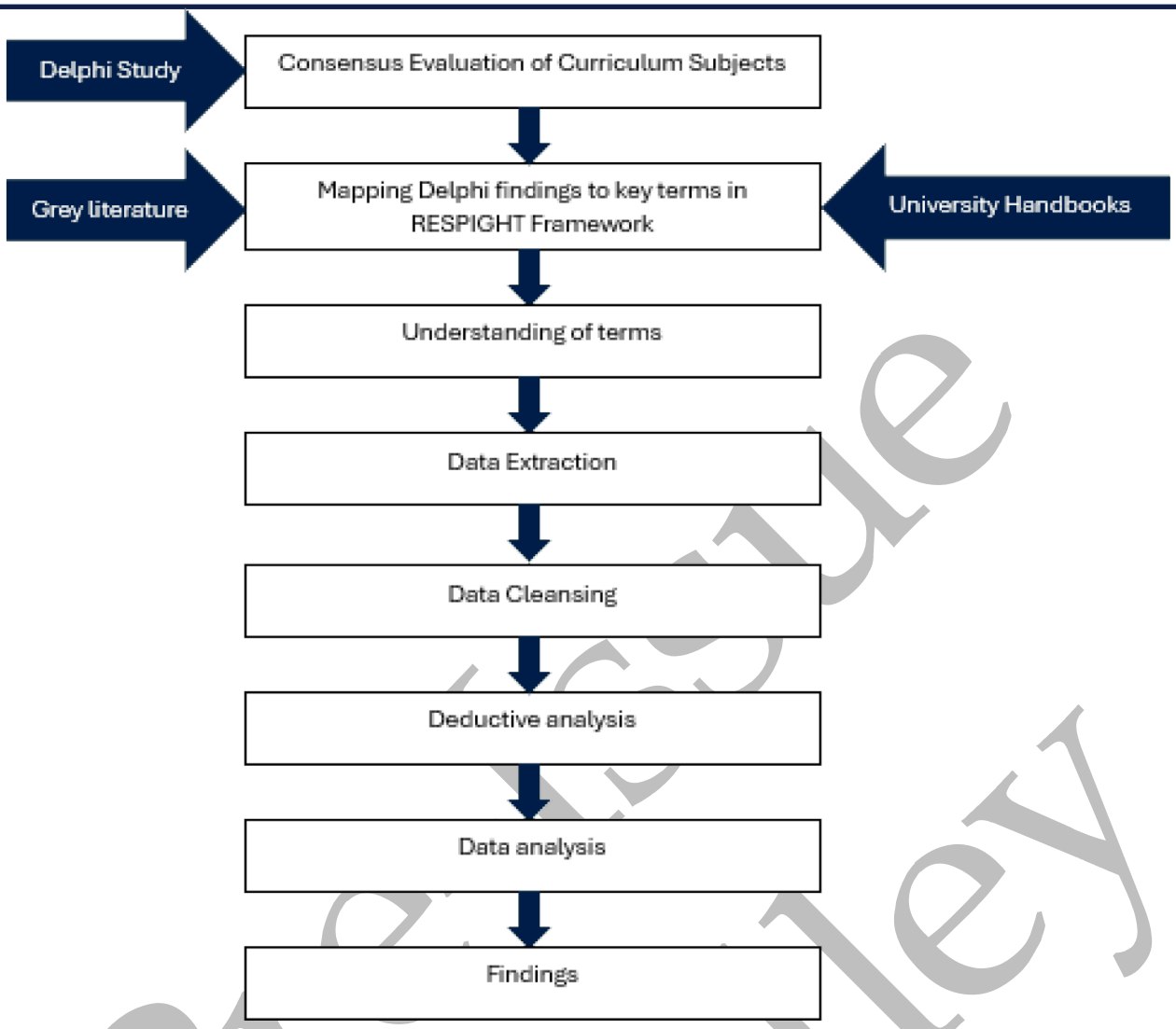

Figure 1. Progress and sequence of methods.

The choices made in the methodological approach were guided by the aim of achieving a comprehensive understanding of the evolution of paramedicine program curricula. Each step in the sequential meta-synthesis process was designed to build upon the previous one, with the findings from each phase informing the development of subsequent stages. This iterative process allowed for a nuanced exploration of the research questions and facilitated the identification of key themes and patterns across studies.

Following the CREDES guideline for rigorous and transparent reporting of Delphi studies, this section outlines the methodology employed in this study (Jünger et al., 2017). In adherence to the CARDA guideline for methodological transparency in document analysis, this section delineates the approach adopted in this study. Despite guidance to improve the rigor of document analysis across various fields, there is a notable absence of clear directives concerning its methodological conduct and reporting standards for peer-reviewed publication.

Step One - Consensus Evaluation of the Curriculum Subjects.

Justification

Delphi studies are reliable for projecting future information scope, making them suitable for examining the paramedic curriculum (Green, 2014). This method, applied without prior research, aligns with constructivist ontology to identify key curriculum elements. Capturing data in 2018 establishes a baseline for tracking curriculum evolution, aiding future comparisons and trend analysis.

Planning and Design

The Delphi process included three data collection rounds (Figure 2). The first round involved paramedic academics identifying crucial units of study through free-text survey responses. In the second round, participants ranked these units using a Likert scale. The third round had participants re-evaluate mean scores from the second round, achieving consensus.

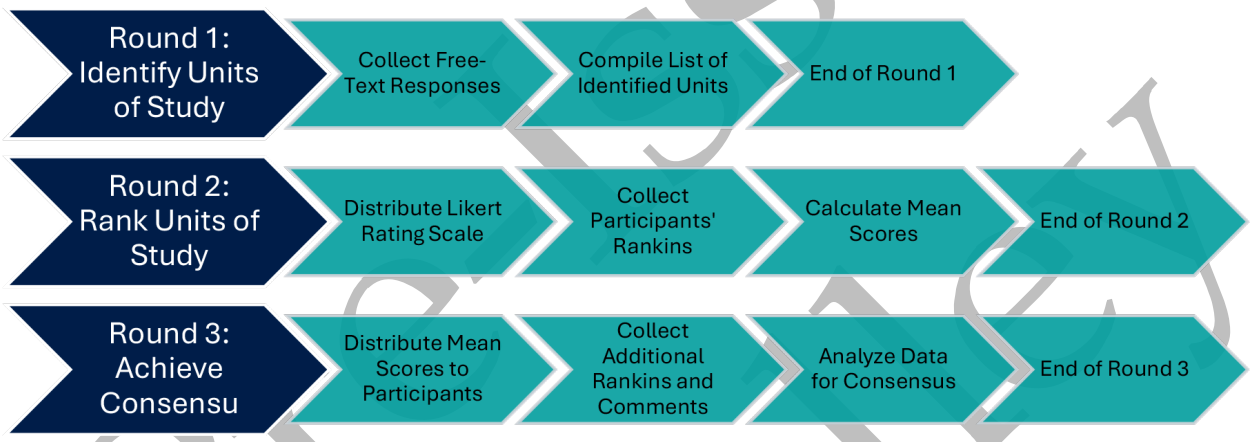

Figure 2. Flow chart Illustrating the stages of Delphi process.

Study Conduct

Maintaining process integrity required a thorough review and piloting of materials for the expert panel. Independent perspectives from public health and paramedicine experts were sought to ensure fairness and effectiveness. The primary author's external position minimized bias, ensuring research integrity and valid consensus.

Reporting

Paramedic academics from 18 universities in Australia and New Zealand were contacted through the Network of Paramedic Academics (NAPA). The expert panel's insights, from clinical and academic environments, informed the study units essential for preparing students as autonomous paramedics. Data collection in 2018 provided a baseline for monitoring curriculum developments and educational priorities, ensuring continuous improvement in paramedic education.

1	Unit of study not important, very unlikely to enhance clinical judgement ability of students to make them road ready
2	Unit of study not very important, unlikely to enhance clinical judgement ability of students to make them road ready
3	Unit of study possibly important may be likely to enhance clinical judgement ability of students to make them road ready
4	Unit of study important, most likely to enhance clinical judgement ability of students to make them road ready
5	Unit of study extremely important, very likely to enhance clinical judgement ability of students to make them road ready

Table 1. Likert scale used within the Delphi study.

Step Two – Mapping Findings from the Delphi Study to Key Terms

Establishing a framework for analyzing paramedicine curriculum data ensures systematic evaluation. In our study, the 2018 Delphi findings were mapped to the RESPIGHT care model in 2024 for a structured analysis. The RESPIGHT model covers various aspects of paramedicine education, such as emergency response, community engagement, primary healthcare, and integration with health services.

Using NVivo software, we organized data according to the RESPIGHT framework categories. This systematic review used open coding to uncover new themes, though no new sub-themes emerged. Axial coding clarified relationships between codes, providing a comprehensive data view. NVivo's comparative features revealed patterns and differences, showing the stability or evolution of curriculum elements over time.

Mapping the 2018 Delphi findings to the RESPIGHT framework allows for a longitudinal curriculum assessment, identifying strengths and weaknesses. This comprehensive mapping guides future curriculum development to better prepare students for the evolving demands of paramedicine practice.

The RESPIGHT framework ensures a balanced evaluation of paramedicine education, highlighting the need for regular updates to keep pace with healthcare changes. This approach promotes relevant and effective paramedicine education.

Step Three – Understanding of Terms

We needed to establish a systematic framework to define the terminologies used in paramedicine university handbooks for our meta-synthesis. In Australian universities, terms like 'degree,' 'program,' and 'course' are often used interchangeably to describe overall educational experiences, while 'subject' or 'unit' refers to specific topics. To effectively compare university degrees, we first standardized institutional definitions. Consequently, we adopted the terms 'course' for overall educational experiences and 'subject' for specific topics within those courses.

Step Four – Data Extraction

The data extraction process for our sequential meta-synthesis involved systematically collecting and comparing findings from the 2018 Delphi study with the categories of the RESPIGHT framework in 2024. This method ensures a comprehensive analysis of the evolution in paramedicine education over time. Figure three outlines each step in the data extraction and analysis process for the sequential meta-synthesis, helping to visualize the systematic approach taken to compare the 2018 Delphi findings with the RESPIGHT framework in 2024.

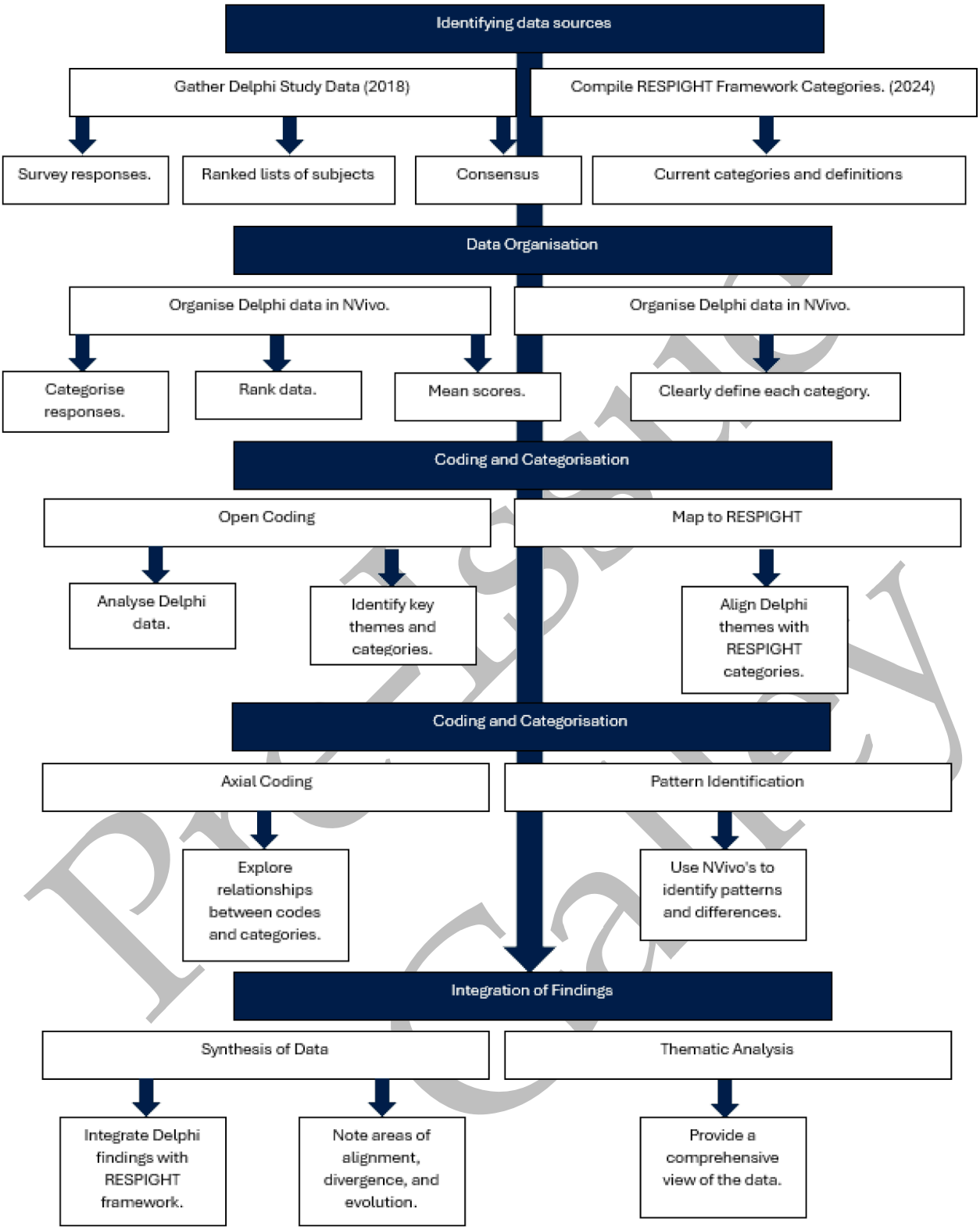

Figure 3. Overall process of data capture.

Step Five – Data Cleaning

Data cleaning is essential to ensure the accuracy and relevance of data before mapping it to the RESPIGHT framework. This process involves reviewing, refining, and validating the dataset to eliminate errors and enhance analysis quality.

The initial step in data cleaning involved thoroughly examining all statements from the 2018 Delphi study, including participant responses, rankings, and comments. The primary objective was to identify and eliminate any duplicate statements. Duplicates often arose when different statements conveyed similar ideas or used identical keywords or phrases. Care was taken to retain each unique statement only once, ensuring the dataset remained concise and focused.

Next, statements containing multiple distinct keywords or themes were addressed. These statements were separated into individual, unique statements as needed. This refinement was crucial for accurately categorizing and mapping each statement to the relevant aspects of the RESPIGHT framework.

After refining the dataset to eliminate duplicates and clarify statements with multiple keywords, each statement's overall relevance was assessed. This detailed analysis confirmed that every piece of data directly contributed to the study's objectives of comparing the findings from the Delphi study to the categories outlined in the RESPIGHT framework. If necessary, statements were re-categorized to ensure alignment with the appropriate RESPIGHT categories, ensuring the dataset accurately represented the diverse aspects of paramedicine education outlined by the framework.

Once satisfied with the dataset's content and relevance, a comprehensive validation process was conducted. This involved confirming the completeness of the dataset, ensuring no critical data was missing, and performing a final quality check to verify the accuracy and integrity of the remaining statements.

Subsequently, the cleaned and validated dataset was organized using NVivo software. This organizational step included assigning each statement to its corresponding RESPIGHT categories, facilitating a seamless transition to the next phase of the analysis. Finally, a final review of the dataset within NVivo was conducted to ensure all statements were correctly categorized and prepared for detailed comparative analysis against the RESPIGHT framework.

This systematic data cleaning and preparation process laid the foundation for extracting meaningful insights and drawing informed conclusions from the meta-synthesis study.

Step Six - Deductive Analysis Approach for Thematic Interpretation and Validation

In the next phase of our study, we used deductive analysis to refine and validate the themes identified from the initial thematic analysis, comparing the 2018 Delphi study with the RESPIGHT framework. Starting with the initial thematic review, we aimed to uncover additional relevant statements that aligned with these themes but had not surfaced initially. These newly identified statements were added to a comprehensive spreadsheet, categorised by theme for data management and analysis.

Validated statements were then confirmed to align with the overarching themes and incorporated into the overall analysis. This integration ensured all relevant insights were considered, providing a comprehensive view of the data. The final dataset, including these additional insights, was used to draw informed conclusions and make recommendations for the paramedicine curriculum in relation to the RESPIGHT framework.

Step Seven – Data Analysis

In our study, the RESPIGHT model of care is a robust framework for analysis, offering a holistic perspective on various facets of paramedicine education. By integrating the findings from the Delphi study, we enhance the depth of our analysis by exploring the evolving scopes of practice within the field. Additionally, we conducted a document analysis of university handbooks across Australia to assess the evolution of curricula, further enriching our understanding of paramedicine education.

This methodological approach ensures a comprehensive and multifaceted examination of the optimal paramedic curriculum subjects. To contribute to the depth of our analysis, we utilised two distinct methods: the Delphi process and analysis of the RESPIGHT model and university handbooks. The Delphi process allows us to capture expert opinions and insights, providing valuable input from practitioners and stakeholders. Integrating the RESPIGHT model and document analysis offers broader contextualization and historical perspectives on the evolution of paramedic curricula, shedding light on trends and developments over time.

The convergence of findings from these diverse methods strengthens the validity and reliability of our research outcomes. By triangulating data from multiple sources and perspectives, we mitigate the risk of bias and enhance the credibility of our conclusions. This rigorous approach underlines the robustness of our study and increases confidence in the generalizability and applicability of our findings to the field of paramedicine education.

Ethics Approval

The Delphi study protocol was approved by the CQUniversity University Human Research Ethics Committee (Reference H17/07-142) in December 2017. No ethics was required for the document analysis of the handbooks as these were available within the public domain.

RESULTS

Consensus Evaluation of the Subjects

During the first round of the Delphi study, 96 paramedic academics affiliated with the NAPA group were initially identified as potential participants. The data collection process commenced with electronic correspondence sent to this group of academics. In the first round of data collection, 48 individuals responded, yielding a response rate of 50% from the targeted sample. Participants were tasked with listing all the curriculum components (subjects, units, topics) they believed were essential in preparing students to become competent, independent, and safe practitioners while remaining adaptable to the evolving practices of paramedicine (Table 2). This round stayed open for 14 days and was accessible through an online survey distributed via Survey Monkey, ensuring participants' anonymity while acknowledging their identity as paramedic academics.

Subjects
Introduction bioscience
Biochemistry
Chemistry
Foundation of Basic Sciences
Pharmacology
Anatomy and Physiology
Pathophysiology
Medical Physiology
Pathophysiology of Issues in Primary Care
Microbiology and infection prevention
Maternal and child health
Pathways of Care in Healthcare
Marginalised Groups in Society
Psychology
Drugs of Abuse
Chronic disease management
Mental health care of patients
Trends in epidemiology
Special and vulnerable populations, including care of patients with disabilities
Health models and the role of paramedicine
Alternate care pathways
Minor Injuries and Minor Illnesses (MIAMI)
Remote and Extended Care
Basic Lab Values Interpretation in Emergency
Medicine and Family Medicine: Blood values,
imaging, POCUS, ECGs
Clinical Assessment (data interpretation)
ECG interpretation
Advanced electrophysiology and ECG interpretation
Law and Ethics
Understanding Decision Making
Cultural Considerations
The legal premise for paramedic practice
Ethical considerations in practice
Resolving personal, ethical and legal dilemmas
Patient Assessment (assessing the
patient, not the machine)
Acute Medical emergency assessment and treatment
Trauma, Environmental emergency and envenomation assessment and treatment
Consolidated Paramedic Practice (capstone)
Medical diagnoses and the complex diagnostic Assessment
Paediatric emergency care assessment
Common Issues of Growth/ Lifespan Issues

Subjects
Acute Medical emergency treatment
Applied pharmacology in paramedic practice
Scene Control
Manual Handling
Clinical Placement/WIL
Self Defence
Practical skills
Basic life support: Includes CPR with AED, basic first aid management, Haemorrhage control and a basic systematic approach
Manual handling
Paediatric emergency management
Treatment Modalities in Emergency Medicine
Human Factors: teamwork
Clinical leadership
Clinical education
Praxis including reflective learning models
Mentoring
Research training/Fundamentals of research
Evidence-based practice
Research project
Introducing the profession
Communications
Foundations of Paramedic Clinical Practice
Medical Terminology, documentation and basic ambulance systems
Clinical communication skills
Professional practice
Paramedic Practitioner Health (Diet, Exercise, Sleep, Injuries)
Stress and Distress: What it is, how it affects us
Occupational Health and Safety

Table 2. Curriculum subjects identified in Stage One of the Delphi study.

In the second round of the Delphi study, participants rated the importance of each curriculum component (subjects, units, topics) using a Likert scale. Importance was defined as the elements of the curriculum that equip graduates with the skills and knowledge needed for their roles in paramedicine. This round had a 71% response rate from 68 paramedic academics the goal was to reach expert consensus on key curriculum elements to enhance student attributes and competence.

In the third round, participants reviewed and could revise their previous scores. They were presented with the scores from the second round, including group mean scores, and could adjust their scores or add new comments over 14 days via SurveyMonkey. Notably, no scores were changed in this round.

The Delphi study provided valuable insights into essential curriculum components for paramedicine education. Categories within the RESPIGHT model achieved high scores and consensus among participants, offering significant guidance for developing comprehensive curricula that meet the evolving demands of the paramedic profession.

Mapping Findings from the Delphi Study to Key Terms

The responses received during the Delphi study were categorized into the recognized categories underpinned by the RESPIGHT framework, which include Response to Emergencies, Engaging with Communities, Situated Practice, Primary Healthcare, Integration with Health, Aged Care, and Social Services, Governance and Leadership, Higher Education and Treatment and Transport (see Table 3).

The Delphi study achieved consensus on 20 subjects distributed across the seven identified categories (Table 4). These findings provide valuable recommendations for inclusion in curriculum development. The subjects identified span a wide range of areas, catering to the diverse needs of paramedic education. Furthermore, 48 more subjects did not reach a consensus.

Data Analysis

To assess the compatibility of curricula with the RESPIGHT framework, we reviewed educational programs from sixteen institutions, focusing on subjects relevant to the RESPIGHT categories. Each subject was evaluated for clear synopses and learning outcomes. Subjects lacking comprehensive synopses or defined learning outcomes were excluded to maintain assessment rigor. Content outside the RESPIGHT framework, such as science-related topics like biochemistry, was generally disregarded unless relevant within the higher education category.

We employed deductive coding techniques, using RESPIGHT search terms and literature-derived codes to identify prevalent themes and trends. This approach allowed us to distil extensive information into meaningful categories for comprehensive analysis.

Our evaluation covered 377 subjects across 19 degrees offered by 16 universities. One university's curriculum lacked accessible online information, potentially limiting our assessment depth for that institution. After coding, 125 subjects were deemed invalid due to non-compliance with the RESPIGHT framework, leaving 252 subjects for further analysis.

Category	Subjects	
Response to Emergencies	Introduction to Bioscience Biochemistry Chemistry Foundation of Basic Sciences Pharmacology Anatomy and Physiology Pathophysiology Medical Physiology Microbiology and Infection Prevention Clinical Assessment (data interpretation) ECG Interpretation Advanced Electrophysiology and ECG Interpretation Patient assessment(assessing the patient, not the machine)	Acute Medical Emergency Assessment and Treatment Trauma, Environmental Emergency, and Envenomation Assessment and Treatment Consolidated Paramedic Practice (Capstone) Paediatric Emergency Care Assessment and Treatment Applied pharmacology in paramedic practice Practical Skills Basic Life Support (CPR with AED, Basic First Aid, Haemorrhage Control) Paediatric Emergency Management Treatment Modalities in Emergency Medicine Clinical leadership
Engaging with Communities	Marginalised Groups in Society Psychology Drugs of Abuse Mental Health Care of Patients	Special and Vulnerable Populations, including care of patients with disabilities Communication
Situated Practice	Maternal and child health Cultural considerations Clinical Placement/WIL	Self Defence Mentoring
Primary Healthcare	Pathophysiology of Issues in Primary Care Pathways of Care in Healthcare Chronic Disease Management Trends in Epidemiology Public Health Health Models and the Role of Paramedicine Alternate Care Pathways	Minor Injuries and Minor Illnesses Remote and Extended Care Basic lab values Medical diagnosis and the complex diagnostic assessment Common issues of growth/lifespan issues
Integration with Health, Aged Care, and Social Services	Law and Ethics Understanding Decision Making Legal Premise for Paramedic Practice Ethical Considerations in Practice	Resolving Personal, Ethical, and Legal Dilemmas Human Factors: Teamwork Professional Practice
Higher Education	Clinical education Praxis, including Reflective Learning Models Research Training/Fundamentals of Research	Evidence-Based Practice Research Project Introducing the profession
Treatment and Transport	Scene Control Manual Handling Foundations of Paramedic Clinical Practice Medical Terminology, Documentation, and Basic Ambulance Systems Clinical Communication Skills	Paramedic Practitioner Health (Diet, Exercise, Sleep, Injuries) Stress and Distress: What it is, how it affects us Occupational Health and Safety Consolidated Paramedic Practice (Capstone)

Table 3. Medication disposal characteristics.

Table 5 presents the percentage breakdown of units aligned with RESPIGHT categories, providing insights into subject content distribution within the curricula and highlighting areas of alignment and divergence from the framework. This detailed examination offers valuable insights into the overall mapping process, the compatibility of educational programs with the RESPIGHT framework, and areas for potential enhancement.

Category	n	Consensus (n) % Likert score 1	Consensus (n) % Likert score 2	Consensus (n) % Likert score 3	Consensus (n) % Likert score 4	Consensus (n) % Likert score 5
Response to Emergencies						
Pharmacology	68				(16) 23.53%	(52) 76.47%
Anatomy and Physiology					(10)14.71%	(58) 85.29%
Pathophysiology				(2) 2.94%	(8) 11.77%	(58) 85.29%
Medical physiology				(2) 2.94%	(24) 35.29%	(42) 61.77%
Clinical assessment				(6) 8.82%	(22) 32.35%	(40) 58.83%
ECG interpretation					(2) 2.94%	(66) 97.06%
Advanced electrophysiology and ECG interpretation				(4) 5.88%	(44) 61.76%	(22) 32.36%
Patient assessment (assessing the patient, not the machine)					(2) 2.94%	(66) 97.06%
Acute medical emergency assessment and treatment					(10) 14.71%	(58) 85.29%
Trauma, environment emergency, envenomation assessment and treatment					(18) 26.47%	(50) 73.53%
Consolidated paramedic practice (capstone)				(10) 14.71%	(16) 23.52%	(42) 61.77%
Paediatric emergency care and assessment			(2) 2.94%	(2) 2.94%	(14) 20.59%	(50) 73.53%
Applied pharmacology in paramedic practice			(2) 2.94%	(2) 2.94%	(14) 20.59%	(50) 73.53%
Practical skills				(2) 2.94%	(20) 29.41%	(46) 67.65%
Basic life support includes CPR, AED, first-aid management, haemorrhage control, and a systematic approach.				(4) 5.88%	(4) 5.88%	(60) 88.24%
Paediatric emergency management				(4) 5.88%	(14) 29.41%	(50) 73.53%
Clinical leadership				(4) 5.88%	(24) 35.29%	(40) 58.83%
Primary Healthcare						
Medical diagnosis and the complex diagnostic assessment	58			(4) 6.90%	(14) 24.12%	(40) 68.98%
Integration with Health, Aged Care, and Social Services						
Human factors: teamwork	68				(34) 50.00%	(34) 50.00%
Treatment and Transport						
Scene control	68		(2) 2.94%	(6) 8.82%	(20) 29.41%	(40) 58.83%

Table 4. Subjects that reached consensus.

Categories	Percentage
Response to emergencies	63.49% (n = 160)
Engaging with communities	3.97% (n = 10)
Situated practice	10.32% (n = 26)
Primary Healthcare	7.14% (n = 18)
Integration with health, aged care and social services	9.13% (n = 23)
Governance and leadership	4.76% (n = 12)
Treatment and transport	1.19% (n = 3)
Invalid	33.15% (n = 125)

Table 5. RESPIGHT factors across undergraduate paramedicine units.

Overall Findings

The comparison between the RESPIGHT framework and the Delphi study highlights significant disparities in their scope and emphasis on paramedic practice and education. The RESPIGHT framework provides a holistic perspective, addressing critical dimensions such as emergency response, primary healthcare, governance, clinical skills, community engagement, and situational awareness. Its emphasis on integrating paramedics into broader healthcare systems and addressing cultural competence reflects the evolving expectations of paramedic roles in diverse contexts.

In contrast, the Delphi study takes a narrower approach, focusing primarily on expert consensus regarding foundational clinical topics such as pharmacology, anatomy, ECG interpretation, and clinical assessment. While these are undeniably important, the study reveals substantial gaps in consensus for critical areas like trauma assessment, clinical leadership, and community-based care. These disparities suggest a fragmented understanding of the broader competencies required for contemporary paramedicine, underscoring a need for further research and dialogue to address these gaps.

Notably, the RESPIGHT framework uniquely prioritizes community engagement and situational practice, while the Delphi study remains centered on emergency response. The absence of consensus in 48 subjects from the Delphi study further highlights areas of uncertainty that require targeted investigation. This underscores the need for future research to focus on underexplored yet essential domains, such as interdisciplinary collaboration, leadership development, and paramedic roles in primary healthcare.

Using the RESPIGHT framework, the Delphi study identified important themes in paramedic education, such as emergency response, community engagement, practice in real-world settings, primary healthcare, integration with health services, governance and leadership, higher education, and treatment and transport. These findings, organised into seven categories and 20 subjects, provide crucial recommendations for developing curricula that address various needs in paramedic education. However, the study also revealed 48 subjects without consensus, suggesting areas needing further exploration.

Analysis of educational programs across 16 institutions revealed varying degrees of alignment with the RESPIGHT framework. While some curricula effectively integrate aspects like primary care and governance, others lack sufficient emphasis on areas such as community engagement and leadership. These discrepancies indicate an urgent need for a more standardized and comprehensive approach to curriculum development, ensuring alignment with industry demands and preparing graduates for multifaceted healthcare roles.

DISCUSSION

This study highlights the evolving landscape of paramedicine education, revealing both progress and persistent challenges. A critical comparison of the RESPIGHT framework and the Delphi study highlights disparities in their scope and priorities, which have significant implications for curriculum development and healthcare preparedness.

Aspect	RESPIGHT Framework	Delphi Study	
Response to Emergencies	63.49% (n = 160)	Pharmacology	76.47%
		Anatomy and Physiology	85.29%
		Pathophysiology	85.29%
		Medical physiology	61.77%
		Clinical assessment	58.83%
		ECG interpretation	97.06%
		Advanced electrophysiology and ECG interpretation	61.76%
		Patient assessment	97.06%
		Acute medical emergency assessment and treatment	85.29%
		Trauma, environmental emergency, envenomation assessment and treatment	73.53%
		Consolidated paramedic practice (capstone)	61.77%
		Paediatric emergency care and assessment	73.53%
		Applied pharmacology in paramedic practice	73.53%
		Practical skills	67.65%
		Basic life support includes CPR, AED, first-aid management, haemorrhage control, and a systematic approach	88.24%
		Paediatric emergency management	73.53%
		Clinical leadership	58.83%
Engaging with Communities	3.97% (n = 10)	- Not addressed	
Situated Practice	10.32% (n = 26)	- Not addressed	
Primary Healthcare	7.14% (n = 18)	- Medical diagnosis and the complex diagnostic assessment: 68.98% agreement	
Integration with Health, Aged Care, and Social Services	9.13% (n = 23)	- Human factors: teamwork: 50.00% agreement	
Governance and Leadership	4.76% (n = 12)	- Not addressed	
Treatment and Transport	1.19% (n = 3)	- Scene control: 58.83% agreement	
Invalid	33.15% (n = 125)	- Not applicable	

Table 6. Correlation of expert consensus and RESPIGHT framework across undergraduate paramedicine units.

The RESPIGHT framework's holistic perspective, emphasizing community engagement, situational practice, and integration into primary healthcare, reflects the expanding role of paramedics beyond emergency response. However, its utility as a guide rather than a formal standard limits its influence on curriculum design, contributing to inconsistencies across institutions. This gap suggests a need for more robust mechanisms to ensure the integration of RESPIGHT principles into educational programs.

Conversely, the Delphi study's narrower focus on foundational clinical topics, while valuable, exposes a lack of consensus in critical areas such as trauma assessment and clinical leadership. These gaps not only highlight missed opportunities for interdisciplinary collaboration but also risk under-preparing graduates for the complexities of modern healthcare environments. The absence of emphasis on community engagement and broader healthcare integration further limits its relevance to the current demands on paramedics.

The findings also reveal significant misalignment between educational programs and industry needs, particularly in primary healthcare preparedness and leadership training. With paramedics increasingly operating in community-based and non-emergency settings, this misalignment risks perpetuating workforce gaps in critical areas. Furthermore, the lack of national consistency in curriculum design exacerbates disparities, undermining efforts to equip graduates with the skills necessary to navigate diverse healthcare challenges.

These results call for urgent action to address these gaps. Strengthening educational standards, embedding community engagement and leadership into curricula, and fostering interdisciplinary collaboration are critical for preparing paramedics for their evolving roles. Without these measures, the field risks lagging behind healthcare demands, ultimately compromising the quality of patient care and equity in service delivery.

LIMITATIONS

The analysis is based on data from a specific subset of institutions and subjects within Australia, potentially limiting the representation of the diverse range of paramedicine programs and curriculum approaches globally. The Delphi study employed a consensus threshold of 90%, which some may consider high. This criterion was centred around subjects deemed high or very high in preparing students for future employment, potentially influencing the outcomes. While the study acknowledges significant changes in paramedicine education since data collection, it primarily focuses on demonstrating that core aspects of paramedic education have not substantially changed, potentially overlooking newer developments.

CONCLUSION

The findings reveal critical disparities in how paramedic education frameworks address the evolving role of paramedics in emergency and primary healthcare. While the RESPIGHT framework offers a comprehensive and forward-looking perspective, the Delphi study's narrower focus on foundational clinical topics exposes gaps that hinder the development of a holistic paramedic education.

A notable shortcoming is the limited integration of primary healthcare principles, cultural competence, and interdisciplinary collaboration in many current curricula. Given the increasing reliance on paramedics in community-based healthcare, it is imperative to prioritize these elements in future curriculum design. To bridge the identified gaps, the following recommendations are proposed:

1. Curriculum Development:
    - Integrate principles of primary healthcare, cultural competence, and interdisciplinary collaboration into existing and future paramedic curricula.
    - Address areas of weak consensus from the Delphi study, such as trauma assessment and clinical leadership, through targeted educational modules.
2. Research Initiatives:
    - Conduct follow-up Delphi studies to refine areas of disagreement and explore emerging topics, such as the role of paramedics in preventative healthcare and chronic disease management.

- Investigate the long-term impact of community engagement and situational awareness training on patient outcomes.

3. Policy and Governance:
   - Develop national guidelines to promote alignment with frameworks like RESPIGHT, ensuring consistency in addressing the broader competencies required of paramedics.
   - Encourage collaboration between accrediting bodies, academic institutions, and healthcare organizations to establish shared priorities.

By combining insights from the RESPIGHT framework and the Delphi study, curriculum developers and policymakers can create a balanced educational approach. This will ensure that paramedics are equipped not only for emergency response but also for the expanding scope of primary healthcare. Such alignment is essential for improving patient outcomes, healthcare equity, and the overall preparedness of paramedics to meet contemporary and future healthcare challenges.

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