The University of Queensland
AUSTRALIA

Thriving Queensland Kids Partnership
connect • catalyse • learn

every child thriving
aracy

Brain Building Workforces

The Neuro-informed Policy and Practice Framework

Acknowledgement of Country

The University of Queensland (UQ) acknowledges the Traditional Owners and their custodianship of the lands on which we meet. We pay respects to their Ancestors and their descendants, who continue cultural and spiritual connections to Country. We recognise their valuable contributions to Australian and global society.

Artwork: *A Guidance Through Time* by Quandamooka artists, Casey Coolwell and Kyra Mancktelow

Brain Building Workforces

The Neuro-informed Policy and Practice Framework

We are all Brain Builders

Every time we interact directly or indirectly, via systems and services, with a child, young person or their family we are helping to build brains. For this reason, understanding brain development is important in supporting children and young people to thrive.

We know that the best outcomes for children, families and society are achieved when individuals, communities, services and systems work together. Actions that are underpinned by a *shared purpose*, *shared knowledge* and *shared language* around brain development can foster a society that not only nurtures its future generations but also invests in its own long-term well-being and prosperity (see Figure 1 below).

The Neuro-informed Policy and Practice Framework is a tool that supports systems and services to establish a shared language, shared knowledge and shared purpose.

Framework development

The Neuro-informed Policy and Practice Framework was developed through an extensive scoping review of publications describing the application of neuro-informed policy and practice, internationally. A total of 116 academic and policy publications across health, education, law, social services, and built environments were synthesised to inform the development of a Neuro-informed Policy and Practice definition and to identify the knowledge bases that underpin its application.

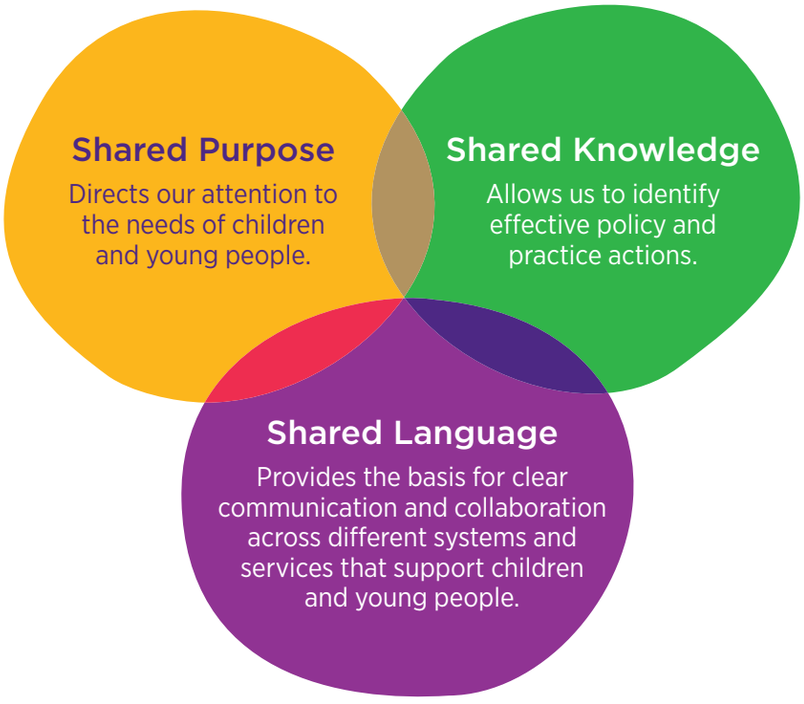

Figure 1: Shared language, shared knowledge, and shared purpose

Evidence Brief: Neuro-informed Policy and Practice Scoping Review

Background

Over the last two decades there has been increasing interest in the application of neuroscience and related sciences to inform policy and practice decisions. This has led to the proliferation of publications that refer to 'neuro-informed' policy and practice across a range of fields and disciplines. Despite the growing interest in neuro-informed policy and practice, a clear definition and framework to guide this approach has not been previously available.

The Neuro-informed Policy and Practice Definition and Framework emerged from a need to establish a clear conceptualisation and identify key knowledge bases that underpin a neuro-informed approach. This definition and framework are intended as tools for guiding the development of a common language, knowledge and messages that can embed understanding of neuroscience into action across and within systems.

Scoping Review of Neuro-informed Policy and Practice

The Neuro-informed Policy and Practice Definition and Framework emerges from an extensive scoping review undertaken by researchers at The Queensland Brain Institute at The University of Queensland, in collaboration with the Thriving Queensland Kids Partnership (TQKP). Full details of the methods for this review will be available shortly through a publication entitled *The Brain in Context: A Scoping Review and Concept Definition for Neuro-Informed Policy and Practice*[1].

This scoping review aims to:

1. **Establish a working definition** of neuro-informed policy and practice that can be applied to different systems, workforces, and contexts.
2. **Identify the key knowledge bases and applications** of neuro-informed policy and practice, with a particular focus on those relevant to children and young people.

Scoping review

The review was undertaken following the PRISMA Extension for Scoping Reviews methodology. Database searches of peer-reviewed academic and grey literature were performed in 2023 using the following databases: Scopus, Web of Science, APA Psycinfo via Ebscohost, Worldwidescience.org, Campbell Collaboration Online Library, ERIC, and WHO.

A total of 6119 documents were identified through initial scanning (see Figure 2 below). Documents published from 2000 onwards that included a definition, discussion or example of neuro-informed policy or practice were included. The selection of documents for inclusion was conducted using Covidence software. One author reviewed the title and abstract of each document for relevance. Two authors independently screened the full text of each document to determine eligibility against the pre-determined inclusion/exclusion criteria. Where required, differences in categorisation were resolved by seeking the opinion of a third researcher and applying a consensus method. Outcomes and reasons for exclusion were documented.

In total, 116 documents that discussed the application of neuro-informed policy and practice were included from across the fields of clinical psychology, counselling, developmental psychology, social policy, education, public health, nursing, medicine, nutrition, law, psychiatry, psychotherapy, social work, art therapy, educational psychology, economics, urban planning, religion, and science communication.

[1] The complete report for this scoping review is currently under review for publication in an academic journal.

Process undertaken to identify documents included in scoping review

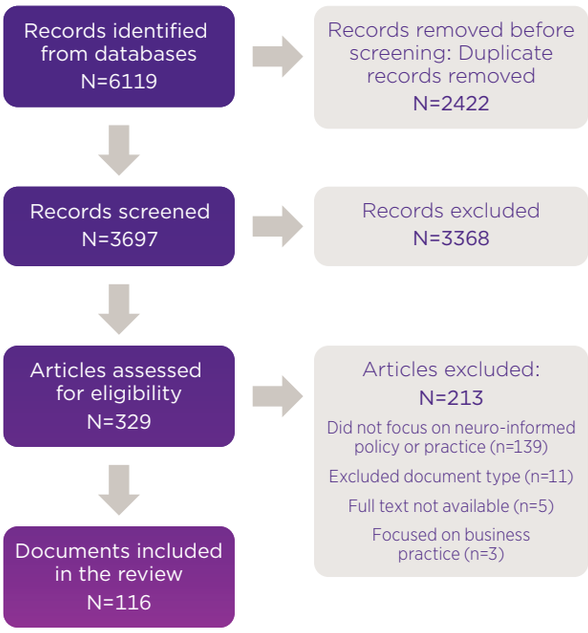

Figure 2: PRISMA flow diagram showing included studies at each stage of inclusion/exclusion process.

Target areas

Applications of neuro-informed policy and/or practice were targeted to a range of areas, including health, education, social services, law, and physical environments (see Figure 3 below).

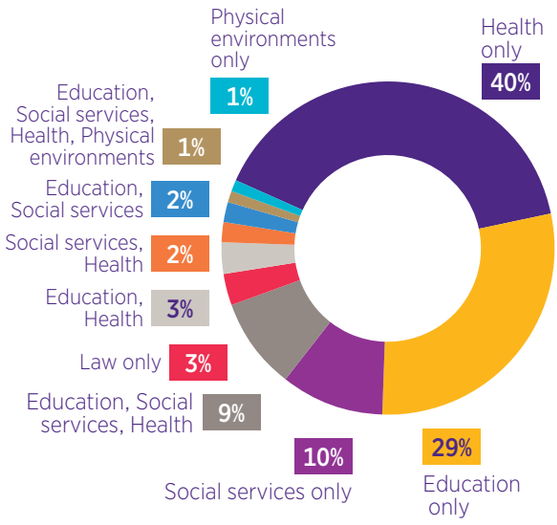

Figure 3: Applications of neuro-informed policy and practice.

Children and young people

From the included documents, 66% made specific reference to children, young people, and/or workforces relevant to these groups.

Critical Considerations

Twenty-four documents (21%) identified critical considerations regarding the ways in which neuroscience is understood and applied. Critiques reflected diverse interpretations that framed neuro-informed policy and practice as either *the brain in isolation* or *the individual in isolation*. Key to these critiques was the need to consider and apply evidence of the complex and profound influence of social and physical environments and systems that underpin human development and behaviour (see Figure 4 below).

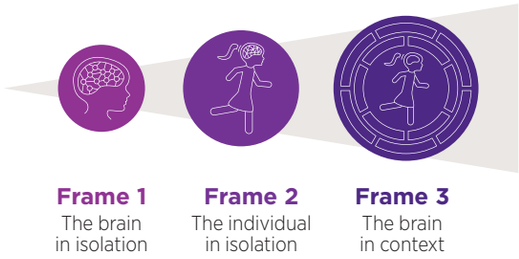

Figure 4: Framing of the applications of evidence from neuroscience into policy and practice.

Defining neuro-informed policy and practice

Across the identified documents, diverse definitions of neuro-informed policy and practice and related concepts were identified. However, these definitions were typically limited to general statement definitions (e.g. "based on neuro-scientific discoveries") or field-specific definitions (e.g. neuro-counselling, neuro-education). None of the available were sufficiently broad and/or specific to capture the current use of this concept across publications.

Defining a concept

A four-step methodology (see Figure 5 below) for defining a concept proposed by Podsakoff *et al*. (2016) was applied to generate a new definition for *neuro-informed policy and practice* that could be applied across fields to inform application and understanding.

First, from the included documents all available definitions were extracted and collated, and 11 key attributes of neuro-informed policy and practice were identified. Three related terms and/or definitions were selected for comparison with neuro-informed policy and practice based on their theoretical proximity and alignment with the concept (i.e. 'trauma-informed', 'evidence-based', and 'neuroscience').

Second, attributes were compared with the three related terms and examined to determine whether each attribute was necessary or sufficient to define neuro-informed policy and practice.

Third, a preliminary definition of neuro-informed policy and practice was developed based upon these attributes. Finally, a conceptual definition was refined through consultation with experts across relevant fields (e.g. neuroscience, psychology, education, sociology, health, community development, paediatrics).

The definition of neuro-informed policy and practice emerging from this analysis and development is provided in The Neuro-informed Policy and Practice Framework.

Knowledge bases and examples of application underpinning neuro-informed policy and practice

Content analysis of the core elements and components of neuro-informed policy and practice that were identified within each of the 116 documents within the scoping review was undertaken, with a particular focus on those that included reference to children and young people[2]. This analysis identified 12 knowledge bases that underpin the definition of neuro-informed policy and practice developed through this scoping review.

Content analysis of each of the documents within the scoping review also identified a range of examples of application of neuro-informed policy and practice across field and contexts. These examples were mapped across each of the 12 knowledge bases and were summarised.

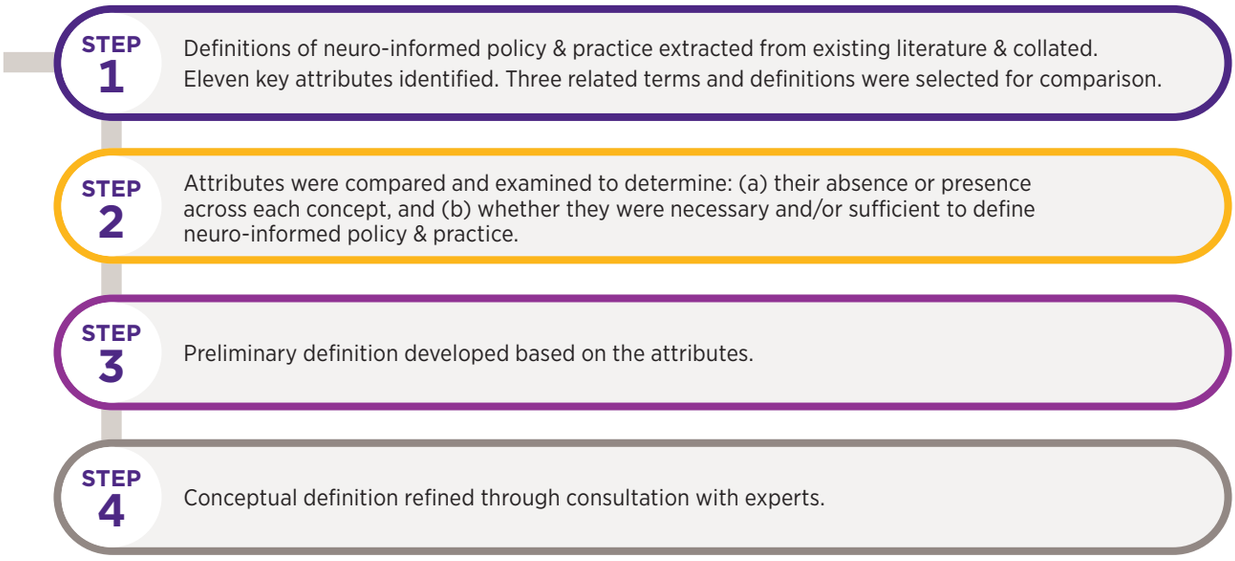

Figure 5: Four-step methodology for defining concepts (Podsakoff *et al.*, 2016)

[2] Whilst the analysis focused on neuro-informed policy and practice in relation to children and young people, analysis of all included publications—including those without specific reference to children and young people—identified similar components, with the only distinguishing factor being the greater emphasis on drug use and addiction.

What is neuro-informed policy and practice?

Neuro-informed policy and practice is the method and outcome of translating and applying current evidence from neuroscience and related field about the processes underpinning human development and behaviour to guide policy and practice actions.

The intent of neuro-informed policy and practice is to create and promote optimal conditions for Brain Health* and related positive physical, social, and community outcomes.

*Brain Health is defined by the World Health Organisation as: "the state of brain functioning across cognitive, sensory, social-emotional, behavioural, and motor domains, allowing a person to realize their full potential over the life course, irrespective of the presence or absence of disorders."

Neuro-informed policy and practice

Does	Does not
• Connect current evidence from science with practice and policy • Consider the complexities of human relationships and contexts • Promote the importance of system, family and community-level supports	• View the brain and individual in isolation • Adopt a one size fits all approach • Disregard individual differences and circumstances • Overlook the role of systems and environments in supporting brain health.

Considering the brain in context

Understanding the brain within the context of the diverse social, physical and system environments in which they live is essential for making meaningful connections between scientific evidence and policy and practice actions (see Figure 6 below).

When we look at the brain in isolation, we do not consider other aspects that influence human functioning and behaviour. Similarly, focusing on the individual in isolation does not consider broader contexts, and can over-emphasise the importance of personal responsibility for individual behaviours.

The Neuro-informed Policy and Practice Framework encourages us to recognise the complex and profound influence of social and physical environments and systems on brain development across the lifespan. That is, the connection from our cells to society.

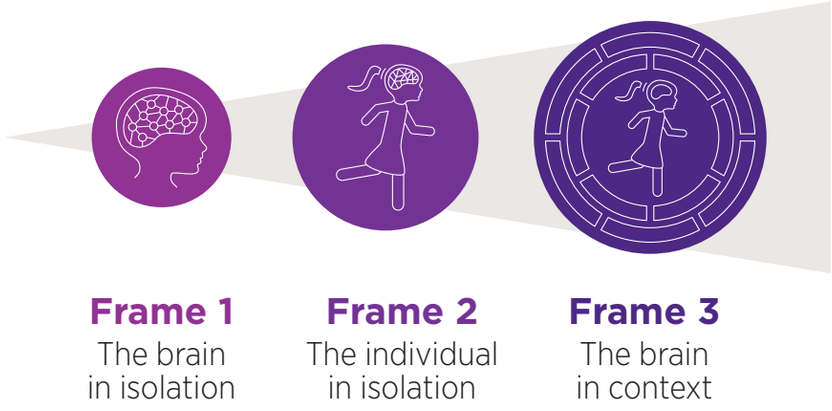

Figure 6: Framing of the applications of evidence from neuroscience into policy and practice

12 Key knowledge bases underpinning neuro-informed policy and practice

There are 12 key knowledge bases that underpin neuro-informed policy and practice. These knowledge bases reflect current applications across the fields of health, education, social services, law and physical environments. Each of the 12 knowledge bases, from cells to society, are shown in Figure 7 below.

The small text under each heading provides examples of the concepts identified under each component. These examples are not intended as exhaustive, but provide a start point for collating key messages, resources, and evidence that can be used in development of knowledge and practice applications across each of the 12 components.

Cells

1 Brain Development
- Gene × environment interactions
- Early phases of brain development
- Adolescent brain development

2 Brain Architecture
- Neurons, synapses and circuits
- Physiological arousal

3 Brain Functions & Systems
- Brain systems involved in cognition and emotion

4 Neuroplasticity
- Brain reorganisation
- Influences of experiences & environments on brain architecture

Person

5 Individual Difference
- Neurodiversity
- Developmental variability
- Understanding of disability

6 Sensitive Periods
- Importance of the early years
- Adolescent periods of brain development

7 Brain-Body Connections
- Nutrition
- Sleep
- Physical activity
- Effect of drugs on brain function

8 Stress
- Types of stress
- Effect of stress on the brain & body

Society

9 Trauma / Adversity
- Effects of trauma
- ACEs
- Adversity & children's development

10 Positive Relationships
- Serve & return interactions
- Importance of stable, supportive relationships with caring adults

11 Resilience
- Balancing positive, adverse & skill development experiences

12 The Whole Person
- Biopsychosocial influences
- Physical environments
- Protective & risk factors

Figure 7: Twelve key knowledge bases, with examples, underpinning neuro-informed policy and practice.

Examples of key messages across each of the 12 neuro-informed policy and practice knowledge bases are provided in Figure 8 below.

	Key Knowledges	Key Messages
Cell	**Brain Development**	Brains are built not born. Brains are shaped by the interaction of our genes and experiences over time.
	Brain Architecture	The foundations of brain architecture are constructed early in life.
	Brain Functions & Systems	Brain areas and systems serve different functions and are interconnected.
	Neuroplasticity	Brains continue to change throughout life in response to our environments and experiences.
Person	**Individual Difference**	Brain health and development varies across individuals.
	Sensitive Periods	Pregnancy, the early years of life and adolescence are key opportunities to support lifelong development.
	Stress	Stress, in a variety of forms, affects the brain and body.
	Brain-body connection	Brains and bodies are interconnected.
Society	**Trauma & Adversity**	Trauma and adversity can have profound effects on the brain and body.
	Positive relationships	Stable, safe, and responsive relationships are essential for brain health and development.
	Resilience	Resilience is underpinned by positive and adverse experiences, skills, and supports.
	Whole Person	Biological, psychological, social and physical environments interact (through services and systems) to influence brain health and development across time.

Figure 8: Twelve key knowledge bases and key messages of neuro-informed policy and practice.

Applying the Neuro-informed Policy and Practice Framework

The Neuro-informed Policy and Practice Framework can be applied across contexts and ectors and inform initiatives that encourage and support brain health and related physical, social and community outcomes.

Further Resources and Supports

There are a range of resources available to support learning and application of the Neuro-informed Policy and Practice Framework into action. See a full list of resources available on the Brain Builders Initiative website

Applications of this framework include, but are not limited to:

Guiding reviews and auditing of curriculum and training in tertiary settings, pre-service and post-service training, and in schools and other education contexts.

Assessing learning capabilities and development within and across workforces.

Promoting shared language, knowledge, and messaging across systems, communities, and workforces.

Providing new opportunities for conversations with workforces, colleagues, families, children and young people around brain health and brain development.

Informing policy and practice actions to ensure they are consistent with contemporary evidence.

Establishing a unifying framework that enables policymakers and practitioner workforces to create and promote optimal conditions that support brain health* and (or) related positive physical, social, and community outcomes.

Provoking conversations and reflections as part of discussions, meetings, communities of practice, forums and seminars.

How to Get Involved

We invite you and your organisation to stay in touch and engage in the Brain Builders Collaborative, be a Brain Builders Champion and/or share your Brain Building story.

'Understanding Brain Development' learning modules
Complete the modules and share with your networks

Brain building in your organisation
How is your organisation embedding brain building within your workplaces, service delivery or practice?

Thriving Kids Brain Builders Initiative website
qbi.uq.edu.au/brain-builders

Join the Brain Building **Community of Practice** through the Project ECHO platform

Join the **Brain Builders event and mailing list**

Get engaged with **Thriving Queensland Kids Partnership**

Contact us

Queensland Brain Institute
qbi.uq.edu.au/brain-builders
E: brainbuilders@uq.edu.au

Thriving Queensland Kids Partnership
www.aracy.org.au/the-nest-in-action/thriving-queensland-kids-partnership-tqkp
E: TQKP@aracy.org.au

How to cite:

Staton, S., Coles, L., Normore, G., Casey, C., Searle, B., Houen, S., Crompton, R., Thorpe, K. (2024).
The Neuro-informed Policy and Practice Framework. Thriving Kids Brain Builders Initiative.
https://qbi.uq.edu.au/brain-builders/tkbbi-elements/brain-building-workforces

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

every child thriving
aracy

Thriving Queensland Kids Partnership
connect • catalyse • learn

CRICOS Provider 00025B • TEQSA PRV12080