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[Shannon, Hugh A.](#)

(2019)

Stats & coding 101: Nailing Senior Health action research analysis. In *ACHPER Queensland - Brisbane HPE Conference, 2019-08-15 - 2019-08-16*, Brisbane, Australia, AUS. (Unpublished)

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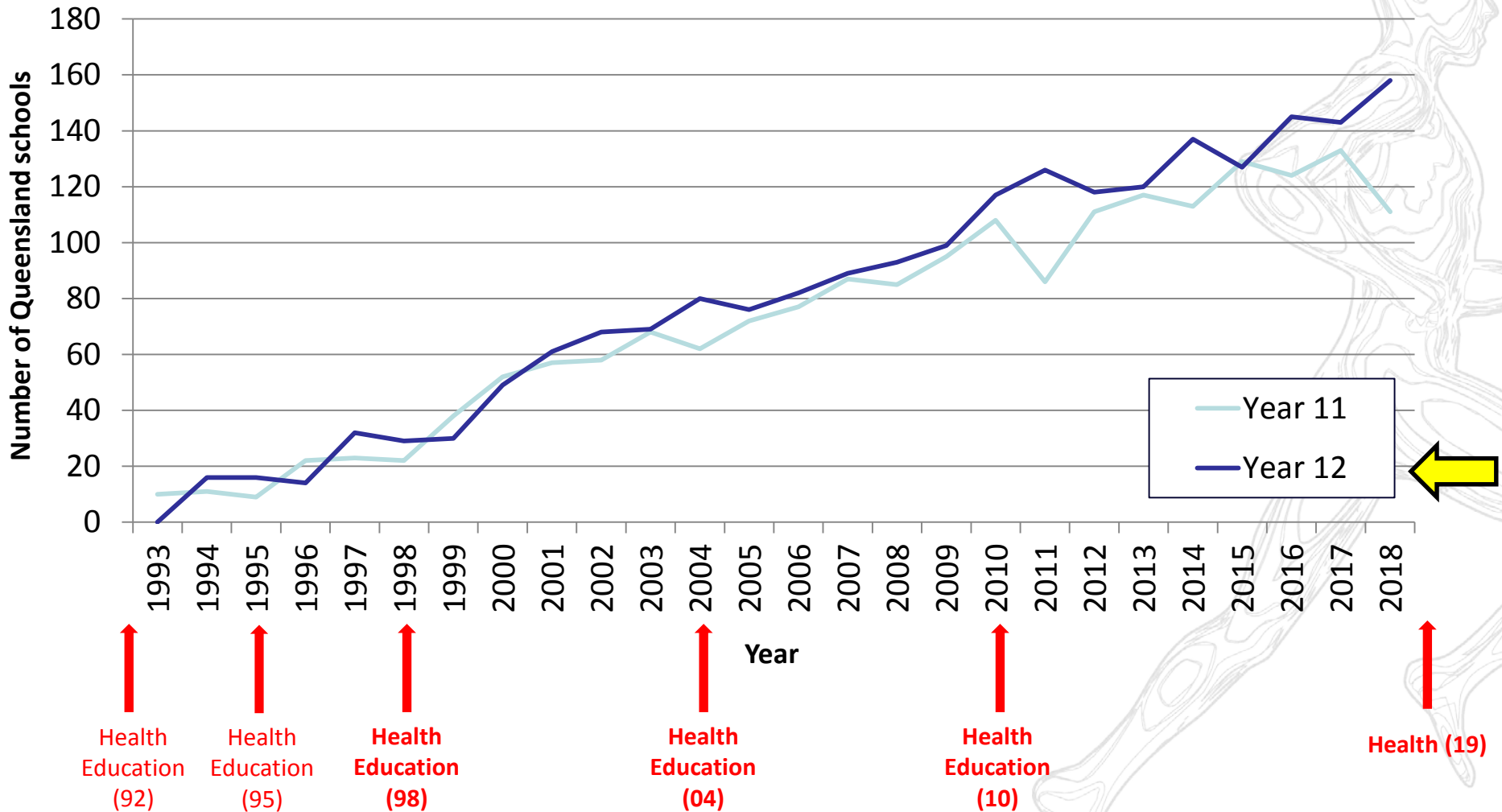
ACHPER Queensland Brisbane HPE Conference 2019



Stats & coding 101: Nailing Senior Health action research analysis

Dr Hugh Shannon | HPE Lecturer, Queensland University of Technology

Our subject: Developmental phases & enrolment data



Primary data source: <https://www.qcaa.qld.edu.au/publications/statistics>

The scientific method adapted for Senior Health research

What do we want to investigate?

1. OBSERVATIONS

What do we want to know?

2. RESEARCH QUESTION(S)

What is already known?

3. BACKGROUND RESEARCH

Proposed explanation based on preliminary evidence

4. HYPOTHESIS

How will the research be conducted?
What primary data will be collected?

5. METHOD (research design & ethics)

How will the quantitative and/or qualitative data be managed?

6. DATA COLLECTION

Does the data support the hypothesis?
What conclusions can be drawn?

7. DATA ANALYSIS & CONCLUSIONS

What are the key findings, strengths and limitations of the investigation?
How will the findings inform future research?

8. REPORT RESULTS

Health students: “I nailed it!”



Source: <https://memegenerator.net/instance/63789651/fist-pump-baby-nailed-it>



Terminology: General & HP orientations

Confidence to perform a task and successfully execute skills

Self-efficacy

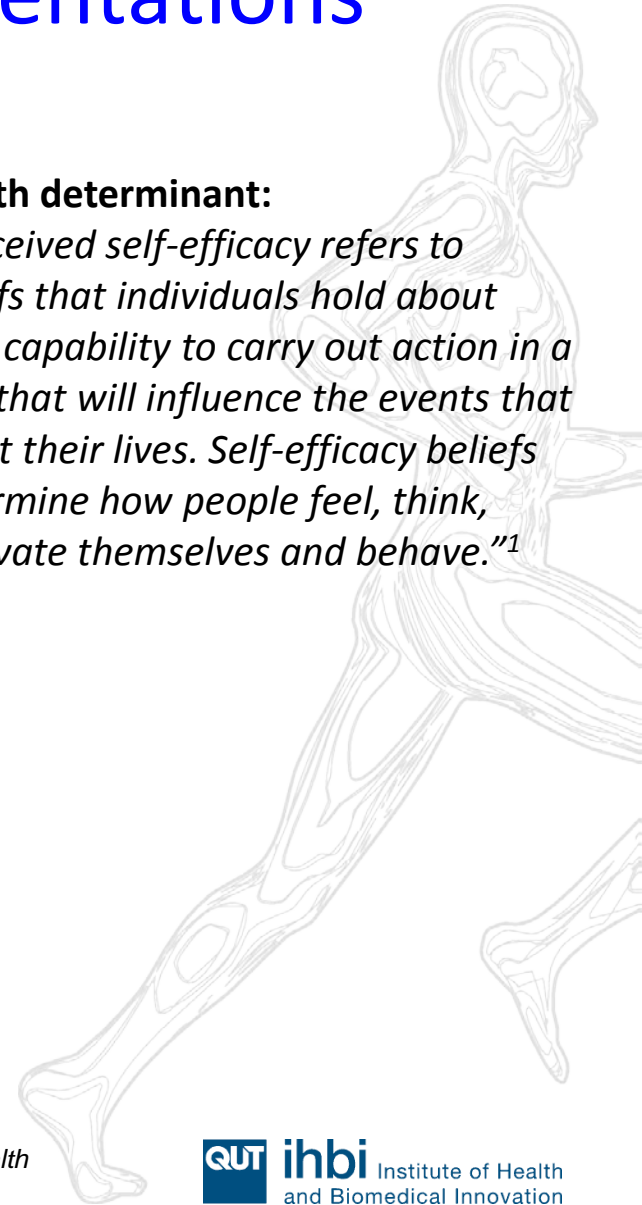
Health determinant:

“Perceived self-efficacy refers to beliefs that individuals hold about their capability to carry out action in a way that will influence the events that affect their lives. Self-efficacy beliefs determine how people feel, think, motivate themselves and behave.”¹

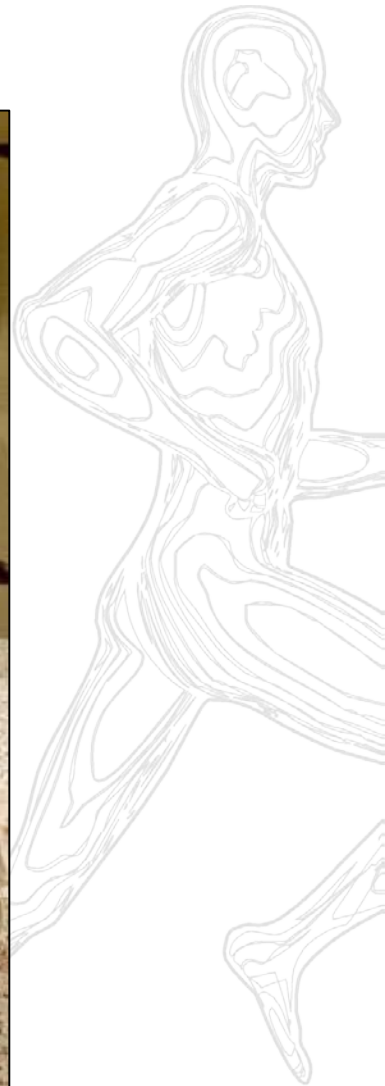
Skills → outcome

Efficacy

¹**Source:** Smith, B., Tang, K., & Nutbeam, D. (2006). WHO Health Promotion Glossary: New terms. *Health Promotion International*, 21(4),340-345.

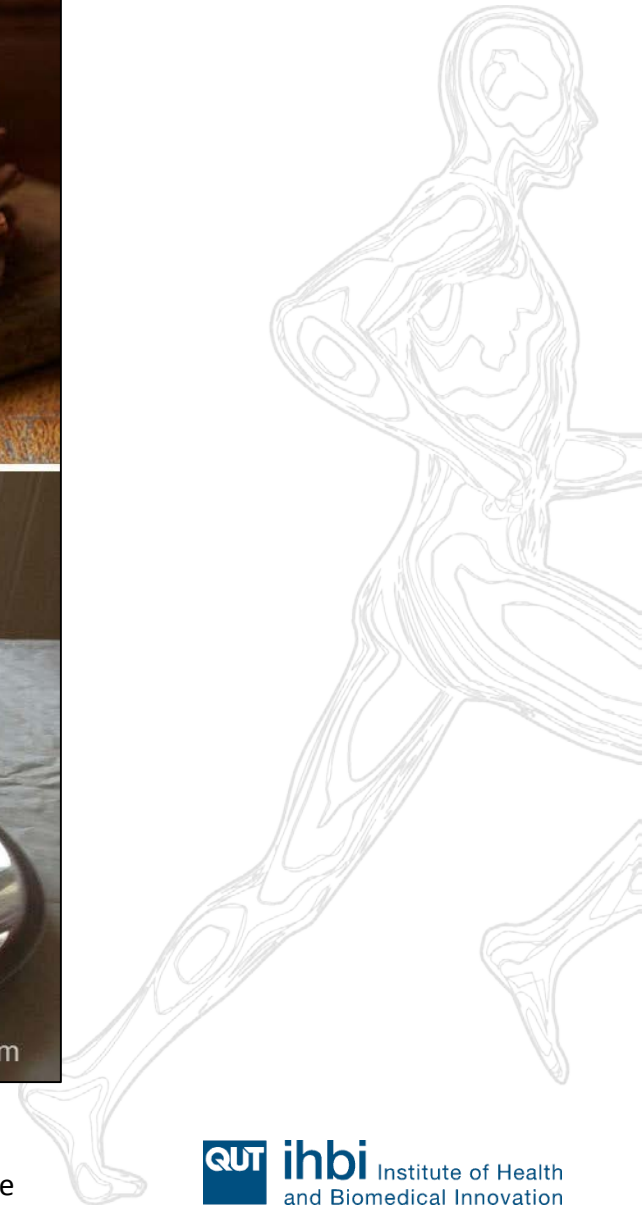


I nailed it!



Source: <https://www.stuff.co.nz/life-style/food-wine/102213748/the-best-cake-fails-of-all-time>

I nailed it!



Source: <https://www.stuff.co.nz/life-style/food-wine/102213748/the-best-cake-fails-of-all-time>

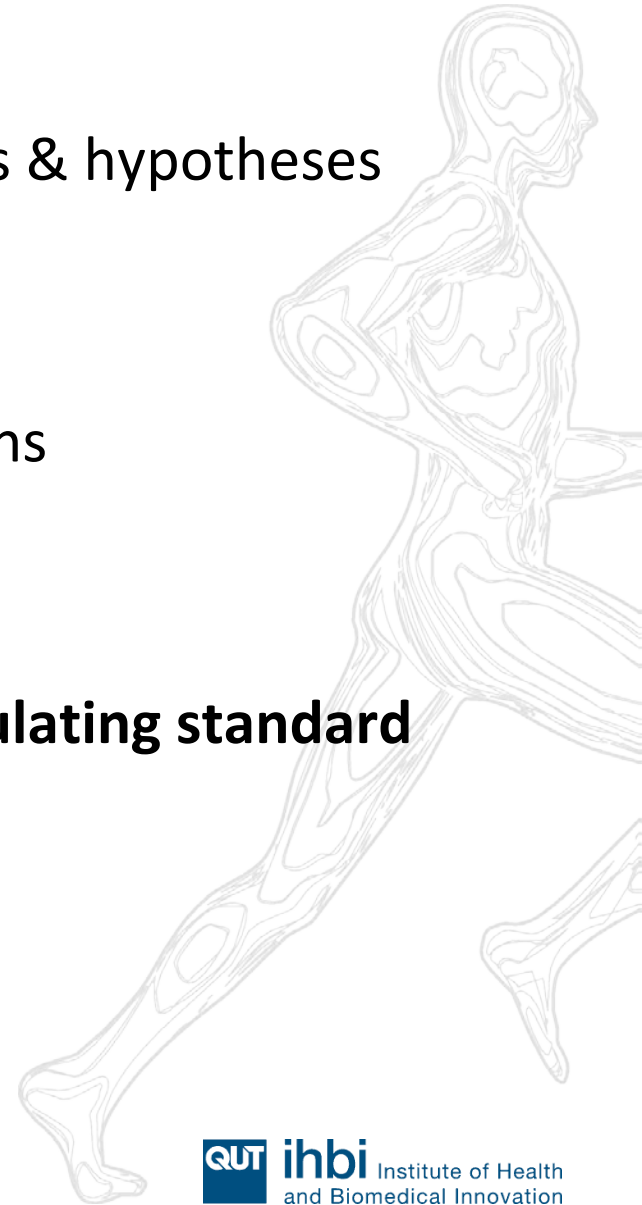
I nailed it!



Source: <https://www.augustalibrary.org/event/nailed-it/>

Workshop overview

- Independent variables, dependent variables & hypotheses
- Common primary data collection methods
- Quasi-experimental time-series study designs
- **Sample size calculation**
- **Quantitative data analysis (MS Excel), calculating standard deviation & Diffusion of Innovation**
- **Qualitative data coding (MS Word)**



Hypothesis

Hypothesis = outcome prediction based upon preliminary evidence

- **Independent variable (IV)** = variable manipulated or controlled by the researcher
- **Dependent variable (DV)** = response or outcome variable
- Your hypothesis should include one IV (action strategy) and the predicted effect/s on one or more DVs

Example hypothesis:

Application of the Driver Digital Detox (Triple D) action strategy incorporating digital story health communication will engage year 11 students leading to greater awareness of 'technoference' and valuing the relationships between driver attention, hazard perception and road user safety.

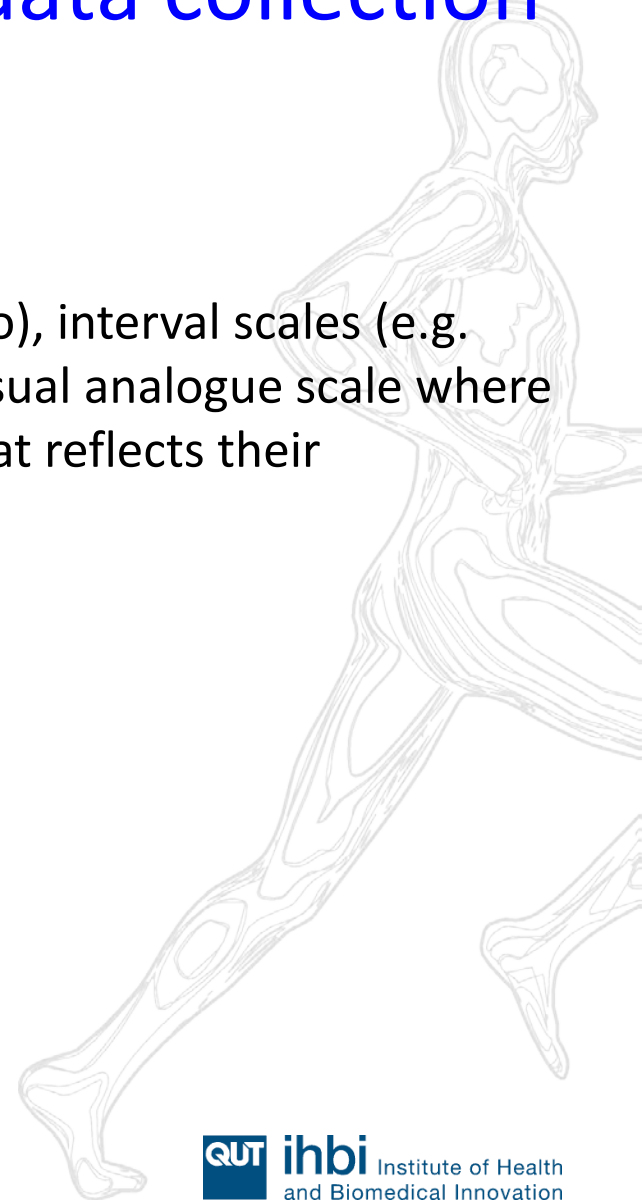
Common methods of primary data collection

- **Questionnaire:**

- Demographic data items
- Descriptive data items: dichotomous (e.g. Yes/No), interval scales (e.g. Likert SA, A, D & SD) & continuous scales (e.g. visual analogue scale where respondents mark a point anywhere on a line that reflects their agreement)
- Qualitative response items

- **Field observation:**

- Criteria for observing & recording behaviours
- Checklist style form for recording data



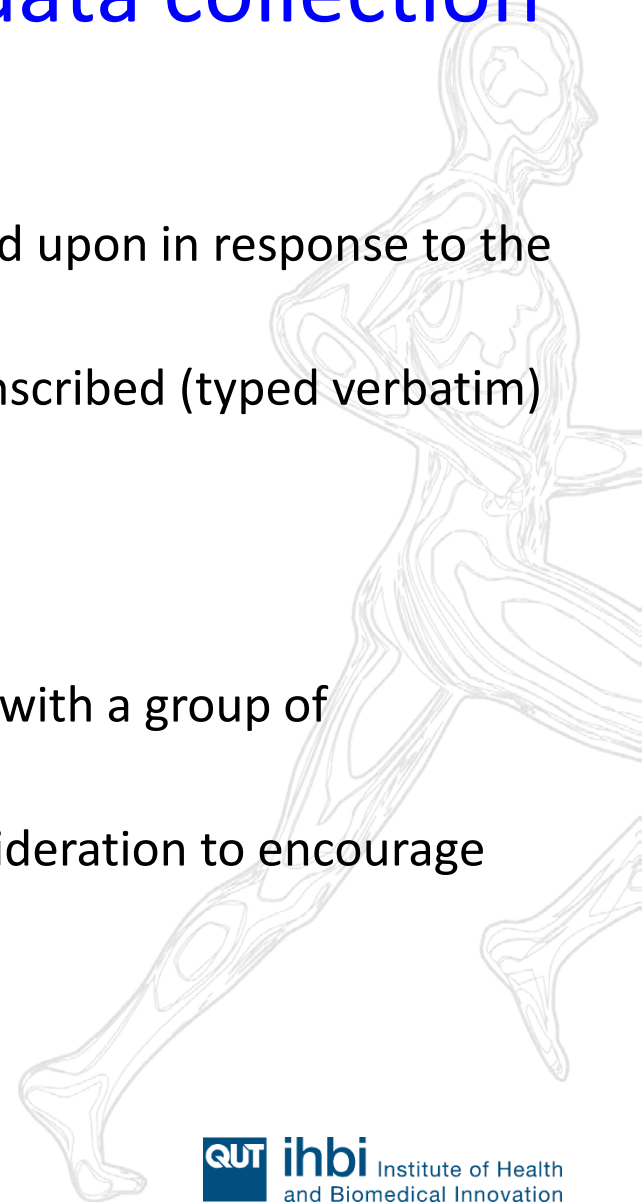
Common methods of primary data collection

- **Semi-structured interview:**

- List of prepared questions which can be extended upon in response to the participant responses
- Responses are recorded (with permission) & transcribed (typed verbatim) for analysis

- **Semi-structured focus group:**

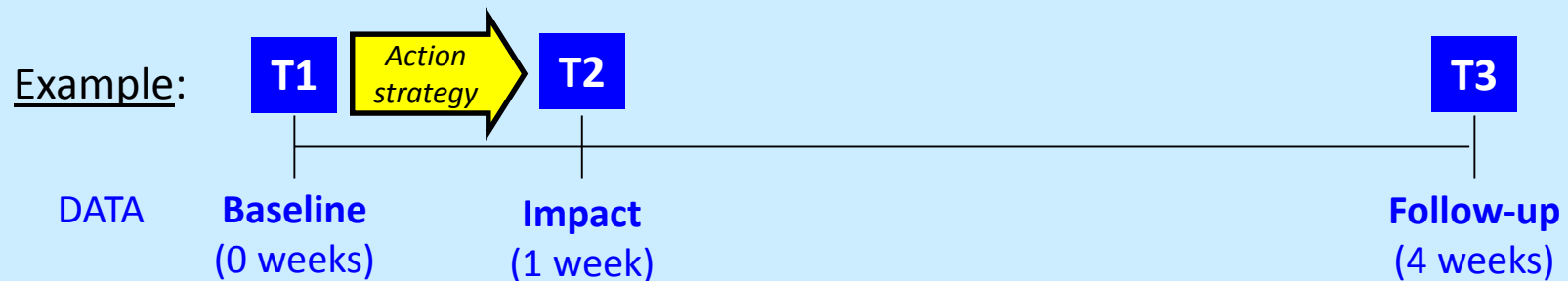
- As per the interview description, but completed with a group of participants at the same time
- The size of the focus group requires careful consideration to encourage participation



Action research study design

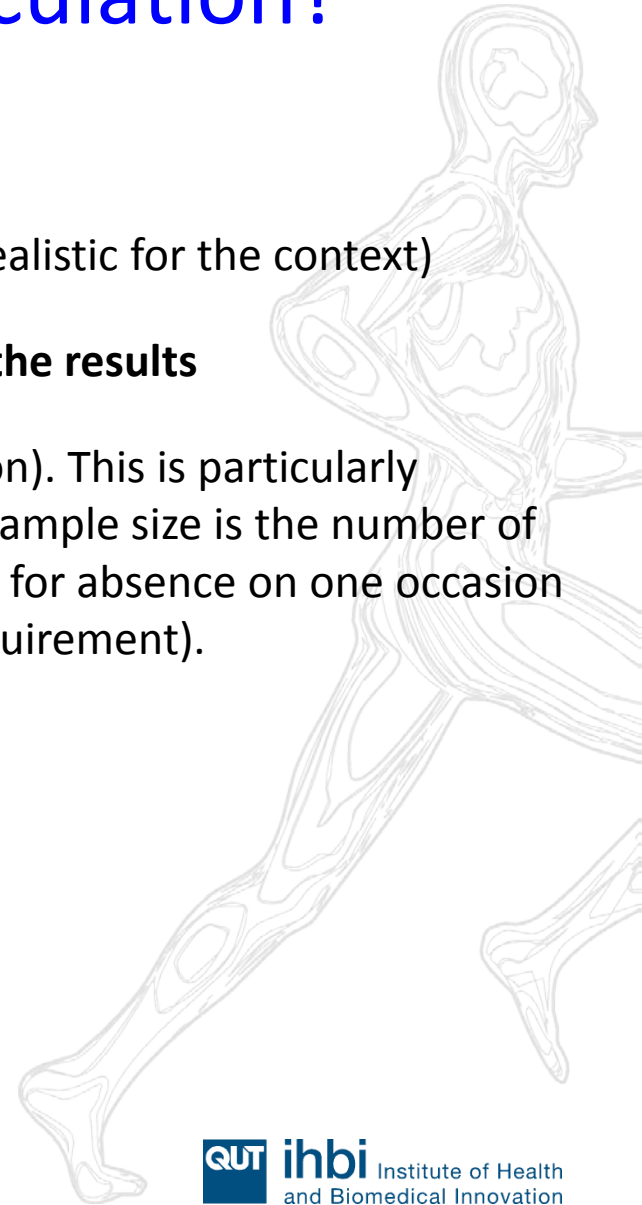
- Consider one of your current or prospective Senior Health units
- **Data collection – What type/s & methods?** (quantitative, qualitative or mixed methods research)
- Quasi-experimental time-series study designs:

Time series studies collect data at multiple time points (at least two) for comparison:



Why perform a sample size calculation?

- **Efficient use of resources**
- **May not be possible to manage a large volume of data** (realistic for the context)
- **Identifying the minimum required to have confidence in the results**
- **Inflation factor:** Aim to exceed the minimum (within reason). This is particularly important for time-series study designs as the calculated sample size is the number of participants required to complete all time points (allowing for absence on one occasion and the option to withdraw from participation (ethical requirement)).



Activity – Sample size calculation

- **What is the target population?**
Describe them & estimate the target population size (N=?)
- **What is the minimum sample size required?**
Complete a sample size calculation using the online ABS calculator

ABS online calculator: <http://tinyurl.com/y4csfavd>

The screenshot shows the ABS online Sample Size Calculator interface. At the top, there is the Australian Bureau of Statistics logo and a search bar. Below the logo is a navigation menu with tabs for 'Statistics', 'Census', 'Complete your survey', and 'About us'. The main heading is 'Sample Size Calculator'. A note states: 'Please Note: This calculator should be used for simple random samples only'. The interface is divided into two main sections: 'Determine Sample Size' and 'How do I use it?'. The 'Determine Sample Size' section has a green background and contains the following fields: 'Confidence Level' (set to 95%), 'Population Size', 'Proportion', 'Confidence Interval' (with radio buttons for 'Upper' and 'Lower'), 'Standard Error', 'Relative Standard Error', and 'Sample Size'. Each field has a blue information icon to its right. At the bottom of this section are 'Calculate' and 'Clear' buttons. The 'How do I use it?' section also has a green background and contains a numbered list of instructions (1-5) and links for 'Sample Size Calculator Help', 'Sample Size Calculator Definitions', 'Sample Size Calculator Examples', and 'Sample Size Calculator Stratification Examples'.

Recommended settings:

- Confidence Level 95%
- Proportion 0.75
- RSE 10

Click on the blue information icon next to each of these inputs to develop your understanding of the terms. Use this knowledge to inform your response.

Research instrument tips

- Clear & concise: respondent fatigue, formatting OCD :)
- No leading questions for open responses!

XNB394 Advanced Health Education – Research Instrument Tips

QUESTIONNAIRE	SEMI-STRUCTURED INTERVIEW OR FOCUS GROUP	FIELD OBSERVATION
<p>Components:</p> <ul style="list-style-type: none"> Participant instructions explaining why the data is being collected, estimated time commitment, indicating return of the completed questionnaire reflects participant consent, & an explanation of how to respond to the items (e.g. tick/cross the boxes & write comments on the lines/within the boxes provided) Include demographic response items that will enable interesting comparisons during the analysis (e.g. age, gender, postcode) Review your research objectives & hypothesis, then prepare a list of items (questions and/or statements) that will generate valuable data Include some qualitative comment items to help participants explain their responses to particular items <p>Principles:</p> <ul style="list-style-type: none"> Clear, concise & age appropriate language No leading questions or statements (should not influence the response or lead them to a response which may not be accurate) Consistent & user friendly layout Suitable length (sufficient data but not excessive, e.g. demographic items plus 10 - 15 items aligned with your research objectives) 	<p>Components:</p> <ul style="list-style-type: none"> Instructions able to be read to participants explaining what will occur & why, estimated time commitment, seeking participant consent, seeking permission to record, & explanation of the need to wait for the whole question to be asked or others to respond before answering Space for procedural notes (e.g. date, location & duration) Review your research objectives & hypothesis, then prepare a list of questions that will generate valuable data Leave space between questions for notes (e.g. additional questions or to support analysis) <p>Principles:</p> <ul style="list-style-type: none"> Clear, concise & age appropriate language No leading questions or statements (should not influence the response or lead them to a response which may not be accurate) Logical order Suitable length (sufficient data but not excessive, e.g. 10 - 15 items aligned with your research objectives) 	<p>Components:</p> <ul style="list-style-type: none"> Community information statement disclosing what will occur & why (able to be shared with school leadership team & via broader communication channels such as newsletter, website, social media or assemblies) Space for procedural notes (e.g. date, location & duration) Review your research objectives & hypothesis, then prepare a list of observational foci or criteria that enable behaviours to be recorded (include space for quantitative & qualitative data) <p>Principles:</p> <ul style="list-style-type: none"> Clear & easy to navigate layout (rapid data entry may be required for real-time observation) Sufficient space for the type of data collected

XNB394 Research instrument development tips i.hopman@qut.ac.au

Example leading question and statement:
Our presentation successfully raised awareness of X. What aspects of our presentation influenced why you believe X is so important?

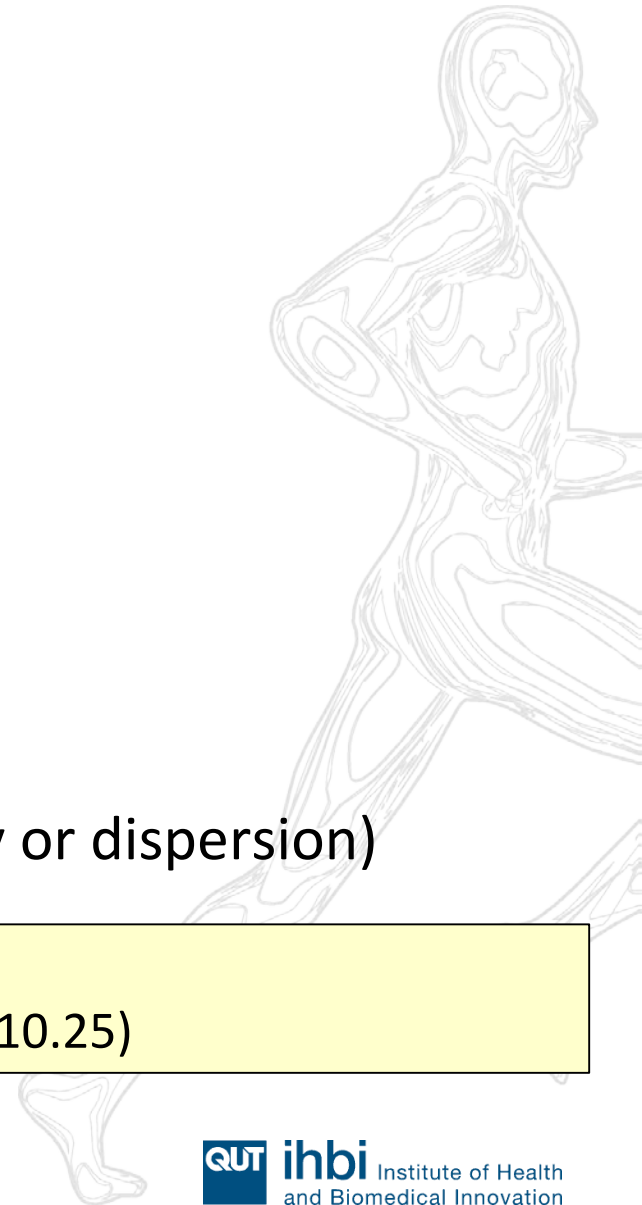


Quantitative data analysis

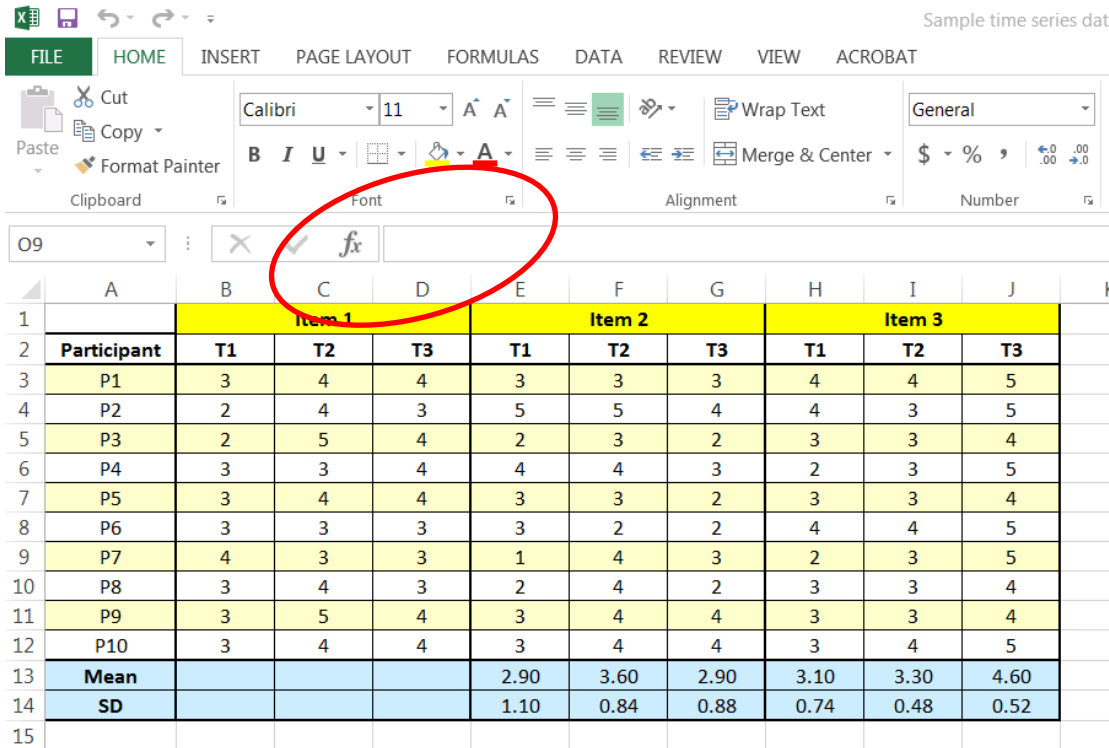
- Measures of central tendency
 - Mean
 - Median
 - Mode
- Measures of variability
 - Range
 - Standard deviation (quantifies variability or dispersion)

Reporting example:

Sample group age range 17 – 56 years ($M = 38.60$, $SD = 10.25$)



Activity – MS Excel functionality



Sample time series data

	A	B	C	D	E	F	G	H	I	J
1		Item 1			Item 2			Item 3		
2	Participant	T1	T2	T3	T1	T2	T3	T1	T2	T3
3	P1	3	4	4	3	3	3	4	4	5
4	P2	2	4	3	5	5	4	4	3	5
5	P3	2	5	4	2	3	2	3	3	4
6	P4	3	3	4	4	4	3	2	3	5
7	P5	3	4	4	3	3	2	3	3	4
8	P6	3	3	3	3	2	2	4	4	5
9	P7	4	3	3	1	4	3	2	3	5
10	P8	3	4	3	2	4	2	3	3	4
11	P9	3	5	4	3	4	4	3	3	4
12	P10	3	4	4	3	4	4	3	4	5
13	Mean				2.90	3.60	2.90	3.10	3.30	4.60
14	SD				1.10	0.84	0.88	0.74	0.48	0.52
15										

Function Argument
=SUM (A1 : A10)

A range of cells has a starting cell, colon, and an ending cell. When you select a range of cells for a formula, Excel will automatically add the colon.

Examples of functions:

=SUM

=AVERAGE

=COUNT

=STDEV

=MIN

=MAX

Steps:

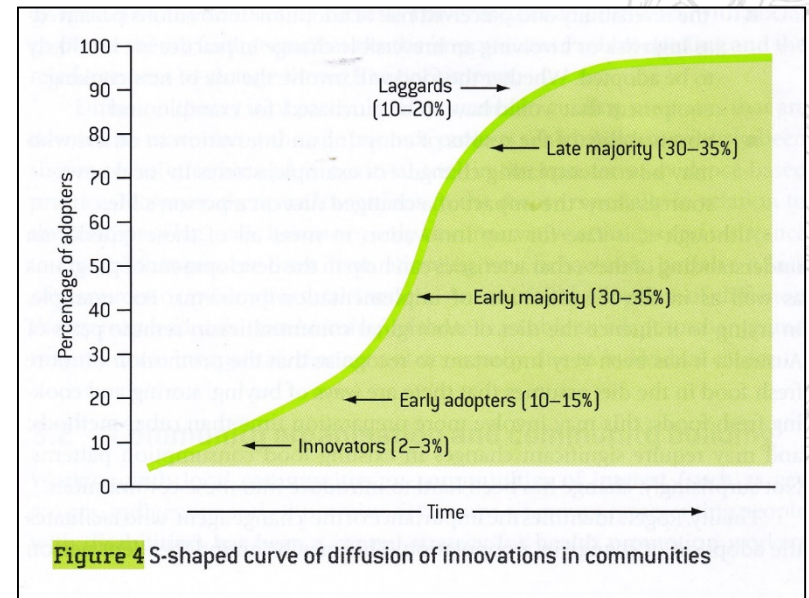
1. Download the sample Excel file <https://tinyurl.com/y4khywql>
2. Set up formulae to calculate mean and standard deviation for Item 1 (T1, T2 & T3)

Activity – MS Excel functionality

Discussion:

- Compare & contrast mean & standard deviation for Item 1 (T1) & Item 2 (T1)
- Compare & contrast the time series data (T1 to T3) for all three items
- Consider potential associations between Item 3 data & DOI theory

Diffusion is defined as 'the process by which an innovation is communicated through certain channels over time among members of a social system'
(Rogers, 2003)



Rogers, E.M. (2003). *Diffusion of Innovations* (5th ed.). New York: Free Press.

Figure source p. 25: Nutbeam, D., Harris, E. & Wise, M. (2010). *Theory in a nutshell: A practical guide to health promotion theories* (3rd ed.). Sydney: McGraw-Hill.

Qualitative data analysis

- **Systematically extracting meaning from text** (e.g. interview transcripts, focus group transcripts, written questionnaire responses & field observation notes)
- Analytical process of **coding** (labelling), organizing, sorting & synthesising qualitative data to enable identification of significant **themes**
- Coding involves assigning a word, phrase, number or symbol to the associated text (labelling process)



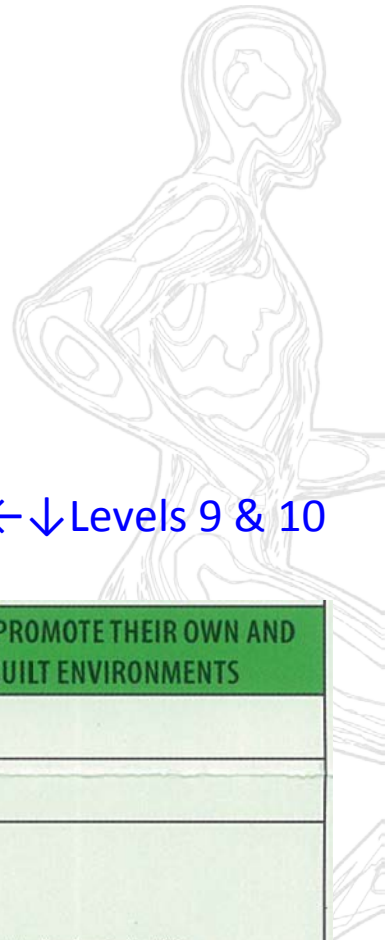
ACTIVITY:

1. Download the sample Word file <https://tinyurl.com/yxonnsqb>
2. Use the text highlight function to code the sample text
3. Discuss the process

Preparing for Senior Secondary

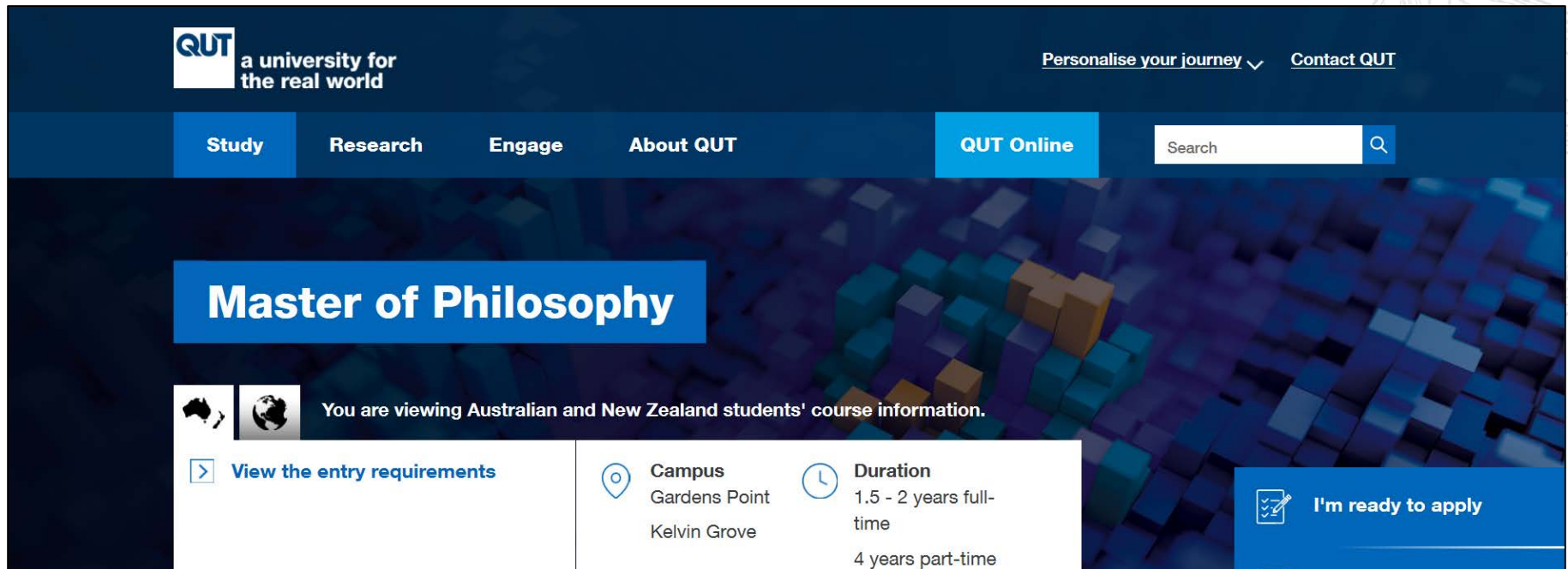
- ACHPE value and Senior Health alignment
- Efficacy & self-efficacy development: Scope and scale

PLAN AND USE HEALTH STRATEGIES AND RESOURCES TO ENHANCE THE HEALTH, SAFETY AND WELLBEING OF THEIR COMMUNITIES		← Levels 7 & 8
FOCUS AREA	AD, HBPA, S, RS, MH, FN	
CAPABILITY OUTCOME	PSC	
PLAN, IMPLEMENT AND CRITIQUE STRATEGIES TO ENHANCE THE HEALTH, SAFETY AND WELLBEING OF THEIR COMMUNITIES		← ↓ Levels 9 & 10
FOCUS AREA	AD, HBPA, S, FN, RS, MH	
CAPABILITY OUTCOME	CCT 11	
QUESTIONS AND ACTIVITIES	Identify health programs aimed at What do I like to eat? Who or what influences my food se What foods are necessary for energ What does 'mind-body-spirit' mear health and wellbeing? Assess the effectiveness of a health Prioritise the top ten influences on r Plan a meal using the food wheel fr	
ACHIEVEMENT STANDARD	Justify actions that promote their o	
PLAN AND EVALUATE NEW AND CREATIVE INTERVENTIONS THAT PROMOTE THEIR OWN AND OTHERS' CONNECTION TO COMMUNITY AND NATURAL AND BUILT ENVIRONMENTS		
FOCUS AREA	CA, LLPA, HBPA, RS, MH, S, AD, FN	
CAPABILITY OUTCOME	CCT 9	
QUESTIONS AND ACTIVITIES	What is an intervention? What makes a community? Develop an app that would encourage the local community to use the natural environment to do physical activity. Students create an orienteering course in the local parklands. The class completes them then provides feedback to the designers. Students choose a culture to focus on. They design an activity relating to the selected culture e.g. a dance, open table food sharing, art and craft, etc. Students then evaluate if, and how, this can promote a sense of connection and belonging.	
ACHIEVEMENT STANDARD	Analyse the impact of attitudes and beliefs about diversity on community connection and wellbeing.	



QUT Master of Philosophy (IF80)

- Fully funded by the federal government for Australian citizens who complete the qualification on time (no tuition fees)
- Professional development – Tailor the research qualification to suit a highly specific professional focus (efficacy & self-efficacy)
- Further information: Contact me

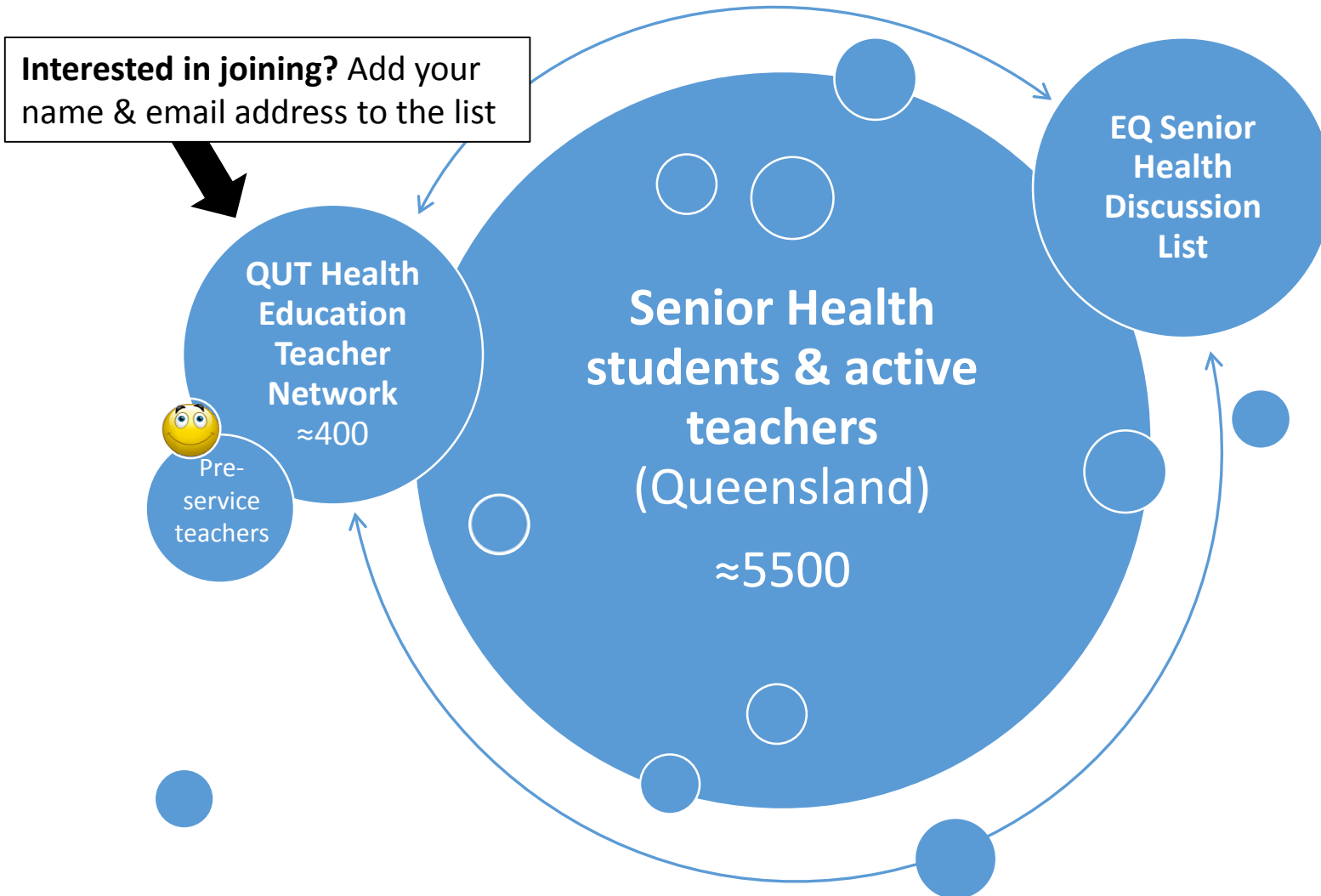


The screenshot shows the QUT website interface for the Master of Philosophy (IF80) program. The header includes the QUT logo and tagline 'a university for the real world', along with navigation links for 'Personalise your journey' and 'Contact QUT'. The main navigation bar features 'Study', 'Research', 'Engage', 'About QUT', and 'QUT Online' (highlighted), with a search bar on the right. The main content area displays 'Master of Philosophy' in a large blue box. Below this, a message indicates 'You are viewing Australian and New Zealand students' course information.' with icons for Australia and New Zealand. A table provides details about the program:

View the entry requirements	Campus Gardens Point Kelvin Grove	Duration 1.5 - 2 years full-time 4 years part-time
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At the bottom right, there is a blue button with a checkmark icon and the text 'I'm ready to apply'.

The Senior Health 'team'



Questions and correspondence

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au.linkedin.com/pub/hugh-shannon/65/a61/791/

