

# Research Methods for the 21st Century: A Specimen Curriculum

Paul Barrett  
Universities of Auckland and Canterbury, NZ  
Psytech International (UK) Ltd.

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## Model 1 Psychologist Curriculum

### Year 1: Concepts and Basics ... 30 hours

- ✧ The Philosophy of Science
  - The major philosophies underpinning the many facets of scientific investigation
  - Truth, Facts, and knowledge claims
- ✧ The Logic and Philosophy of Measurement
  - The quality and the quantity of a something
  - The definition of a variable
  - The axioms of quantity
  - Meaning, measurement, and constructs
- ✧ Phenomena and Data
  - Describing data using language
  - Describing data using numbers
  - Describing data using graphs

### Year 2: Intermediate ... 30 hours

- ✧ Using Computers for Data analysis
  - EDA with SPSS/STATISTICA
  - nVivo/NUDIST
- ✧ Experiment Design and Hypothesis testing
  - The design of an experiment or observational strategy in order to test something.
  - The Qualitative approach
  - Classical Inferential Statistical Theory
  - Bayesian Statistics
  - Algorithmic Methods
- ✧ Basic Statistical analysis

### Year 3: Intermediate Practical Training .1 ... 30 hours

- ✧ Basic practical psychometrics
  - Reliability and Validity revisited
  - The Latent Variable
  - item analysis
  - the logic of IRT
- ✧ Continuing Basic Statistics
  - ?
- ✧ Qualitative Methodologies
  - ?

### Year 4: ... Intermediate Practical Training .2 ... 30 hours

- ✧ Advanced Qualitative Methods
  - ?
- ✧ A brief overview of common multivariate Statistical Analysis methodologies
  - Discriminant Analysis
  - Cluster Analysis
  - Factor Analysis
  - Structural Equation Modeling
- ✧ Basic evaluation strategies
  - The decision-table
  - errors, rates, and proportions

Total Hours training = **120 hours** (~4 single semester courses over a 4-year degree).

## Model 2 Psychologist Curriculum

### Year 1: Concepts and Basics ... 60 hours

- ✦ The Philosophy of Science
  - The major philosophies underpinning the many facets of scientific investigation
  - Truth, Facts, and knowledge claims
- ✦ The Logic and Philosophy of Measurement
  - The quality and the quantity of a something
  - The definition of a variable
  - The axioms of quantity
  - Meaning, measurement, and constructs
- ✦ Phenomena and Data
  - Describing data using language
  - Describing data using numbers
  - Describing data using graphs
- ✦ Using Computers for Data analysis
  - EDA with SPSS/STATISTICA
  - nVivo/NUDIST
- ✦ Experiment Design and Hypothesis testing
  - The design of an experiment or observational strategy in order to test something.
  - The Qualitative approach
  - Classical Inferential Statistical Theory
  - Bayesian Statistics
  - Algorithmic Methods

### Year 2: Intermediate Practical Training ... 90 hours

- ✦ Qualitative Methodologies of Investigation
  - Ethnography
  - Grounded Theory
  - Discourse and Narrative Analysis
- ✦ Computational Data Analysis
  - Examining Relationships between variables
  - Examining Differences between variables
  - Prediction and Classification
  - Resampling, Simulating, and Bootstrapping

### Year 3: Intermediate Practical Training ... 90 hours

- ✦ Psychometrics
  - Reliability and Construct Validity revisited
  - The Latent Variable
  - Scaling
  - Classical test Theory
  - Item response Theory
  - Facet Theory
- ✦ Diagnostics, Evaluation, and Risk Assessment
  - Rates, Proportions, and Odds
  - Medical and Psychological Intervention Diagnostics
  - Actuarial Risk Assessment
- ✦ Algorithmic Methods
  - The concept of an algorithm and analytical heuristics
  - Discrimination and Classification
  - Neural Nets

## Model 2 Psychologist (cont).

### Year 4: Advanced Methods Training ... 90 hours

Pick two of the following – from qualitative **OR** quantitative items

- ✦ Advanced Qualitative 1.
- ✦ Advanced Qualitative 2.
- ✦ Advanced Qualitative 3.
- ✦ Advanced Qualitative 4.
  
- ✦ Non-metric Analysis of Qualitative Data (Scalogram, Correspondence, and Configural analysis)
  
- ✦ Linear Multivariate Statistics
  - Multiple linear, Logistic, and Multinomial Regression
  - MANOVA and MANCOVA
  - Component and Factor Analysis
  - Structural Equation Modelling
- ✦ Prediction, Classification, Statistical Learning and Data Mining
  - CART analysis in depth
  - MARS
  - Support Vector Machines
  - Neural Nets
  - Bayesian Nets/Trees
- ✦ Evolutionary/Non-Linear Systems-Dynamics modelling
  - The concept of an evolved computational system
  - Artificial Life evolutionary modelling
  - Complex Systems theory and non-linear dynamics
- ✦ Advanced Psychometrics
  - Psychological Test construction for High and Low-Stakes testing
  - Multidimensional Scaling and Geometric construct representations
  - Uni and Multidimensional Unfolding – Ideal Point analysis
  - DIF and Bias analysis

Total Hours training = **330 hours** (~11 single semester courses over a 4-year degree).

At the 4<sup>th</sup> year – expected specialization in qualitative or quantitative methodologies.

Then continued mentoring with a suitable member of staff as part of Masters supervision and possible PhD research.