Research Methodology
Higher Level

Introduction to research methodology
This part of the course serves two functions.
• To allow students to develop appropriate practical research skills
• To enable students to evaluate research encountered in other components of the course

Knowledge and understanding of quantitative methods and statistical analysis of data will not be externally examined but will be assessed through the reporting of one experimental study. However, knowledge and understanding of qualitative methods will be externally assessed through paper 3.

Use of quantitative and qualitative methods
Quantitative methods demonstrate a systematic approach to the investigation of behaviour. Some aspects of behaviour are not suitable for investigation by quantitative methods and therefore qualitative methods must be used. In some cases the distinction between qualitative and quantitative approaches is difficult to determine. In Likert scales the same responses of participants can be used as either qualitative or quantitative data.

Definition of the experimental method
For this course the experimental method is defined as requiring the manipulation of one independent variable, while other variables are kept constant. Consequently, correlational studies will not be accepted as meeting the requirements of the experimental study.

Ethics
Before attempting any practical work, students must be made aware of all relevant ethical considerations. The complete ethical guidelines for the psychology course can be found in the Vade Mecum. Students must consider the ethical responsibilities of researchers towards participants and they must recognize the need to use psychological findings responsibly. The following ethical considerations should be thoroughly described, elaborated and discussed, so that students can fully understand the relevance of this issue.
• Responsibility to the profession of psychology (including the school environment)
  • Acknowledgment of others’ work and publications
  • Honesty in reporting results
  • Monitoring the ethical standards and procedures of the research community
• Competence of the investigator
• Personal conduct of the investigator
• Informed consent
• Respect for participant integrity
• Justification for using deception
• Participant’s right of withdrawal
• Confidentiality of findings
• Debriefing
• Use of non-human animals in research

Quantitative research methods
Psychologists use quantitative methods to investigate areas of study where it is possible to test hypotheses under rigorous conditions. Experiments can take place in the laboratory or in the field. The aim is to be able to establish a cause and effect relationship through the use of descriptive as well as inferential statistics, allowing the researcher to determine the significance of the results.

All experimental research studies submitted for internal assessment must include the manipulation of one independent variable while other variables are held constant. Therefore, quasi-experiments and natural experiments (that is, any research undertaken without control over the independent variable and without a controlled sampling procedure), and those where the gender or age of the participants is the independent variable, will not be accepted as meeting the requirements.

Experimental designs and controls

Students are expected to be able to define, explain, apply and evaluate the terms below.

Considerations in designing experiments
• Independent and dependent variables
• Confounding variables
• Experimental, control and placebo groups
• Research bias and expectancy (researcher and participant effects)
• Demand characteristics
• Single- and double-blind techniques

Types of experimental design
• Independent measures/samples/subjects design (between-subjects design)
• Matched pairs design
• Repeated measures design (within-subject design)
• Single participant/subject design

Sampling procedures
• Random selection of participants and random assignment to groups
• Random and representative sampling
• Stratified and systematic sampling procedures

Evaluating research
• Reliability and validity (internal and external)
• Replication
**Descriptive statistics**
Students are expected to be able to define, explain, use and apply the terms below.
• Levels of measurement (nominal, ordinal, interval, ratio)
• Measures of central tendency (mean, mode, median)
• Measures of dispersion (range, standard deviation, variance)
• Normal distribution of data (standard scores, frequency, skewed distributions)

**Inferential statistics**
Students are expected to be able to use and apply the following.
• Operational definitions of variables
• Hypothesis testing: research and null hypotheses
• Statistical significance: probability and levels of confidence
• The appropriate choice of statistical tests and limitations upon their use
• Non-parametric tests
• Wilcoxon signed ranks tests, Mann–Whitney U tests
• Sign test, chi-squared test

**Graphical techniques**
Students are expected to be able to define, explain, use and apply the graphical techniques below.
• Bar chart
• Histogram
• Line graph
• Frequency polygon

**Qualitative research methods**
Although qualitative research may involve the use of descriptive statistics, more frequently it involves methods that do not usually employ numerical methods; these may include, for example, questionnaires, case studies or content analysis. It is recognized that to have a fuller picture, psychologists may choose to approach their data collection by using more than one method. To achieve this, psychologists can use triangulation to allow for a more credible interpretation of the data that has been collected. For example, when studying aggression in humans, a psychologist may:
• measure hormone levels
• conduct an interview
• observe behaviour over an extended period of time.
The measurement of hormones is quantitative, while the other two methods can be quantitative or qualitative. The measurement of hormones may give only a partial interpretation of aggression. However, the use of all three methods will give a more credible interpretation of what is happening in human aggression.
Students will be expected to explain, apply and evaluate the following when using all qualitative methods.
• Ethics
• Participant and researcher expectancies
• Demand characteristics
Sampling techniques

For all of the qualitative methods, students will be expected to:
- explain each method
- identify conditions appropriate for the use of each method (sampling techniques, participant and researcher expectancies, how demand characteristics affect data)
- evaluate the strengths and limitations of each method
- explain why a single method of qualitative research is often inadequate for drawing conclusions.

There are many different qualitative research methods. Students must study in detail only the following qualitative research methods.
- Interviews
- Questionnaires/surveys
- Observation
- Content analysis
- Case study

Interviews

Students are expected to be able to define, explain, apply and evaluate the terms below.

Types of interview
- Structured
- Semi-structured
- Unstructured
- One-to-one interviews
- Conversational interviews
- Small-group interviews (focus groups)
- E-mail and telephone interviews
- Verbal protocols (think-aloud protocols)

Verbal protocols are particularly used in task analysis (for example, in problem solving, learning a new task such as using a computer or driving a police car in dense traffic), or obtaining feedback from a patient undertaking a new form of treatment.

“Verbal protocols are a record of what people say when they are asked to think aloud as they perform a task. Their speech is recorded and later transcribed so that the mental processes that are reported can be analysed.”

Methods of transcribing recorded interviews

Methods of transcribing recorded interviews include the traditional method (words only) and the post-modern method (words plus volume, pitch, speed, pauses, facial expressions, gestures and other non-verbal communication).

Questionnaires/surveys

Students are expected to be able to define, explain, apply and evaluate the terms below.
- Large-scale and small-scale surveys
- Identification and representativeness of target population
- Techniques of sampling from target population
• Use of a Likert scale

**Observation**
Students are expected to be able to define, explain, apply and evaluate the terms below.
• Participant observation
• Non-participant observation
• Methods of recording data, including time, event and point sampling

**Content analysis**
Students are expected to be able to explain how to apply the techniques of content analysis to:
• printed material
• television, video and film
• advertising
• Internet and e-mail.

**Case study**
Students are expected to know about the types of case study listed below, as well as related concepts including data-collection methods and problems of generalization.
• One individual
• Small and large groups. Students are also expected to be able to understand the following concepts related to case studies.
• Collecting data, including self-reports, observed data and a range of other techniques.
• Issues of generalizing from an individual case study. Some case studies are chosen to be representative of a target population (extrinsic/instrumental case studies) and are therefore more generalizable; others are chosen because the case is especially unusual or interesting (intrinsic case studies) and these are less generalizable.

**Triangulation**
Triangulation is the application and combination of several research methodologies in the study of the same phenomenon.

“The use of evidence from different sources, of different methods of collecting data and of different investigators, where feasible, are all triangulation techniques which enhance credibility.”

**Types of triangulation**
There are four basic types of triangulation.
• Data triangulation, which involves using different times, locations and participants (individuals or groups).
• Investigator triangulation, which involves using multiple, rather than single observers.
• Theory triangulation, which involves using theories from more than one perspective in the interpretation of the data.
• Methodological triangulation, which involves using more than one method and may consist of within-method or between-method strategies. Multiple triangulation involves a combination of the four basic types.
**Descriptive statistics**
Students are expected to be able to define, explain, use and apply the terms below.
- Measures of central tendency
  - Mean
  - Median
  - Mode
- Measures of dispersion
  - Range
  - Variance
  - Standard deviation
- Quartile and semi-interquartile range

**Graphical techniques**
Students are expected to be able to define, explain, use and apply the terms below.
- Bar chart
- Histogram
- Line graph
- Frequency polygon

**Standard Level**

**Introduction to research methodology**
This part of the course serves two functions.
- To allow students to develop appropriate practical research skills
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Knowledge and understanding of quantitative methods and statistical analysis of data will not be externally examined, but will be assessed through the reporting of one simple experimental study.

When students are conducting a partial replication of an experiment, it is sufficient if they produce only descriptive statistics.

The results given in tables and graphs should be inspected, and conclusions drawn on the basis of this inspection. It may be informative to consider measures of standard deviation or dispersion, but at SL students will be assessed only on the descriptive statistics that have been covered.

While studying the perspectives and chosen option, students may encounter a variety of qualitative studies at SL and should be prepared to evaluate these, where appropriate, in response to examination questions.

**Ethics**
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researchers towards participants, and must recognize the need to use psychological findings responsibly. The following ethical considerations must be thoroughly described, elaborated and discussed, so that students can fully understand the relevance of this issue.

• Responsibility to the profession of psychology (including the school environment)
  • Acknowledgment of others’ work and publications
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  • Monitoring the ethical standards and procedures of the research community
• Competence of the investigator
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• Informed consent
• Respect for participant integrity
• Justification for using deception
• Participant’s right of withdrawal
• Confidentiality of findings
• Debriefing
• Use of non-human animals in research

Quantitative research methods
All experimental research studies submitted for internal assessment must include the manipulation of one independent variable while other variables are held constant. Therefore, quasi-experiments and natural experiments (that is, any research undertaken without control over the independent variable and without a controlled sampling procedure), and those where use of gender or age is the independent variable, will not be accepted as meeting the requirements.

Experimental designs and controls
Students are expected to be able to define, explain, apply and evaluate the terms below.
Considerations in designing experiments
• Independent and dependent variables
• Confounding variables
• Experimental, control and placebo groups
• Research bias and expectancy (researcher and participant effects)
• Demand characteristics
• Single- and double-blind techniques

Types of experimental design
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• Matched pairs design
• Repeated measures design (within-subject design)

Sampling procedures
• Random selection of participants and random assignment to groups
• Random and representative sampling
• Stratified and systematic sampling
Evaluating research
- Reliability and validity
- Replication

**Simple descriptive statistics**
Students are expected to be able to define, explain, use and apply the terms below.
- Measures of central tendency (mean, median, mode)
- Measures of dispersion (range)

**Graphical techniques**
Students are expected to be able to define, explain, use and apply the terms below.
- Bar chart
- Histogram
- Line graph
- Frequency polygon