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METHODOLOGY OF SOCIAL SCIENCES IN THE 21ST CENTURY

Introduction

Social sciences are facing big methodological challenges in 21st century. The only constant we know is the increasing change and complexity, not only inside social sciences as a scientific field, but because of the internet exponential growth. Some of these challenges involve continuity in topic and research approach, whereas others involve new characteristics and aspects of social life. Contemporary social sciences deal with issues such as well-being and disadvantage, diversity and community, vulnerabilities and risks and the relationship between social and digital worlds (Societal Challenges, 2014). The research methodology in these areas is increasingly facing challenges. This essay will explore some of the key methodological challenges and the need for methodological innovation to face them. It begins with the presentation of the six research challenges. Then it presents methodological innovation, the two main research paradigms (qualitative and quantitative) and its research steps. Finally, a European project of development of innovation in the area of Cooperation for Innovation and the Exchange of Good Practices – Strategic Partnerships for School Education is presented as a good example of methodology of social sciences in the 21st-century.

Methodological challenges of social sciences in 21st century

The big six social sciences methodological challenges in 21st-century are technological change, administrative data developments, integrated research capacity, research ethics respect, social research democratization and sense of purpose.

The first main challenge is technological change and the need to keep up with it and exploit. The sample survey and the in-depth interview are increasingly out of date research methods (Cox, 2012; Savage, Burrows, 2007, p. 885). On the other hand, the rapid development of online methods is the best way to keep up with the technologi-

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cal revolution in communications (Hooley, Wellens, Marriott, 2012). Therefore, social sciences need to explore and adapt their methods to face the technological revolution.

Access to and development of administrative data sources are the second big challenge for social sciences (Boyle, 2011). The EU provides a collection of huge administrative data. The main goal of this administrative data project is to help the Member States make wider and better use of administrative sources in the production of official statistics. This means addressing the most typical challenges faced in the use of these sources: limited access to the data, the lack of quality of the sources, methodological issues related to the processing of the data and the integration of several sources. It is also important to ensure that the European statistics produced with the use of administrative data are comparable across the Member States and are of sufficient quality (CROS – Collaboration in Research and Methodology for Official Statistics[1]).

The third big challenge is to enhance research capacity in an integrated way. Many developments of contemporary priority for the social issues really require increasingly specialist knowledge and skills (McMahon, 2014). To face this challenge, research on social sciences should be more and more a collaborative effort requiring mutual understanding across interdisciplinary teams (Krishnan, 2009). As a consequence, social sciences are now using pluralism methodology and mixed methods (qualitative and quantitative) (Mason, 2006).

The fourth big challenge is the respect of research ethics. Personal data protection and informed consent are needed in all European research projects. Questions about the whole research process, from research design and access to data analysis and ownership, continually re-appear in new forms. Using data from social media is an on-going challenge (Wiles, 2012). Furthermore, researchers need to make the argument for their ethical choices (Wiles, 2012) because research involves risks.

The fifth big challenge is the democratization of social sciences research and, as a consequence, the increasing valorization of the interdisciplinary aspect. Working with research partners beyond academia is nowadays an imperative to do good research and to apply for European funding, which needs at least three partners from different countries. A practical example of this challenge is the Connectivity Center Conference of Faculty of Education, Psychology and Sociology of University of Zielona Góra, Poland (Garcês i in., 2017) and the Interdisciplinarity in Social and Human Sciences Center Conference of University of Algarve, Portugal (Pocinho i in., 2017). Pursuing collaborative research and the 'impact' agenda does not always lead straightforwardly to a meeting of minds/practices (Crow, Pope, 2008).

The sixth big challenge is to keep a sense of purpose. Methodological innovations are more than technical exercises – the importance of keeping in mind why we pur-

[1] In https://ec.europa.eu/eurostat/cros/content/essvip-admin-administrative-data-sources_en.

sue them (to answer new research questions and to generate better quality data and analyses). We should be careful with claims to innovation and treat them with caution (Societal Challenges, 2014).

Methodological innovation

Facing these challenges is not an easy task. The methodology of social sciences should be rooted in a genuine attempt to improve some aspects of the research process (not just gimmickry or innovation for innovation's sake). It can comprise developments to established methods as well as new methods. It should have some level of dissemination (inclusion in textbooks), acceptance and take-up in the research community (Taylor, Coffey, 2008; Travers, 2009; Xenitidou, Gilbert, 2010).

Social sciences research: what is science? What is research?

In a basic way, social science is a body of knowledge and the way how this knowledge is collected. This way is called a scientific method, a sequential social research process that includes the statement of problem, hypotheses to be tested, collecting and analyzing data, results, and discussion and conclusions about data and the problem. The question is why not just rely on common sense or informal advice? Picture 1 helps us to answer this question. Look at the orange circle. Which circcle is bigger (left or right)?

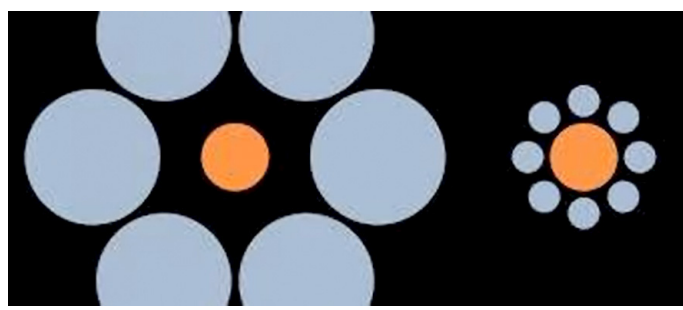

Fig. 1. Look at orange circles. Which one is bigger?
Source: Samuel Schwarzkopf (https://www.newscientist.com/article/dn19823-bigger-brains-tricked-by-optical-illusion/).

In fact, this exercise shows how we need scientific research, or better say, how we need to use a scientific approach to collect and logically analyze data. On the other hand, data shapes beliefs (rather than beginning with beliefs and seeking data to confirm them). And the ways in wich one collects and analyze data are called research methods. Therefore, the nature of social sciences requires constant methodological innovation, but the scientific paradigms didn't change too much. The methodological innovation

is the capacity to integrate the social sciences research paradigms according to the methodological challenges of the 21st-century.

Two main methodological paradigms: the mixed methods research process

As we said before, one of the big methodological challenges in social sciences is increasing research skills in an integrated way, using mixed methods: using quantitative and qualitative methodology (Pictures 2 and 3). The quantitative methodology is appropriate for structured data, such as surveys and experiments, and provides statistical analyses using the well-known SPSS. One of the crucial skills in the 21st-century is definitely the statistical software expertise. If you don't know how to perform a simple ANOVA or a multiple linear regression, please don't choose quantitative methodology or even better please do an online SPSS course. As a consequence, statistical data analysis gives us objective conclusions. The quantitative data collections tools in the 21st-century are now more accessible to researchers than in the past because one can use free digital tools. For example, online web surveys, virtual face-to-face tools (Skype, WhatsApp, Facebook), mobile phones, central location intercept, and so on.

The qualitative methodology is appropriate for unstructured data, like observations, interviews, and focus groups (O'Connor, 2011). Nowadays you have great tools to collect qualitative data such as online forums, online communities, Facebook, Twitter, web-survey-chat, groups, triads, dyads, in-depth interviews (IDIs).

These two main methodological approaches are currently the best way to collect data in order to analyze research variables. In social sciences, you have two main types of variables: quantitative and qualitative. The quantitative variables are related to the amount or degree. They are analyzed as a scale, interval, or ordinal variables. For example, age, intelligence test assessment, school grade, respectively. On the other hand, you have the qualitative variables related to the type or kind of variables. They are analyzed as nominal variables. But if you have nominal variables, such as the gender, you can make codification: male means "1" and female means "2". As a consequence, these qualitative variables become numeric variables and you can make statistical data analyses. Finally, you have sophistical methods for analyzing qualitative interview data – computer software for data analysis, such as ATLAS.ti or NVivo to help manage the data (Rucker, 2017). This does not mean that the computer simply performs the analysis as is still the job of the researcher. However, this software can help us organize, retrieve and present our data in an effective and more coherent way.

Therefore, in the 21st-century the challenge is the custom hybrid use of methodology for quantitative and qualitative data collecting and analyzing, in an integrative approach: the mixed methods research (Picture 4). In every research process, you always begin with a general topic, go to specific steps within your topic, and finish with the general

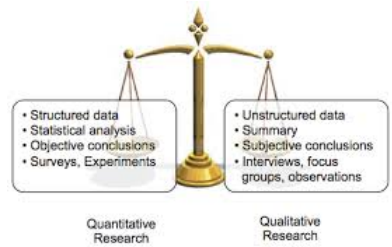

Fig. 2. Quantitative and qualitative methodology characteristics
Source: http://www.mymarketresearchmethods.com/quantitative-vs-qualitative-research-whats-the-difference/.

Fig. 3. Quantitative and qualitative data collection tools
Source: https://infogram.com/quantitative-vs-qualitative-research-1gqgk269rj632n0.

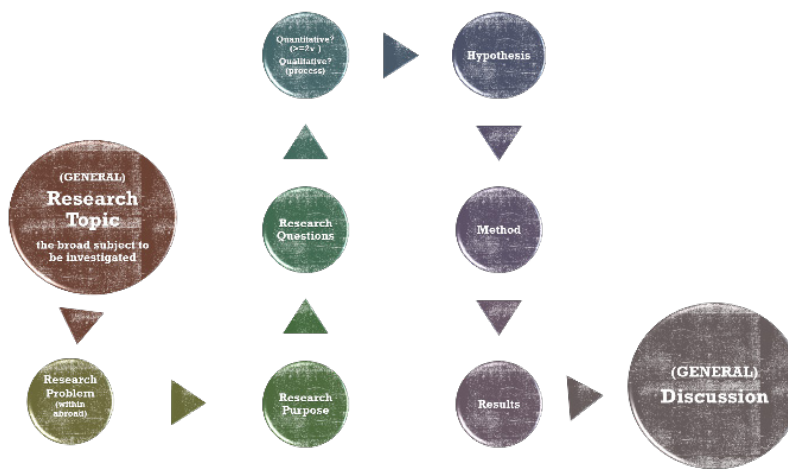

Fig. 4. The mixed method research process steps
Source: Author's own work.

topic discussion. Picture 3 describes the main steps of a mixed method research process that corresponded also to the sections of a report paper.

Research topic. Finding a research topic is a broad subject to be investigated. How do researchers choose a topic? You should answer three questions: (1) is it a topic that really interests you? (2) Is it creative (include novelty and appropriateness) and innovative? And (3) does it following the 21st-century priorities?

Research problem. Select the adequate research problem, the educational issue or problem within a broad topic area. To help the selection of the problem try to answer the following questions: what is the specific issue you want to study? And why does it need attention? You can study the problem quantitatively to explain, predict or statistically describe an event or outcome; or qualitatively to understand a group, process, event or phenomenon.

Research Purpose. Statement of intent or objective of the study. The research purpose typically includes variables, the relationship between these variables and the participants involved. For example,

a) A quantitative purpose: *The purpose of this study is to investigate the effect of an intervention program on creativity, intelligence and 3D technology skills for children in disadvantaged situations, using the creativity test and the IQ Raven test for children.*
b) A qualitative purpose: *The focus of this study was to explore the process of creativity in children from disadvantaged environment working with 3D technology with the use of an observational naturalistic approach.*

Research questions. After the purpose has been defined, you are able to establish research questions. The quantitative research questions are interrogative sentences that ask a question about the relation between two or more variables; the qualitative research questions are interrogative sentences that ask questions about a process, issue or phenomenon to be explored.

Hypotheses. If you have some hypothetic answers to questions or solution to the problem, then you are formulating the hypotheses to be tested.

Method. To test these hypotheses you need research methods of collecting and analyzing data. In this step, you select the appropriate design, the participants, the instruments and materials and the procedures.

Results. Mains findings or results, argument, what was accomplished.

Discussion and Conclusion. This part of the scientific paper/research process interprets or extends results, draws inferences, points to applications, wider implications, and recommendations. The end of the conclusion should be a simple statement to key points of the paper and what the future is.

The case study of a European Union social sciences research project

As it was said before, the contemporary social sciences issues cover priorities such well-being and disadvantage, diversity and community, vulnerabilities and risks and the relationship between social and digital worlds (European Commission, 2017). The case study presented below is a good example of a methodology of social sciences in the 21st-century. It is a project directed to pre-school children with a low social economic status in order to answer to the first EU priority: inclusive education (Pocinho i in., 2017). The project aims at promoting equity and inclusion by facilitating the access for participants from disadvantaged backgrounds and with fewer opportunities, instilling from a young age fundamental skills for the children's present and future and promoting their inherent skills that will help them surpass their economic challenges. The second horizontal priority addresses an open and innovative education in the digital era. Beyond the focus in participants with fewer opportunities in life, the project will develop a new and innovative approach to an extra-curricular education program, that will bring innovation to school education methods with a more know-how and creative approach to enhancing children's inherent skills. Also, this priority brings the element of the digital era. The present project will use 3D printing to enhance creativity and entrepreneurship skills in preschoolers, making a clear use of this new emerging technology. The last priority chosen is evident, the project intends to promote better education for young children, enhancing the quality of early childhood education and care.

As we can see, this project covered all these research priorities and it uses innovation to face the 21st methodological challenges. It was a project within the programme of the European Commission, in the area of Cooperation for Innovation and the Exchange of Good Practices – Strategic Partnerships for School Education. The main objective was the development of innovation. The project aimed to develop creativity, multiple intelligences (Gardner theory) and 3D technology skills in children in disadvantaged situations. It involved partnership, researchers from Portugal, Poland, and Spain, to enhance research capacity in an integrated way. To face the challenge of the need for different skills and knowledge, the interdisciplinarity of Portugal, Spain, and Poland was crucial. For example, Portugal had the expertise of creativity, multiple intelligences, and engineering and 3D technology practice. Spain had knowledge about early childhood education using technology and Poland was an expert in developmental psychology, social exclusion, and bilingualism. The multiculturalism, working methods, early education (theory and practice) and 3D and technology expertise provided by each of these three countries became a unity with a sense of purpose (Fig. 5).

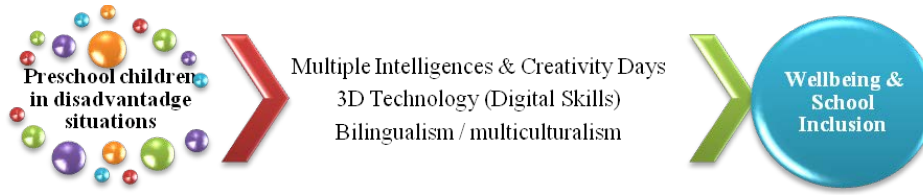

Fig. 5. The unity of interdisciplinarity: the sense of purpose
Source: Author's own work.

Finally, the project uses social sciences mixed with innovated methodology. An experimental design – implementation of an intervention program "Creativity Days", with group dynamics, 3D modelling and 3D printing – with pre and post-test, experimental (disadvantaged children) and control group, using mixed methods: quantitative and qualitative data (tests, google docs questionnaires, interviews, online forums, focus-group, recorded observations, naturalistic observations).

Conclusions

It is apparent from the previous sections that the question of methodology challenges for the 21st-century cannot be dissociated from the social sciences research priorities. If we consider today's literature on research, we may be inclined to conclude that change and complexity linked with the inevitable internet "tsunami" will be the dominating paradigm for the 21st-century. Planning social sciences methodology in the 21st-century is an intriguing topic because the only information we have is speculation and the life experiences of today (Voogd, 1997).

Given the growing complexity and internationalization of societies in the 21st-century, the question should be raised whether this differentiation within the planning methodology, resulting in planners with different knowledge, skills, and methodologies, should be accepted or dealt with (McMahon, 2014). A researcher in the 21st-century cannot restrict his or her view to one of the challenges of methodological research described in this paper, but that knowledge and skills should encompass the full spectrum of the constant social change and the complexity of data collecting tools using the Internet in everything everywhere.

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Methodology of Social Sciences in the 21st Century

Summary: This essay presents the methodological challenges on social sciences for the 21st century. The contemporary social sciences issues cover priorities such as well-being and disadvantage, diversity and community, vulnerabilities and risks and the relationship between social and digital worlds. The research methodology in these areas is increasingly facing challenges. This article explores the big six methodological challenges (technological change, administrative data developments, integrated research capacity, research ethics respect, social research democratization and sense of purpose), and the need for methodological innovation to face them. Finally, it presents a case study of a European project of development of innovation.
Keywords: methodology, social sciences, 21st-century, innovation, mixed research methods, European project.

Metodologia nauk społecznych w XXI wieku

Streszczenie: Niniejszy artykuł przedstawia wyzwania metodologiczne w naukach społecznych na miarę XXI wieku. Współczesne nauki społeczne zajmują się takimi kwestiami, jak dobrobyt i niekorzyści, różnorodność i społeczność, bezbronność i zagrożenia oraz relacje między światem społecznym a cyfrowym. Metodologia badań w tych obszarach staje przed nowymi wyzwaniami. W artykule opisano sześć wielkich wyzwań metodologicznych (zmiana technologiczna, rozwój danych administracyjnych, zintegrowane możliwości badawcze, szacunek dla etyki badawczej, demokratyzacja badań społecznych i poczucie celu) oraz potrzebę innowacji metodologicznych, aby stawić im czoła. Wreszcie przedstawia studium przypadku europejskiego projektu rozwoju innowacji.
Słowa kluczowe: metodologia, nauki społeczne, XXI wiek, innowacje, mieszane metody badawcze, projekt europejski.