ESCI upf.
School of International Studies

Academic Year/course: 2021/22

40323 - Data mapping for marketing

TEACHING PLAN

1. Basic description

Name of the course: Data Mapping for Marketing
Academic year: 2021–2022
Area: Marketing and Market Research
Profile: International Market Research and Business Analytics
Term: 1st
Degree / Course: Bachelor's Degree in International Business and Marketing
Code: 40323
Number of credits: 4
Total number of hours committed: 100
Teaching language: English
Lecturer:
Timetable: Schedule Sigma
Office hours: Tuesdays from 12:00 to 13:00

2. Presentation of the course

The aim of this course is to provide students with the skills necessary to perform dimensionality reduction and data mapping in the area of marketing. Students will learn a set of techniques that allow high dimensional spatial data to be analyzed and represented in meaningful ways, including techniques associated with Geographical Information Systems (GIS). The specific learning objectives include: being able to analyze and interpret the results of factorial models, multidimensional scaling techniques, correspondence analysis, and the use of GIS in applied marketing research settings. Students will work with R and open source GIS software.

3. Competences to be worked in the course

General competences	Specific competences
Instrumental competences	Professional competences
G.I.1. Ability to search, analyse, assess and summarise information. G.I.3. Ability to organise and plan. G.I.4. Ability to tackle and solve problems G.I.5. Ability to take decisions in complex and changing environments. G.I.6. Ability to develop, present and defend arguments	E.P.2. Ability to analyse economic and market indicators when taking decisions within the organisation. E.P.21. Ability to search and use various information sources. E.P.22. Ability to contrast knowledge obtained in the learning process and adapt it to real situations.
Generic systemic competences	
G.S.5. Ability to learn on one's own.	
Competences for applicability	
G.A.2. Ability to use quantitative criteria and qualitative insights when taking decisions. G.A.3. Ability to search and exploit new	

information sources.	

The above competences reflect the basic competences set out in Royal Decree 1393/2007, namely:

a. Competence to **comprehend knowledge, on the basis of general secondary education.**
b. Competence to **apply knowledge** to day-to-day work in international management or marketing, in particular the ability to develop and defend arguments and to solve problems.
c. Competence to **gather and interpret** relevant **data**, enabling the development of critical judgements on the economic and social reality.
d. Competence to **communicate and transmit information** (ideas, problems, solutions) to a specialist and non-specialist audience.
e. Competence to **develop learning activities** in a relatively autonomous manner.

The competences worked on in the course are divided into two groups: those seen as a development or specification of a basic competence; and those that hone graduates' professional profile with respect to general and specific competences.

Basic competence: **understanding of knowledge**
General competences G.I.3, G.A.2

Basic competence: **gather and interpret data**
General competences G.I.1, G.A.3
Specific competences E.P.2

Basic competence: **communicate and transmit information**
General competences G.I.6, G.I.8

Basic competence: **develop learning activities**
General competences G.I.3, G.I.4, G.S.5
Specific competences E.P.21, E.P.22

Competences that hone graduates' professional profile which are not included under basic competences

In general, these competences combine the following key elements for honing students' professional profile in the area of international business and marketing:

- Provide students with the capacity to adapt to dynamic teams and environments.
- Provide students with the capacity to create their own integral vision of the operation of a business or international marketing project.
- Provide students with the capacity to take complex decisions and carry out negotiation processes.

General competences G.I.4, G.I.5

Learning outcomes

Entender e interpretar la reducción de la dimensionalidad de los datos y su representación espacial, así como su aplicación en el área del marketing.

The competences, the learning outcomes, the assessment elements and the quality of the learning process included in this Teaching Plan will not be affected if during the academic trimester the teaching model has to switch either to an hybrid model (combination of face-to-face and on-line sessions) or to a complete on-line model.

4. Contents

The course is structured around learning how to analyze data and interpret the output using various dimensionality reduction and GIS techniques in the area of marketing. More specifically, the course covers the following topics from an applied perspective:

1. An introduction to multivariate techniques for data dimensionality reduction. Objectives and areas of application.
2. Factorial techniques I: Principal Components Analysis. Data reduction and mapping of quantitative variables.
3. Factorial techniques II: Factor Analysis. Data reduction and mapping of quantitative variables. Searching the optimal 2D fit. Applications in marketing.
4. Factorial techniques III: Correspondence Analysis. Data reduction and mapping of qualitative variables.
5. Multidimensional Scaling. Mapping of objects.
6. An introduction to Geographical Information Systems.
7. Applications of Geographical Information Systems in Marketing.

5. Assessment

Assessment elements	Time period	Type of assessment		Assessment agent			Type of activity	Grouping		Weighti %
		Mandatory	Optional	Lecturer	Self-assessment	Co-assessment		Ind.	Group	
Problem Sets	Weeks 2-6	x		x			Synthesis	x		25%
Research Project	Weeks 5-10	x		x			Application		x	25%
Final exam	Exam week	x		x			Synthesis	x		50%

Working competences and assessment of learning outcomes:

	GI1	GI3	GI4	GI5	GI6	GI8	GS5	GA2	GA3	EP2	EP21	EP22	Learning outcomes
Problem Sets	x	x	x				x	x					x
Research Project	x	x	x	x	x	x	x	x	x	x	x	x	x
Final exam	x	x	x				x	x		x		x	x

Any student who has turned in all of the problem sets and the research project and who has sat for the final exam but has not achieved a passing grade in the course will be allowed to take an extraordinary exam. Any student who does not sit for the final exam will receive a final grade of "not presented" ("*no presentat*").

Any students found copying and/or plagiarizing work, in whole or in part, will fail the subject. They will receive a final grade of zero and will not be allowed to take the make-up exam. In accordance with the UPF Disciplinary Rules and Regulations for Students, other additional sanctions may apply depending on the seriousness of the offense.

6. Bibliography and teaching resources

Basic bibliography

Chapman, Chris & Feit, Elea McDonnell (2019). *R for Marketing Research and Analytics.* Second Edition. Springer.

Crawley, M. J. (2012). *The R book*. John Wiley & Sons.

Hessa, Ronald L., Rubin, Ronald S., West Jr., Lawrence A. (2021), "Geographic information systems as a marketing information system technology." *Decision Support Systems* 38: 197-212.

Jolliffe, I. T. (2002). *Principal Component Analysis*. Second Edition. Springer.
Sutton, T., O. Dassau, & M. Sutton (2009). *A Gentle Introduction to GIS*, https://docs.qgis.org/2.8/en/docs/gentle_gis_introduction/.

Thiede, Rüdiger, Tim Sutton, Horst Düster, & Marcelle Sutton (2018). *QGIS Training Manual*, https://docs.qgis.org/2.8/en/docs/training_manual/index.html.

Wickham, Hadley & Grolemund, Garrett (2021). *R for Data Science*, https://r4ds.had.co.nz/.

Supplementary bibliography

Abdi, Hervé & Williams, Lynne J. (2010). “Principal Component Analysis.” *Wiley Interdisciplinary Reviews: Computational Statistics* 2 (4): 433–59.

Bivand, R. S., Pebesma, E. J., Gómez-Rubio, V., & Pebesma, E. J. (2008). *Applied spatial data analysis with R*. New York: Springer.

Borg, I., & Groenen, P. J. (2005). *Modern multidimensional scaling: Theory and applications*. Springer Science & Business Media.

Dolnicar, Sara, Grun, Bettina & Leisch, Friedrich (2018). *Market Segmentation Analysis*. Springer.

Greenacre, Michael (2017). *Correspondence Analysis in Practice*. Third Edition. Chapman and Hall/CRC.

Härdle, W. K., & Simar, L. (2019). *Applied multivariate statistical analysis*. Springer International Publishing.

Harvey, Francis (2015). *A primer of GIS: Fundamental geographic and cartographic concepts*. Guilford Publications.

Hout, M. C., Papesh, M. H., & Goldinger, S. D. (2013). Multidimensional scaling. *Wiley Interdisciplinary Reviews: Cognitive Science*, *4*(1), 93-103.

Iacobucci, D., Grisaffe, D., & DeSarbo, W. (2017). Statistical perceptual maps: using confidence region ellipses to enhance the interpretations of brand positions in multidimensional scaling. *Journal of Marketing Analytics*, *5*(3), 81-98.

Venables, W. N., D. M. Smith, & the R Core Team (2018). *An Introduction to R*, Version 3.5.1 (https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf)

Teaching resources (posted on AULA-ESCI)

Lecture and lab handouts

7. Methodology

The course will be taught through a combination of lectures and in-class discussions (which may be carried out in hybrid or totally online form depending on covid-19 restrictions), hand-on practical computer exercises and a directed research project. Students will be assigned readings and problem sets to complete before each weekly class.

8. Scheduled activities

Week	Activity in the classroom Grouping/type of activity	Time	Activity outside the classroom Grouping/type of activity	Time
Week 1	An introduction to multivariate techniques for data dimensionality reduction. Objectives and areas of application. Lecture and lab	3 hours	Assigned Reading (to do before the Week 2 class): • Chapman & Feit (2019) Chapters 1-3; 8.1, 8.2. • Jolliffe (2002) Chapter 1.	6 hours
Week 2	Factorial techniques I: Principal Components Analysis. Data reduction and mapping of quantitative variables. Lecture and lab	3 hours	Assigned Reading (to do before the Week 3 class): • Chapman & Feit (2019) Chapters 8.3, 10.1, 10.2. • Jolliffe (2002) Chapter 7. Problem set 1	6 hours

Week 3	Factorial techniques II: Factor Analysis. Data reduction and mapping of quantitative variables. Searching the optimal 2D fit. Applications in marketing. Lecture and Lab	3 hours	Assigned Reading (to do before the Week 4 class): ● Jolliffe (2002) Chapters 5.4, 5.5. Problem set 2	6 hours
Week 4	Factorial techniques III: Correspondence Analysis. Data reduction and mapping of qualitative variables. Lecture and Lab	3 hours	Assigned Reading (to do before the Week 5 class): ● Chapman & Feit (2019) Chapters 8.4 Problem set 3	6 hours
Week 5	Multidimensional Scaling. Mapping of objects. Lecture and Lab	3 hours	Assigned Reading (to do before the Week 6 class): ● Sutton, Dassau & Sutton (2009). Problem set 4	6 hours
Week 6	An introduction to Geographical Information Systems. Lecture and Lab	3 hours	Assigned Reading (to do before the Week 7 class): ● Hessa. Rubin & West (2021) Problem set 5	6 hours
Week 7	Applications of Geographical Information Systems in Marketing. Lecture and Lab	3 hours	Independent work on projects	6 hours
Week 8	Synthesis I: Working with real-world marketing data. Workshop	3 hours	Independent work on projects	6 hours
Week 9	Synthesis II: Visualizing and presenting results. Workshop	3 hours	Independent work on projects	6 hours

Week 10	Synthesis III: Decision-support systems Workshop	3 hours	Independent work on projects Exam preparation	6 hours
Week final exams	Final Exam	3 hours	Exam preparation	7 hours