Course Syllabus "Qualitative and Quantitative Research Methods in Psychology"

Approved

MP Academic Council

Protocol №01 01/09/2017

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Number of credits	8
Face-to-face hours	100
Coursework hours	204
Course	M.Sc., 1st year
Delivery format	Without an online course

I. GOALS, OUTCOMES, AND PREREQUISITES

The course reviews the principal steps taken during a psychological research study and aims to provide students with the knowledge and competencies necessary to plan and conduct research projects of their own leading to M.Sc. dissertation and future scientific publications.

The course aims to help the students:

- learn about the principal steps of a research project in Psychology, as well as the choices that each step involves and the different possibilities that exist;
- learn about the possibilities and limitations of quantitative, qualitative, and mixed-methods approaches in application to different research questions;
- learn to formulate research questions and develop them into testable hypotheses;
- explore the possibilities of data collection and different approaches to sampling, learn to choose an appropriate sampling approach for their research question;
- learn about the different paradigms of measurement in psychology and ways to apply the essential psychometric criteria to evaluate the quality of a quantitative measurement approach;
- study the common experimental, quasi-experimental, and non-experimental plans and learn to evaluate research plans, discover and prevent the associated threats to data validity;
- practice in preparing their quantitative data for analysis, evaluating data quality, working with missing data;
- learn about the possibilities and limitations of conventional statistical hypothesis testing approaches and criteria, as well as some contemporary multivariate statistical methods;
- learn to choose and apply in practice a set of appropriate statistical tests for their research questions;
- practice in preparing research reports in line with the international standards of the American Psychological Association.

This course is required as part of three M.Sc. programs, "Applied Social Psychology", "Cognitive Sciences and Technologies: From Neuron to Cognition", and "Consulting Psychology, Personology."

Prerequisites. The students are expected to have some knowledge of basic statistics and research methods at the undergraduate level. Though the course includes a review of some undergraduate material, it is assumed that the students already have a basic understanding of the key concepts (such as probability, distribution, sampling, reliability, validity). The students without any undergraduate background in quantitative methods are advised to plan their time to allow for extra reading.

This course is the first step within the integral research training provided by an ensemble of courses provided by each program. The postrequisites (provided within the context of each M.Sc. programme) include:

1) Research Seminars: practical hands-on sessions aimed to further develop the essential research skills by training practical skills, such as doing literature search using the electronic resources available at the HSE, using reference managers and mind-maps to structure the research material, structuring and writing theoretical reviews and research proposals, and preparing papers for publication according to the APA standards.
2) Advanced Courses in data analysis are aimed to develop practical skills of using advanced quantitative and qualitative research methods specific to the context of each program (e.g., latent variable modeling, working with large-scale databases and hierarchically structured data for Applied Social Psychology, or using time series analysis and spatial visualization of data for Cognitive Science).

Some of the topics of research seminars and advanced courses will be reviewed briefly within this course in a propaedeutic manner to give the students preliminary guidance on practical research steps to support their own research initiation and develop a general understanding of the aims and scope of advanced methods, to the extent to which it is necessary to understand existing research and to start planning their own projects.

II. COURSE CONTENT

1. Human being as a challenge: Research paradigms in psychology

Scientific method and the criteria of science in psychology. The complexity of human beings: humans as evolving biological, social, and cultural beings. A systemic multilevel perspective on human behavior. Holism and reductionism in psychology. Complexity of research methods as a function of degrees of freedom of the reality studied. Psychology and the problem of free will.

The problem of 'objectivity' and the evolution of research paradigms in psychology. Positivist and alternative (postpositivist) paradigms: philosophical assumptions and consequences for methodology. Nomothetic, hermeneutic, and idiographic approaches to research and explanation. Qualitative and quantitative methods.

2. Planning your research: Theories, hypotheses, and potential pitfalls

The stages of scientific research process and types of research studies. Where do research questions come from? Levels of scientific theories and the place of theory in psychological research. Formulating good hypotheses. Operationalizing your research question: seven methodological steps.

Doing literature reviews: choose keywords, find material, structure it, write it up. How to find out quickly what's happening in a field of research: three practical ways to do it. Types of research publications: which ones can we trust? Five questions to assess the quality of a literature review.

Research ethics. Academic integrity and its violations. Plagiarism and ways to avoid it. Ethical guidelines for psychological research involving human participants or animals. Ethical guidelines for scientific publications.

3. Getting your data: Sources and samples

Sources of psychological data: behavior, physiological processes, activity products, self-reports, peer reports, biographical and archival data. A review of data collection methods: observation, interviews, focus groups, surveys, objective physiological measurements, using archival data.

Sample as an indicant of general population: representativeness and sample bias. Law of large numbers and the importance of sample size. Random variables and distributions. A review of descriptive statistics. Normal distribution as an ideal: properties of normal and standard normal distributions. Standard error (of the mean) as a function of sample size.

Sampling. The advantages and limitations of systematic approaches (random sample, systematic random sample, stratified sample, cluster sample, multi-stage strategies) and opportunistic approaches (snowball sample, convenience sample, self-selecting sample, theoretical sampling). Volunteer bias. Internet samples: limitations and possibilities. Developing an online study the easy way (using ready-made interface) and the hard way (from scratch): technical challenges vs. research possibilities.

4. Psychological measurement: Psychophysics and Psychometrics

Subjective measurements in psychology and related sciences: psychophysics and psychometrics. The notion of scale and Stevens' classification (nominal, ordinal, interval, and ratio scales). A review of psychophysical methods. Threshold detection: method of adjustment, method of limits, method of constant stimuli, adaptive method. Signal detection theory. Representational theory of measurement as a basis for psychophysics and its critique: 'operational' and 'classical' approaches to measurement.

Psychometrics. Thurstone, Guttman, Likert scales. Varieties of rating scales and associated biases. Measurement result as a random variable. Random error. Inverse relationship of reliability and "standard error" (random error) in classical test theory (CTT). Assessing reliability: Cronbach's alpha and other methods. Assumptions and limitations of classical test theory. The concept of systematic error (bias). The idea and advantages of Item Response Theory.

Measurement validity: the notions of construct validity, operational validity, convergent and discriminant (divergent) validity, structural validity, criterial validity, predictive validity, face validity, expert validity. Ways to establish validity of a measure; multitrait-multimethod approach; nomological network. Formulating items to reduce random error. Varieties of systematic error (biases) in self-reports and ways to prevent them. Norms, standard scales, and conversion formulae. Steps to develop a psychometric instrument.

5. Research designs 1: Experiments

Causal and non-causal hypotheses. Necessary conditions for causal inference. The logic of experimentation. Variables: independent, dependent, and extraneous (confounding) variables; typical examples. Typical experimenter and respondent biases and ways to control them (double blind method, deception, hidden experiment, post-experimental control). Validity of experiments: ideal experiment as a validity reference point. Classification of experiments by goal, by setting, and by relation to practice.

Experimental designs and factors that jeopardize internal and external validity. Pre-experimental designs vs. true experimental designs. Between-groups designs and within-groups designs. Experimental control in between-group designs: controlling group non-equivalence (randomization,

matching, etc.). Experimental control in within-group designs: controlling time / position effects (randomization, counterbalancing, etc.).

Factorial experiments. Mixed plans: time-group interactions. Fixed and random factors. Theoretically predicted factors, factors as covariates (reducing error variance), factors to control for contextual effects. Intentional confounding: Latin squares. Statistical approaches to analyze experimental data.

6. Research designs 2: Quasi-experimental and non-experimental designs

Quasi-experimental designs: manipulation without complete control. Typical plans and examples. Small-N designs: using idiographic approach in experimental settings.

Non-experimental (correlational) designs. Correlations: the place of correlational analysis in a correlational study. Cross-sectional (between-groups) designs, longitudinal (within-group) designs, and mixed (multiple cohort longitudinal) designs. Ex post facto designs.

Specific non-experimental designs. Twin studies: shared genes and shared environment as independent variables; heritability coefficients. Cross-cultural studies: culture as independent variable; the problems of equivalence and sources of bias.

7. Quantitative methods 1: Testing statistical hypotheses

A review of statistical hypothesis testing. The null-hypothesis testing debate. Effect sizes (r, Cohen's d, R-squared), their relationships and interpretation. Effect size and statistical significance: confidence intervals. Meta-analysis: principles, steps, and examples. Statistical power and its determinants, performing power analyses in GPower.

Preparing your data for analysis. Checking data quality. Exploratory data analysis. Analyzing distributions: criteria of a normal distribution. Distribution problems and ways to cope with them. Dealing with outliers. Data transformations.

Handling missing data. MCAR, MAR, NMAR conditions. Traditional approaches (listwise, pairwise, mean substitution, single imputation) and robust approaches (model-based full-information maximum likelihood, data-based expectation maximization, Bayesian multiple imputation).

8. Quantitative methods 2: Comparing samples and looking for pairwise associations

A summary review of elementary statistical criteria and their assumptions. Criteria for nominal data (cross-tables), parametric sample comparisons (Student t, ANOVA), nonparametric sample conparisons (Mann-Whitney, Wilcoxon, Kruskal-Wallis), inter-rater agreement (reliability, Cohen's kappa), correlations (Guilford's phi, pont-biserial, Spearman, Pearson). The relationship between linear regression and Pearson product-moment correlation coefficients. Coefficient of determination. Comparing effect sizes in parametric and nonparametric tests. Recent developments in exploring associations: distance correlation and maximal information coefficient.

Writing up your results in APA style: the general structure of a quantitative research report. Presenting your data in the form of text, tables, and figures: useful suggestions. Visualizing different types of data.

9. Quantitative methods 3: General Linear Model

Models of associations of 3 variables. Multiple regression: purpose, assumptions and limitations, steps, presenting results. Dummy coding and effect coding. Simultaneous and sequential (hierarchical) linear regression.

General linear model as a general framework for ANOVA and regression. ANCOVA: purpose, assumptions and limitations, steps, interpreting results, presenting results. MANOVA: purpose, assumptions and limitations, steps, interpreting results, presenting results. Using (M)AN(C)OVAs to analyze repeated-measures experimental data. Nesting.

Testing for simple moderation using GLM/ANOVA and hierarchical linear regression. Mediation: criteria and ways to establish. Complex hypotheses (moderated mediation and mediated moderation). Path analysis. Regression and causality.

10. Quantitative methods 4: Multivariate exploratory and confirmatory methods

Establishing dimensions. Principal components analysis and factor analysis: assumptions & limitations, requirements, caveats, steps, and data interpretation. Criteria for choice of the number of factors: Kaiser's criterion, scree plot, parallel analysis, minimum average partial. Canonical correlation analysis, multidimensional scaling: aims and possibilities. Exploratory factor analysis tools for dichotomous and ordinal data.

Classification. Hierarchical cluster analysis: algorithms, metrics, challenges & limitations. K-means classification. Person-oriented approach: analyzing individual patterns of change in longitudinal data. Latent profile analysis, latent class analysis, and latent transition analysis: general idea. The notion of discriminant analysis.

Advanced modelling approaches. Structural equation modeling: aims and possibilities, limitations & caveats. Path models and latent variable models. Model specification, model fit assessment, nested models, modification indices. Applications of confirmatory factor analysis in psychology. Artifacts resulting from data aggregation. Intraclass correlation. Addressing hierarchically structured data using multilevel models: regression-based and latent variable-based approaches.

11. Qualitative Research

Advantages of qualitative approach. Steps of a qualitative study: choosing material, selection principle, analysis approach. Extracting meaning at different levels: descriptive phenomenological analysis, interpretative phenomenological analysis, thematic analysis and qualitative content analysis, quantitative content analysis. Software for content analysis and thematic analysis. Critical discourse analysis. Procedures for establishing validity of qualitative data.

Strengths and limitations of quantitative, qualitative, and mixed-methods approaches. Aims of mixed-methods approaches. Ways to unite the two paradigms. Examples of integration of qualitative and quantitative approaches: repertoire grids, ultimate concerns technique. The current directions and nearest perspectives of research methods in psychology.

12. Mixed-Methods Research

Strengths and limitations of quantitative, qualitative, and mixed-methods approaches. Aims of mixed-methods approaches. Ways to unite the two paradigms. Examples of integration of qualitative and quantitative approaches: repertoire grids, ultimate concerns technique. The current directions and nearest perspectives of research methods in psychology.

III. EVALUATION

The coursework grade is constituted by three components:

1) S: grade for activity at the seminars (evaluated by the seminar leader at the end of the module based on seminar attendance, active participation, small daily assignments, and/or participation in research studies);

2) H: average grade for home assignments: the students are expected to complete 3 home assignments per course, marked by the seminar leaders, resulting in an average score. The missing works are rated 0 (it is better to submit an imperfect work than nothing);

Detailed descriptions of home assignments and evaluation criteria are given in separate files "Home Assignment 1/2/3" on the Google Drive. The deadlines are set by your seminar leader. Late homework submissions are normally accepted at any moment before the final grades are published, but a penalty for late submissions may be applied (please check with the seminar leader for the deadline policy in your group).

3) T: average score on tests given at the end of each module (each test has around 40 questions, some multiple-choice, some open-ended; timeframe: typically 45 minutes if open-book, up to 75 minutes if closed-book – please check with your seminar leader);

The formula for evaluation:

$$Coursework\_Score = 0.5 * H + 0.3 * T + 0.2 * S.$$

4) Final Exam: at the end of the final module, 20 multiple choice questions (weighted .33 of the total grade) + 3-4 case questions (weighted .66 of the total grade). Open-book exam (the use of course materials is allowed).

$$CourseFinalScore = 0.6 * Coursework\_Score + 0.4 * FinalExamScore.$$

The scores S, H, and T are not rounded. The coursework, course exam, and course final scores are not rounded or rounded to the nearest integer, whichever results in a higher score.

Those students whose average score for the 3 end-of-module tests (T) equals 7.5 or above, have the option of having this score counted as the final exam score (skipping exam option 1).

Those students whose Coursework score (H, T, S combined) equals 7.5 or above, have the option of having this score counted as the course final score (skipping exam option 2).

If a student who is eligible to skip the final exam still takes the exam, her/his exam score will be counted only in case it results in a higher score, compared to the option 1/2 score.

IV. SAMPLE EVALUATION QUESTIONS

Sample multiple-choice questions (test, exam):

Classical test theory assumes that:

A. All measurement error is completely random
B. The amount of measurement error can be different for different items
C. A reliable test is always valid
D. True score is correlated with measurement error

Sample open-ended (case) question:

University management has created a psychological counselling center for students and conducted a study of its efficiency. A team of three psychologists used a battery of questionnaires (including measures of depression, anxiety, and well-being) to measure changes in the psychological status of students who underwent the 3-month-long counselling programme. A statistical analysis of the differences between the questionnaire scores before and after counselling showed a statistically significant increase in satisfaction with life, satisfaction with university, and emotional stability, combined with a statistically significant decrease in anxiety and depression scores. Feedback from the professors in charge of students' groups suggested that the counselling was effective in more than 80% cases.

1) Do you agree with the conclusion that the counselling was effective? Why?
2) What alternative explanations can you suggest for these findings?

V. RESOURCES

Recommended Literature

1. Frost, N. (2011). Qualitative Research Methods in Psychology: Combining Core Approaches. Open University Press. URL: https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=744149
2. Giles, D., & Strang, M. (2002). Advanced Research Methods in Psychology. Routledge. URL: https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=1144492
3. Robins, R. W., Fraley, C. R., Krueger R. F. (2007). Handbook of Research Methods in Personality Psychology. Guilford Press. URL: https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=320580
4. Schinka, J. A., & Velicer, W. F. (2012) (Eds.). Handbook of Psychology. Vol. 2. Research Methods in Psychology. Hoboken, NJ: Wiley. URL: https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=918179
5. Tabachnick, B. G., & Fidell, L. S. (2014). Using Multivariate Statistics. Pearson Education. URL: https://proxylibrary.hse.ru:2173/ehost/detail/detail?vid=0&sid=5070216b-9726-4ef9-9c04-271307c2a624%40sessionmgr102&bdata=#AN=1418064&db=nlebk

a. Software

#	Name	Access

1.	Microsoft Windows 7 Professional RUS Microsoft Windows 10 Microsoft Windows 8.1 Professional RUS	*University license (local)*
2.	Microsoft Office Professional Plus 2010	*University license (local)*
3.	SPSS Statistics 23 (or later)	*University license (local)*
4.	R Statistics 3 (or later)	*https://www.r-project.org/ (free software)*
5.	GPower	*http://www.gpower.hhu.de/ (free software)*

b. Electronic Resources

#	Name	Access
	Professional Databases	
1.	Scopus Citation Index	*University subscription (on-campus access)*
2.	Journal databases (APA, Elsevier, Springer, Wiley, etc.)	*University subscription (on-campus access)*
	Internet Resources	
1.	Google Academia	*https://scholar.google.com*
2.	Russian Index of Scientific Citations	*https://elibrary.ru*

c. Equipment

Teaching rooms equipped for lectures with demonstration of PowerPoint slides (computers connected to the Internet, sound equipment, remote-controlled projector, screen). Teaching rooms for practical sessions should include computers with Internet connection and access to the HSE software and on-campus electronic resources.