Course Description
MEDD8910 Introduction to Regression Analysis and Data Visualisation

Course description
This course will cover a number of regression methods and data visualisation using R. The emphasis will be on how to do data analysis using R as well as how to present and interpret the results from regression analysis. The topics include 1) R programming and visualisation, 2) descriptive statistics, 3) correlation and causation, 4) hypothesis testing, 5) simple regression, 6) multiple regression, 7) categorical predictors, and 8) interactions and quadratic effects. This course will illustrate how to use R software to carry out most statistical analyses and graphics covered in this course.

Course objectives
1) To prepare students with fundamental knowledge and skills necessary to perform regression analyses using R
2) To interpret the results from the analyses
3) To effectively present results in tables and figures
4) To apply appropriate strategies to address questions that arise in educational research and practice

Course learning outcomes (CLOs)	**Aligned programme learning outcomes (PLOs)**
1. Install, code, and use R programming language in R studio to perform statistical analyses and data visualisation	PLOs 1-3
2. Demonstrate a fundamental understanding of regression analysis in educational research	PLOs 1-2
3. Conduct regression analyses and effectively present results through reflecting on important educational values, such as equity and social justice	PLOs 1-4
4. Read, interpret, and critically evaluate statistical methodology, outcomes and interpretations found in educational research	PLOs 4-5

Course assessment methods

Assessment method	Weighting	Aligned course learning outcome(s)
Group assignments (two)	30%	CLOs 1-4
Individual assignments (two)	30%	CLOs 1-4
Final project	40%	CLOs 1-4

Course content and topics
Introduction to the course and R programming 1 (R language)
Introduction to publicly available education datasets
Introduction to R programming 2 (R packages)
Descriptive statistics and correlation analysis
p-values and hypothesis testing
t-test
The use of Analysis of Variance (ANOVA) and Analysis of
Covariance (ANCOVA)
The basics of simple regression
The basics of multiple regression
The use of categorical predictors for educational equity
The coding procedure to create categorical variables
Interaction effects

Required / recommended readings and online materials

Azar, B. (2006) Discussing your findings. http://www.apa.org/gradpsych/ 2006/01/findings.aspx

Jang, S. T. (2018). The implications of intersectionality of race, gender, and socioeconomic status on Southeast Asian female students' educational outcomes: Critical quantitative intersectionality analysis. *American Educational Research Journal*, 55(6), 1268-1306.

Jang, S. T. (2019). Schooling experiences and educational outcomes of Latinx secondary school students living at the intersections of multiple social constructs. *Urban Education*. Advance online publication. doi:10.1177/0042085919857793

Jang, S. T. (2020). The schooling experiences and aspirations of students belonging to intersecting marginalisations based on race or ethnicity, sexuality, and socioeconomic status. *Race Ethnicity and Education*. Advance online publication. doi: 10/1080/13613324.2020.1842350

Jang, S. T., Halse, C., Lee, D. H. L., & Hon, Q. C. K. (2021). Belongingness and national belonging among youth in Hong Kong. *Youth & Society*. Advance online publication. doi: 10.1177/0044118X211022393

Jang, S. T., & Alexander, N. A. (2022). Black women principals in American secondary schools: Quantitative evidence of the link between their leadership and student achievement. *Educational Administration Quarterly*. Advance online publication. https://doi.org/10.1177/0013161X211068415

Kutner, M., Nachtsheim, C., Neter, J., & Li, W. (2005). *Applied linear statistical models*. McGraw Hill/Irwin.

Nicol, A. A., & Pexman, P. M. (2010). *Displaying your findings: A practical guide for creating figures, posters, and presentations*. American Psychological Association.

Stage, F. K. (2007). *Answering critical questions using quantitative data. New Directions for Institutional Research,* 2007(133), 5-16.

Tabachnick, B. G., & Fidel, L. S. (2013). *Using multivariate statistics.* Pearson.

Teranishi, R. T. (2007). Race, ethnicity, and higher education policy: The use of critical quantitative research. *New Directions for Institutional Research*, 2007(133), 37–49.

Other additional course information

With Advanced Research Course (ARM)