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## Learning Social Research Techniques through Digital Resources and Collaborative Approaches: the Point of View of Sociology Students

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**ABSTRACT:** *in this paper we will illustrate the main results of a student evaluation activity aimed at exploring the learning process in a multivariate data analysis course, offered as part of the Bachelor degree in Sociology at the University of Barcelona. More specifically, by using a structured questionnaire, students evaluated the experience realized during a workshop, i.e. a problem based and collaborative learning activity, that allowed them to design an empirical research on a 'real' and contemporary social phenomena; moreover, the workshop – made up of two sessions – was designed to foster an aware use of the digital resources and tools which in recent years are taking on an important role in the social research process.*

**KEYWORDS:** *Teaching quantitative methods, Statistics student anxiety, Digital resources*

### Introduction

In recent years, social science researchers are trying to develop a pedagogical culture on social research methods and techniques, with the aim to reflect on the contents, actors and appropriate ways to encourage the acquisition of methodological and technical expertise amongst both students and early-career learners in different contexts. Many of them (Payne, Williams, 2011; Kilburn, 2014; Lewthwaite, Nind, 2016) are dealing with the different interrelated components, underpinning the teaching of methodological subjects, in terms of practices, tools, resources used by professors and experiences, difficulties, skills, and attitudes of students.

In particular, most contemporary works promote a student-centred learning approaches and experiential forms of *learning by doing* (Atkinson, Hunt, 2008; Aguado, 2009), without neglecting the theoretical issues which characterize the discipline. For example, Atkinson and Hunt (2008) carried out a workshop experience based on inquiry-guided learning, during which students were invited to think and act like

sociologists, engaging them in all the phases of the research process. Lovekamp, Soboroff and Gillespie (2017) realized a collaborative assignment based on the realization of some quantitative methods tasks in order to foster critical thinking, forms of self-reflection, and statistical literacy.

Within this broader scenario, in this paper we present our teaching experience of the course of Social Research Techniques IV, offered as part of the Bachelor degree in Sociology at the University of Barcelona. More specifically, we illustrate the realization of a workshop, i.e. a problem based and collaborative learning activity, and some results of the student evaluation of this learning experience (Freude *et al.*, 2020). These aspects are developed in the following sections of this paper: the first and second sections deal with the main characteristics of the course and the use of digital resources and contexts in the university educational processes; finally, the main results of the student evaluation activity are presented in the last section.

## **1. Teaching quantitative social research techniques**

This paper presents the main results of a student evaluation on a learning activity carried out in the second semester in the academic year 19/20, within the Course of Social Research Techniques IV, part of the Bachelor Degree in Sociology at the University of Barcelona. In particular, through a structured questionnaire, students evaluated the experience carried out during a workshop, i.e. a problem based and collaborative learning activity, aimed at designing an empirical research based on a multidimensional approach. The design and implementation of this activity underlies several interconnected issues that link two main aspects: on the one hand, the teaching of quantitative methods in sociological university studies and, on the other, the role of e-learning platforms and digital resources as new frontiers towards which university teaching is moving.

With respect to the first issue, which concerns the teaching practices of quantitative social research techniques, in recent years the discussion among social sciences scholars has been focused on the following points: the difficulties and prejudices that social sciences students usually meet towards the statistical aspects; the learning goals of the social research techniques courses (Marsh, 1981; Payne *et al.*, 2011; Ni, 2013); the skills that a sociologist should develop during the university path (Domínguez Amorós, Gómez Yáñez, 2016); the disciplinary issues also linked to the new frontiers of social research due to the digitization process; the role of theory and practice and the need to find the right balance between these two components (Barraket, 2005; Trowler, 2005; Tarifa, Zhupa, 2014). This last aspect concerns on one side the need to favour a hands-on exposure to research methods and on the other side, to enhance the theoretical sociological categories as fundamental guide of the research

process, which cannot to be reduced to a set of pre-packaged automatisms and technical procedures.

All these issues converge in the development of a pedagogical culture around the methods and techniques of social investigation (Earley, 2014; Kilburn *et al.*, 2014; Nind *et al.*, 2015; Lewthwaite, Nind, 2016; Diana, Catone, 2018; Catone, Diana, 2020); it is an area of research that is gradually consolidating and which intertwines pedagogical, social, cultural and technological issues, as part of the planning and implementation of a path of learning in the university environment (Diana, Catone, 2016).

The second central aspect of this paper focuses on the use of digital resources in university learning paths, which also characterize some activities of the Course of Social Research Techniques IV.

The use of Information and Communication Technologies in higher education is not recent, as the last decades have been characterized by an increasing development of a wide range of forms of online education such as e-learning, blended learning, full distance learning, etc. in which a plurality of actors, choices, factors and dimensions on micro and macro levels converge. These digital environments can be considered as techno-social contexts that contribute to impact on the processes and methods of teaching and learning, thus affecting the nature of knowledge itself and on the way in which people use it and transform it (Colombo, 2008).

Recent developments highlight the use of digital technologies also in the teaching of social research methods and techniques, adopting a constructivist approach based on the centrality of the student and on a cooperative dimension; for instance, the implementation of gamified activities (Mattar, *et al.*, 2017; Snelson *et al.*, 2017; Zuckerman *et al.*, 2015), in order to increase the students' engagement in research; virtual world simulations capable to involve social sciences students and encourage the understanding data analysis techniques (Rock *et al.*, 2016); the use of online discussion forums for reducing anxiety about statistics (Thompson *et al.*, 2019).

## **2. The design of the course**

Within this wider context, our experience concerns the teaching of Social Research Techniques IV. i.e. a course aimed at encouraging the understanding and application of multivariate data analysis techniques such as: log-linear analysis, principal component analysis, multiple correspondence analysis and cluster analysis.

More specifically, the course aims at achieving the following cognitive and practical skills such as:

- Acquiring a conceptual domain of multivariate data analysis techniques to study social sciences phenomena.

- Understanding the relationship between techniques and other design aspects of the social research process.
- Developing the ability to identify and understanding the scientific literature on multivariate data analysis.
- Discerning and choosing the techniques which best suited to the different research goals and the characteristics of the contexts, in order to face the complexity of social analysis with the scientific rigor and argumentation.
- Acquiring skills in order to use of secondary dataset and to analyse data through specific statistical packages such as SPSS.
- Interpreting the results of the multivariate analysis.
- Knowing the main procedures needed to adapt the plurality and complexity of social information and data to multivariate statistical analysis.

The course is made up of 60 hours organized in 2 weekly lectures and it is structured in theoretical and practical sessions.

Theoretical-conceptual lectures represent the pillar of the course and they consist in the exposition, by the teaching staff, of the theoretical concepts of each unit and their interpretative and applicative aspects. In the other sessions, realized in a computer lab, data analysis and interpretation activities are carried out. This structure of course allows learner to foster the understanding of the delicate transition from theory to practice in sociological research.

As will be see described in the chapter, study materials and activities are provided through the Virtual Campus, the e-learning platform of the University of Barcelona.

Due to the spread of the COVID-19 which has determined the mass closures of universities in order to limit interpersonal contact, many aspects of the organization and structure of the Course have been changed last year, such as the consequent shift to online forms of teaching and learning.

With respect to the use of digital and technological resources in the Course of Social Research Techniques, an important role is played by the Virtual Campus; it is the e-learning platform, based on a Moodle System, provided by the University of Barcelona that supports the student learning experience and the professors teaching activities. The platform consists of several sections which guide the learning process through: the upload of theoretical materials (PowerPoint, etc.) for each topic; the realization of practical activities with the support of digital resources, working materials (video tutorial, interactive exercises, online questionnaires, dataset, etc.) and collaborative tools (wiki, forums, virtual classroom, chat).

Among the different activities, which characterize the Course we planned a workshop that allowed students to design an empirical research on a 'real' and contemporary social phenomenon (Freude *et al.*, 2020). In particular, students had to respond to different fictional cases engaged by city councils on different topics such as inequality (1), sports

(2), exclusion of lesbians, gays, trans and bisexuals (3) politics, participation and youth (4) and labor market and gender (5).

The workshop was made up of two sessions: in the first one, realized in the university computer lab, students had to form groups and to choose between different fictional cases engaged by city councils; to prepare a first review of the scientific literature; to elaborate a first plan according to the fictional contract, and to review and search different datasets.

The second activity was realized in virtual way due to the spread of COVID-19 and the shift to online forms of teaching and learning; during this session students developed a model of multivariate analysis in order to respond to the fictional city council request, using the Campus Virtual tools (video-tutorial, wiki, collaborate classrooms, etc.) and the digital resources, usually employed the field of social research (dataset, graphics, concept maps, etc.).

The idea underpinning the planning and organization of these activities was to bring students closer to the analysis of contemporary social phenomena, making the research 'visible' through the right combination of theoretical and empirical aspects that underlie the path of social research.

### **3. The student evaluation**

After briefly described the overall structure of the course and the main characteristics of the workshop, in this section we will present the main results of the empirical research aimed at exploring the students learning experience realized during the activities, in terms of knowledge and skills developed, study approach and tools used. The data were collected designing two questionnaires, one for each workshop session and analyzed using descriptive analysis techniques; next, we carried out some multidimensional data analysis techniques, such as the principal component analysis (PCA) (Hotelling, 1933), i.e. a factorial technique employed to synthesize the information contained in a data matrix, through the identification of a small number of factors expressing the relations between a set of variables and the Cluster Analysis, which that allowed us to define two groups of students with a different learning experiences in the realization of this workshop.

The questionnaires were articulated in the following dimensions through which students assessed: the level of knowledge and skills acquired before and after each activity; the tools and resources used; the relationship with the classmates and with the professor. The first questionnaire was responded by 68 students (29 males, 38 females, 1 other); the second questionnaire was answered by 98 respondents (42 males, 53 females, 3 other).

Starting from the results of the first questionnaire, more than 85% of students stated to have actively participated to the activity; moreover,



using a Cantril scale, they evaluated the level of knowledge developed on five key-competences and tasks characterizing the session: specific knowledge on the case-study, formulation of a research topic, formulation of research objectives and hypothesis and a preliminary databases research. The means of all the items evaluated after the activity are around 7, i.e. a value that is slightly greater than that they indicated before the activity which is approximately equal to a 6. In particular, students also agreed that the activity helped them to better understand how to deal with a research problem (79,4%) and according to the 77,9% of the respondents, after the activity they feel more curious and capable of adopt a critical thinking about contemporary social phenomena. Moreover, teamworking was evaluated positively compared to individual activity by the 80,9% of students and almost all the students perceived their participation as strong or very strong (95,6%).

Also, in the second activity realized online, due to the lockdown, students evaluated their previous and posterior knowledge on three different key-competences and tasks realized during the session: identification of different sources of information, selection and construction of databases and finally the identification of the appropriate multivariate data analysis techniques. All the items received an average value of about 6 which is lower than in the first activity; at the same time, the average's values are greater than that they indicated before performing the activity. These results can also be read in the light of the unprecedented situation that the students experienced during the lockdown period, characterized by a change of places, times and modes of study, suddenly adapted in the virtual context.

Next, we investigated the main dimensions underlying the student learning experiences focusing on their use of digital tools and their relation with other students, taking account of the virtual context which characterized this second activity. More specifically, we carried out a multidimensional data analysis path which allowed us to extract the factors through the principal component analysis (PCA); then, we performed a cluster analysis in order to identify a typology of students. Starting from 8 items used to detect the learning approach and tools adopted the second activity, according to the point of view of the students, the PCA (using varimax rotation) allowed us to extract two factors which reproduced the 57,7% of the total variance. More specifically, the first factor (30,4% of total variance) expresses the aspects connected to the use of digital tool and contexts which, especially during the lockdown, played a central role in the educational student experience. Indeed, this factor brings together some variables linked by the technological component such as «Internet and the technological tools that I have used allowed me be more effective to do this activity»; «this online practice allowed me to participate more actively than in the classroom»; «doing this online activity from home was comfortable» and «this activity done using online tools has required more effort than doing it in the classroom» (item with a negative value). The second factor

(27,3% of total variance) concerns the collaborative dimension and forms of reflexivity underpinning the activity and it brings together some variables such as «group activity has allowed me to feel part of our class during this period of confinement», «I would have preferred to do this practical activity alone» (item with a negative value), «this practice has given me a greater awareness of my difficulties».

Next, we carried out a cluster analysis, using a hierarchical technique, that allowed us to define two groups of students, which suggest different experiences in the realization of this workshop.

The first group includes the 51% of the interviewees who appreciated the collaborative approach and the teamworking which made the activity less boring and favored the degree of reflexivity on the skills and knowledge acquired; however, this group believes that technologies did not facilitate the realization of the activities, which instead required a lot of effort. The second group, on the other hand, is made up of 49% of students who believed in the usefulness of technologies and of digital resources in carrying out the activity, which allowed them to participate in a more actively way and to understand some aspects of the empirical research they designed. These results and in particular the identification of these groups with different orientations to technology are linked to a plurality of aspects that deserve to be deepened with further analysis and research, for example, considering the different level of digital competence possessed by learners and possible differences related to the digital divide.

## **Conclusion**

The learning experience described in this paper was an attempt to try to overcome the sense of anxiety over statistics usually felt by sociology students (Williams, Sutton, 2011); to involve them in the practice of multivariate analysis techniques in real world contexts without neglecting the theoretical issues underpinning the social research process; to promote the socialization of learners into the «culture of research» (Eisenhart, DeHaan, 2005, 7); moreover, it has been also a challenge to foster the student use of digital resources in a scientific framework. This last point, also in the light of the teaching experience carried out completely online during this period of COVID-19, undoubtedly leads us to deeply reflect on how to bring students closer to the conscious use of digital resources in data analysis course, without determining a marginalization of the theoretical component in favor of the purely technological. These aspects suggest some directions toward which we can orientate the planning and the organization of the activities of the course in the Course of Social Research Techniques in the next years in order to find the right balance among technological, disciplinary, educational and social dimensions.



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