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METHODOLOGICAL AND ETHICAL DILEMMAS OF COLLECTING DATA VIA ONLINE SURVEYS IN EDUCATION RESEARCH

Abstract: *Starting from the premise that scientific paradigms are philosophically determined, and not by research methods, the paper critically analyses the characteristics of online survey research in pedagogy using a theoretical and comparative approach. Attention is paid to data collection via surveys, the quantitative approach, sampling, and research ethics. Sample representativeness is (almost) impossible to achieve, since these are mainly types of intentional samples. Samples of such research deviate from the established classification of random samples. Ethical dilemmas of (survey) online research are visible, such as anonymity, confidentiality, and informed consent. Therefore, the challenge of developing a new categorization and systematization of random samples and ethical protocols for conducting online survey research is anticipated. By advocating pluralism in scientific paradigms and encouraging a triangulation approach in pedagogical research, we are moving away from the traditional positivist approach that still prevails in educational research and introducing unjustifiably neglected research methods. The above would significantly influence the necessary methodological development of pedagogy in Croatia.*
Keywords: *didactics, pedagogy, quantitative methodology, research method, research samples*

INTRODUCTION

When asked what science is, there is no single unified definition. But we can agree with the definition of science as the process of forming knowledge using specially developed methods adapted to the subject of research, which enable the collection of facts, their explanation, and the verification of every part of their content (Stančić, 1996, p. 3). Scientific knowledge is only one of several possible knowledges of the world (Milas, 2005) and as such is neither superior nor inferior to other knowledges, since people use them (un) consciously. The goal of science is to discover new scientific facts, form new concepts, and find and explain connections and relationships between ideas. Science strives to describe, classify, predict, and control the problems it investigates. It forms scientific concepts, their definitions, taxonomies, and (re) forms scientific theories. The ultimate goal of science is to provide a scientific explanation and understanding of the issues under investigation.

In pedagogy, i.e., the science of education or educational sciences, as well as in other sciences, empirical and historical research is complemented by the role of theory(s) (Biesta, 2020). An essential element in understanding science is recognizing that scientific theory does not exist as such in nature, society, or the environment − i.e., in reality. A scientific theory cannot be "harvested", "found", or "caught" as such in nature or society. A scientific theory is a human intellectual product, i.e., an intellectual construction. Only through human thought does a scientific theory emerge. Therefore, a scientific theory can be constructed and refuted precisely because of the scientific method (methodology) (Kuhn, 1996). There are various scientific fields, including natural, social, and humanistic sciences. The methods of a particular science are primarily determined by the problem it studies and the scientific paradigm. Unlike the natural sciences, in the social and humanistic sciences, there are no scientific laws but only regularities. We can say that topics in pedagogical methodology are still underdeveloped in Croatia compared to other pedagogical issues. For example, in the bibliography of *Život i škola*[1], 265 contributions were published in the period from 1982 to 2017, of which only 2.64% were published related to pedagogical methodology (Dubovicki & Munjiza, 2019, pp. 45–46). Furthermore, among the 370 analyzed papers in the research journals, only 1.9% were from the field of methodology (Dubovicki & Topolovčan, 2020).

[1] *Život i škola* [Croatian: Life and School] is a journal for cultural and educational issues that began publication in Osijek in 1952. It was launched by a group of prominent educational and cultural workers within the Osijek Cultural Workers' Club. The organizers of the launch of Life and School were: Mirko Jirsak, Marin Petančić and Slobodan Kovačević, then professors at the Teacher Training School in Osijek (Dubovicki & Munjiza, 2019, p. 9).

Pedagogy, which studies education, is also a social science. Scientists from other fields also study education (sociology, psychology, economics, etc.), but this is only a sporadic subject for them, since they have their own primary areas of study. However, in pedagogy, the only subject of study is education. As in other scientific fields, in pedagogy (i.e., education research), the quality of research and the results obtained depend on the methodological decisions of the researcher. That is, on human choices. The *scientific paradigm* is one factor in a researcher's decision-making because it serves as the framework for research.

Research methodology is most often divided into qualitative, quantitative, and, more recently, mixed methodology. Guided by the assumption that scientific paradigms are determined by *research methods/tools*, in this sense, we have the understanding paradigm and the explanation paradigm (Gojkov, 2006; Halmi, 2005; Kuvačić, 1988; Mužić, 1973, 2004; Pastuović, 1997; Sekulić-Majurec, 2000, 2007; van Manen, 2001). The *understanding paradigm* (germ.: *Verstehen*) emphasizes holism, focuses on natural observation, and seeks a greater role for subjectivity and a deeper understanding of the phenomena being researched (interpretative paradigm). On the other hand, the *explanation paradigm* (germ. *Erklären*) strives for objectivity, establishing cause-and-effect relationships (causal paradigm) that involve exact measurement. For the above reasons, data must be reliable and repeatable. Considering, on the other hand, that scientific paradigms should be determined by *philosophical starting points* rather than by research methods/tools, we divide scientific paradigms into: positivist, post-positivist, critical-theoretical, constructivist, and participatory paradigms. Be that as it may, it is essential to emphasize that in the research of pedagogical phenomena, it is necessary to advocate the pluralism of scientific paradigms that focus on a specific problem/challenge, and not just a theoretical framework or a specific research instrument (Bognar, B., 2012; Bognar, L., 2012; Dubovicki et al., 2018; Dubovicki & Topolovčan, 2020; Guba & Lincoln, 2005; Žarnić, 1996; van Manen, 2001). Just such an approach could enable the development of pedagogy as a theory and practice of upbringing and education:

> *By changing the existing ossified classification of works and incorporating all other paradigms with special emphasis on theoretical foundation, connection with practice, and creative approach, the further methodological development of pedagogy in our country would be more seriously encouraged* (Bognar, L., 2012, p. 119).

It includes consideration of sample selection, a key methodological decision. An inappropriate, undefined, and small number of respondents (selected from a heterogeneous population) and unknown participant

characteristics will yield deviant and incomplete results, leading to incorrect conclusions. Cohen, Manion, and Morrison (2018) point out the importance of the strategy of selecting the type of sample from a specific population:

> *The quality of a piece of research not only stands or falls by the appropriateness of methodology and instrumentation but also by the suitability of the sampling strategy that has been adopted (see also Morrison, 1993:112–17)*[2]*. Questions of sampling arise directly out of the issue of defining the population on which the research will focus* (Cohen et al., 2018, p. 202).

The representativeness of the sample is important for the quality of the results and their generalizability to the population, especially in quantitative research. It is important to note that sample representativeness depends on the *selection strategy and the sample size*. Therefore, it is explicitly indicated:

> *As can be logically expected, inferential statistics is more "cautious" in concluding that we have obtained certain results on a smaller amount of data. On the contrary, the higher the number, the more we can be sure that the obtained results are also valid "otherwise", and not only in the case we measured. But all this, of course, under the assumption that the "sample" on which we performed the measurement is representative of the group to which that sample belongs, i.e., that the sample is not biased. (...) Since in inferential statistics the problem of the sample and its representativeness has a primary meaning (because all the conclusions we derive from the obtained results are valid only if the sample is chosen as a rule), many statisticians call inferential statistics also 'sample statistics*' (Petz, 1981, p. 13).

From these several relevant and recent examples, it is evident, in addition to the above, that the researcher's decision also depends on the methodological research design's characteristics, which are crucial for obtaining optimal research results and a valid scientific contribution. These methodological decisions include the selection of instruments/tools and the data collection procedure, and, in particular, the selection of an appropriate sample selection strategy, i.e., the optimal type and size of the research respondents/participants (Cohen et al., 2018). The axiological and ontological characteristics of the research objective help us decide on the application of a qualitative, quantitative, or combined methodological approach to research (pluralism of scientific paradigms). Based on the approach, appropriate instruments and

[2] Author's note. In the Croatian translation (Cohen et al., 2007) of the original fifth edition of the book, the authors paraphrase the book: Morrison, K. R. B. (1993). *Planning and accomplishing school-centred evaluation*. Norfolk: Peter Francis Publishers.

data collection procedures can be determined. This is followed by selecting the sample type. The representativeness of the sample is essential for a valid scientific contribution. The representativeness of the sample of respondents, i.e., research participants, is equally important in both quantitative and qualitative research (Cohen et al., 2018; Mejovšek, 2013; Mužić, 1973). In extensive, quantitative, and most often, survey research with a large number of respondents, the importance of representative sample selection strategies is particularly emphasized. Previous research shows that quantitative methodology dominates in education research in Croatia and that survey research is one of the most common research techniques/tools (Dubovicki et al., 2018; Dubovicki & Topolovčan, 2020; Kakuk & Ham, 2023) that researchers choose, both because of the "ease" of conducting the research, but also because of the unjustifiably higher level of scientificity that such research provides through "statistical stunts" (Bognar, L., 2012).

In Croatian pedagogical and scientific periodicals, the dominance of the positivist paradigm and the survey as a research instrument is visible. Of the 370 analyzed papers in Croatian journals[3], 172 (72.9%) are from the field of quantitative methodology, and as many as 118 (40%) of them used the survey alone (Dubovicki and Topolovčan, 2020). Of the 159 analyzed student diploma theses[4], 60.6% used the survey as the only research instrument (Dubovicki et al., 2018). Also, in an earlier study of 504 analyzed papers in Croatian journals[5], 231 (54.8%) used exclusively quantitative methodology, indicating that the positivist paradigm prevailed (Kakuk & Ham, 2023).

Recently, *online research* has become increasingly common. Data from specific research have been collected using particular instruments and procedures posted on the Internet (Cohen et al., 2018; Maliković, 2015). In large-scale, survey-based, quantitative online research, unlike direct paper-and-pencil data collection, the respondents are not visible to the researchers (with guaranteed anonymity). The web link to the questionnaire in a survey is most often sent to the email address of a specific respondent, i.e., to a particular online platform or social network profile used by the research participants. Maliković (2015) points out that from the late 1990s to 2014, the number of online research projects on the Web Experiment List portal, by scientific field, increased from 18 (1998/1999, according to Reips, 2007) to 734 (2014),

[3] The journals analyzed in the period from 2012 to 2017 were: *Napredak* and *Život i škola* (Dubovicki & Topolovčan, 2020).

[4] The diploma theses were defended and analyzed in the period from 2015 to 2017 at the Faculty of Education, Josip Juraj Strossmayer University of Osijek (Dubovicki et al., 2018).

[5] The journals analyzed in the period from 2017 to 2021 were: Acta Iadertina, Croatian Journal of Education, Školski vjesnik, and Život and škola (Kakuk & Ham, 2023).

further emphasizing the importance of this issue. This is supported by the research conducted by Sargis *et al.* (2013), in which out of 1547 scientific articles analyzed[6] by the authors, 173, or (11%) published the results of at least one study that used the Internet to collect data.

Two crucial questions arise from this issue, one methodological and the other ethical. The first question is how to categorize the sample of respondents where data were collected through online surveys. The second question is who the respondents are, i.e., did the desired anonymous respondent from the intended sample approach the researcher and fill out the survey? Therefore, this study aims to critically analyze, define, and explain the inherent characteristics of online research, data collection through surveys and polls, and types of respondent samples in education research. Based on the definitions and classifications provided for the analyzed terminology, descriptions and explanations of methodological and ethical dilemmas, and the possibilities of online surveys are presented.

DATA COLLECTION BY SURVEYS AND INTERNET RESEARCH

There are different classifications of techniques, methods, or tools for data collection in research on education and related social sciences. Here, we will describe several Croatian and foreign classifications of data collection techniques, both recent and older, to highlight their similarities and differences. Andrilović (1986) lists as research techniques introspective report, interview, questionnaire, survey, document study, content analysis, work rehearsal, keeping diaries and files, case history, observation, sociometric procedure, role playing, assessment systems, scales (numerical scales; scales of typical individuals, examples of behavior and descriptive statements), list of statements, combination of scales of typical examples of behavior and descriptive statements, rankings, pair comparisons, tests (abilities, personality and knowledge), objective type tasks and essay type tasks. Cohen et al. (2007, 2018) list questionnaires, interviews, explanations, observations, tests, the use of secondary data/sources, personal constructs, multidimensional measurement, and role-playing as data collection methods. Mužić (1973) lists data collection procedures and instruments explicitly. Differentiating between these two terms, he indicates that the procedure encompasses the forms and specificities of the

[6] Journals that belong to the world's top in the field of social psychology in terms of quality were analyzed: Asian Journal of Social Psychology, Basic and Applied Social Psychology, British Journal of Social Psychology, European Journal of Social Psychology, Journal of Applied Social Psychology, Journal of Experimental Social Psychology, Journal of Personality and Social Psychology, Personality and Social Psychology Bulletin, Social Psychology and Personality Science (Maliković, 2015, p. 8).

research work itself, whereas research instruments are considered tools for collecting data (Mužić, 1973, p. 147). He lists documentation work, systematic observation, interviewing, surveys, testing, assessment, and judgment procedures. He lists the evidence sheet for analyzing the content of pedagogical documentation; devices for recording pedagogical phenomena; protocols for recording written phenomena; interview protocols; questionnaires; tests; and judgment scales as data-collection instruments. In addition to the above, research techniques from the field of futures studies also stand out in research on education and pedagogy (Dubovicki, 2017; Greene, 2000; Inayatullah, 2013; Suzić, 2010, 2012; Vrcelj & Mušanović, 2001). Some of them, which are more applicable in education research, are: *Focus Groups, Futures Wheel, Forecasting, Backcasting, Trend analysis, Technological forecasting, Delphi Method/Techniques, Cross impact analysis, Relevance Trees, Morphological analysis, Polak game or Where Do You Stand?, Visioning, Scenario Planning, Causal Layered Analysis (CLA), Adaptive role playing, Futures biographies* and others (Dubovicki, 2017; Inayatullah, 2004, 2005).

The focus of this study is survey research, and several definitions are provided. A *survey* in pedagogical research is a procedure for asking questions about facts known to the research participants and of significant scientific interest to pedagogy, as well as questions about respondents' opinions. A research procedure in which different types of questions (open, closed, multiple-choice, dichotomous, Likert scales, rankings, etc.) are asked and answered in writing is called a *survey*[7] (Mužić, 1973, p. 262). In a broader sense, a survey refers to the collection of data directly from participants or from documents (e.g., school reports) using various techniques, such as questionnaires, interviews, and systematic observation. In a narrower sense, the meaning of a survey is close to what we understand by the term questionnaire. The survey is a series of questions that are asked to selected research participants in writing (with the help of a questionnaire) or orally (with the help of an interview) (Andrilović, 1986, p. 41). In *Pedagoška enciklopedija* (1989), a *survey* is defined as a procedure for collecting data on various pedagogical phenomena using questionnaires, and participants express their views by choosing the offered answers or writing them down (*Pedagoška enciklopedija I.*, 1989, p. 27). First of all, it is necessary to satisfy three essential preconditions for the design of any survey research, namely: specifying the purpose of the study, the population to which the research refers, and the available resources (Cohen et al., 2007, pp. 172–175)

[7] Mužić listed five synonyms for *anketni list* in Croatian, which in English translation can be subsumed under the common denominator (survey) questionnaire. It is interesting to note that one of the synonyms is a Croatian adaptation of the noun questionnaire *kestioner* (Mužić, 1973, p. 262).

With the development of ideas and computer-supported interpersonal communication, methods for researching their use have also been developed. Computer technology and, more generally, information and communication technologies have been growing rapidly since the 1960s. Computer-mediated communication and the vision of a global information network emerged as early as the 1960s and 1970s, when the first mobile phone was developed, and in 1994, the World Wide Web[8] was publicly released. As the Internet evolved and the public began to use it, online research and Internet surveys emerged relatively early. The first online surveys appeared in the mid-1980s, when Kiesler and Sproull conducted one (Kiesler and Sproull, 1986; Hooley et al., 2012, p. 8). Internet research[9] later experienced rapid development, and was defined as research where the Internet or online tools were used to collect data on an issue, research on the use of the Internet, i.e., how users use the Internet, and the use of Internet collections and databases and other materials (Buchanan & Zimmer, 2012, according to Cohen *et al.*, 2018, p. 144).

In Table 1, we can see the most common advantages and disadvantages of online research, which help us decide what is desirable for our study and the research technique/tool we plan to use, and what is not.

Table 1
Advantages and disadvantages of online research (adapted from Galešić, 2005; Maliković, 2015)

Internet research	
Advantages	Disadvantages
- usually shorter data collection period	- not all participants still have access to the internet
- the subjective experience of anonymity of respondents in online surveys has a positive effect on honesty in answering	- internet users are mostly younger people, have better financial status/ income, and belong to a more educated part of the population

[8] That same year, Internet Explorer was released, and a year later, the first public video conference appeared. In 1996, instant messenger appeared, and in 1997, Google began to be used. In 1997, SixDegrees.com was created, considered the first social network; in 2003, Myspace appeared; and in 2004, Facebook (Hooley et al., 2012, pp. 8–10).

[9] In the literature, we often come across three similar names: *Internet research* (research that uses various Internet services and data sources (e-mail, *World Wide Web*, social networks, etc.), *web research* (research that uses the World Wide Web) and *online research* (research that may or may not use the Internet in a global sense for its implementation (therefore, it can be closed network research) (Maliković, 2015, pp. 8–9).

Table 1 *(continued)*

- there are no geographical restrictions	- the representativeness of the sample is limited
- some respondents are easier to reach with the help of the internet	- the population of internet users cannot be equal to the characteristics of the total population
- the internet allows the application of almost all research methods	- self-selection of participants
- there is a greater possibility of using images, sounds and audio-visual displays	- doubts about the true identity of the participants
- standardization[10] is usually better	- possible greater research bias
- there is a possibility of increased honesty of participants	- one person with several different profiles can fill out the survey multiple times
- the researcher does not have to enter the research results "manually"	- the sample is convenient – anyone who "comes across" can fill out the survey
- there are fewer errors when adding frequencies and percentages	- non-response to the survey at various research stages
- the frequency of giving socially desirable answers is reduced	- understanding the questions is difficult because there is no researcher to explain them
- cost-effectiveness	- non-verbal signs remain unrecorded
- research participants do not feel social pressure if they decide to leave the research	- the level of anonymity is very high, and accordingly, the level of responsibility
	- the possibility of rushing the survey participants

There are research topics that are *well-suited for online conduct*. Here, first of all, we are thinking of some research techniques/tools in the field of futures studies for which it is desirable to select experts, and experts from specific scientific areas, fields, and branches can sometimes be difficult to find. A real example of this is the *Delphi method*. It is based on the selection of experts who must meet strictly defined criteria in advance to be considered experts.

[10] Standardization of the research procedure in online research is often better than in traditional studies, since all respondents receive exactly the same instructions, there is no interaction with the researcher or other participants, and manual data entry is not required, which shortens time and eliminates data entry errors (Galešić, 2005; Reips, 2000) to.

It is precisely here that it is desirable to conduct online research to "gather" experts from different parts of the world while meeting strict selection criteria. This research is best conducted using an electronic address from which we personally send each expert our research question(s), to which we want to receive an expert answer. The method is most often carried out in three or four rounds (according to the leader's assessment, there may be more), and a group of experts is asked a precise question about the future of a phenomenon that we are researching. Here, research ethics are not compromised because we know at all times who our research participants are and have complete control over the research sample. However, this is not always the case in online research.

RESPONDENT SAMPLES IN EDUCATION RESEARCH

When selecting respondents for a research sample, it is essential to consider the characteristics of the *population*, as the sample is always drawn from a specific population (Cohen et al., 2018; Mužić, 1973; Punch, 2009). The population (or basic set) is all persons who have a characteristic of interest to the researcher (e.g., all elementary school students, all eighth-grade elementary school students, mathematics teachers in secondary schools, all professional associate pedagogues in primary and secondary schools in Croatia). Due to cost-effectiveness, population size, availability, or research design, it is almost impossible (and even unnecessary) to reach all members of the population. Therefore, a specific number of individuals who will participate in the research is selected from the population in a particular way. The part (members) of the population that is chosen for the research process using a specific method is *the sample*.

There is no clear, conventional answer to how many respondents are needed in a research sample or what constitutes a large or small sample (Cohen et al., 2018). The traditional categorization is that a sample of up to 30 participants is considered small, 30 to 60 is considered medium, and more than 60 is considered significant (Mužić, 1973). The population size and the research design determine the sample size. There are also tabular presentations of sample sizes for the desired level of inference, based on statistical significance and population size (Cohen et al., 2018, pp. 206–207). There is a general recommendation that a large number of participants is appropriate for *survey research*, while in qualitative research, such as ethnographic research, a small sample is appropriate (Cohen et al., 2007, 2018). Likewise, if there are only three students in a country with the necessary research characteristics and if all three students participate in the research, then the population is included, not the sample of participants.

In addition to the number of participants in the sample, the sampling strategy (e.g., type of sampling) is also essential. As with tools and instruments

for collecting data, there are several classifications and definitions of the strategy for selecting the type of sample of research respondents (participants) (e.g., Cohen et al., 2007, 2018; Mejovšek, 2013; Mužić, 1973). Cohen et al. (2007, 2018) initially identified two methods for selecting samples. The first method is a sample with a known probability of selection (random sample), and the second is a sample with an unknown probability of selection (non-probability sample, purposive sample). In the random sample method, the broader population from which the sample is selected is known, and all individuals in that population have an equal chance of being selected (or excluded) in the sample (the chances of members of the population being selected in the sample are known). In a non-random (purposive) sample, individuals from the population are chosen intentionally or excluded; i.e., not all members of the population need to be selected for the sample. Random samples are classified as simple random, systematic, stratified random, cluster, stage, and multi-phase samples. Non-random samples include convenience, quota, purposive, and snowball samples (Cohen et al., 2018). Mužić's (1973) categorization of sample types includes simple random, systematic, stratified, intentional, and group samples. Mejovšek (2013) lists simple random, interval (systematic), stratified, group, and convenience samples as sample types. Among these classifications of sample types, distinct divisions are evident. In the following text, we will briefly describe the most frequently mentioned (and used) types (strategies) of samples.

A simple random sample is one in which all members of the population have an equal chance of being selected into the sample. More specifically, if we know all members of the population (each member is identified by their unique identification number, i.e., code), then we select the required number of participants in the research sample by "drawing from a hat" (Cohen et al., 2018; Mejovšek, 2013; Mužić, 1973). *A systematic or interval sample* is a participant selection strategy when members of the population are coded by identification numbers and arranged in order (from the most minor, first to the largest identification number/last), and every third, sixth, or tenth is selected, which depends on the number of participants needed in the sample, in relation to the total number of members of the population. From which initial number in a series of arranged population members is the die most often rolled, and then from the second, fifth, or sixth member of the population, every third, seventh, or fifteenth member is counted (Cohen et al., 2018; Mejovšek, 2013; Mužić, 1973). *A stratified sample* is a group of research participants selected from the population based on a characteristic. The population needs to be divided into separate layers (stratums) according to the characteristics of the members (gender, place of residence, type of school, etc.), and research participants

are proportionally[11] selected into the sample according to the homogeneity of individual strata (Cohen et al., 2018; Mejovšek, 2013; Mužić, 1973). In this type of sample, we distinguish between a proportional stratified sample, in which the number of participants with the required characteristic is selected proportionally to their representation in the population. The second variant is an optimal stratified sample, with strata that are extremely homogeneous with respect to the required characteristics, so the smallest possible number of participants is selected to ensure the sample's representativeness. In a stratified sample, participants are selected according to the principle of chance (simple random or systematic sampling) (Mužić, 1973). Similar to a stratified sample is a *quota sample*[12], which ensures representation of specific characteristics of the population. The difference is that in a stratified sample, participants are selected by chance, whereas in a quota sample, participants are selected by convenience sampling (Mejovšek, 2013). A group sample is a case in which individuals from the population are not selected, but groups of individuals are. More specifically, not an individual student is selected, but schools where all students from that school are examined (Mužić, 1973). This type of sample is sometimes called a *cluster sample* (Cohen et al., 2018). Simple random, systematic, stratified, and cluster samples belong to the category of random samples (Cohen et al., 2018), but more importantly, to the category of representative samples (Mužić, 1973, p. 601). A *territorial or areal sample* is a method of proportional selection of respondents based on the geographical distribution of the researched characteristic within a given territory (Mejovšek, 2013). A *convenience sample* consists of members of the population who are "at hand" to the researcher, who are the easiest to reach. An example of a convenience sample is students of a school or class, students at a university where the teacher conducting the research also works (Cohen et al., 2018; Mejovšek, 2013). A *target sample* is formed to select participants to be examined deliberately. Participants are intentionally and selectively chosen according to the specific goal of the research (Cohen et al., 2018). The *"snowball" or "snow avalanche" is a sampling method in which, because of the uniqueness of the population*, individual participants recommend other research participants to the researcher. Thus, the sample is increased through recommendations from existing participants. This sample (strategy) is characteristic of deprived populations or population members who do not have

[11] Cohen et al. (2018) do not state the proportional representation of respondents according to some of their characteristics in the sample according to their frequency in the population as a mandatory, but rather as an optional characteristic of this sample. In other words, they call this characteristic a sample quota.

[12] There are somewhat different interpretations of what a quota is and what a stratified sample is (see: Cohen et al., 2018; Mejovšek, 2013; Mužić, 1973).

developed communication networks, such as substitute teachers (Cohen et al., 2018).

Sampling is significant in Internet surveys. Previous research has shown that the number of Internet surveys is increasing year by year (Fricker and Schonlau, 2002; Galešić, 2005; Maliković, 2015). Internet users differ significantly from the rest of the population. The target population of Internet surveys is usually limited to all Internet users or to various narrow groups, such as employees of an organization, members of a club, subscribers to certain services, members of a profession, or visitors to a website (Galešić, 2005, 289-299). It is also essential to highlight the sampling error, since there is no (and will never be) a list of all Internet users or of all users of a given social network group. In relation to the above, it is not possible to obtain a simple random sample by random selection.

DISCUSSION

As with conventional research (pencil-and-paper) and online research, methodological and ethical concerns arise. Many of these doubts are common to both traditional and Internet research. It is evident that the size and type of the sample, relative to the population from which the participants were sampled, are crucial for obtaining optimal results and for the scientific contribution of the research (Cohen et al., 2007; Mužić, 1973; Petz, 1981; Punch, 2009). It primarily refers to the representativeness of the sample. In all research, the fundamental decision for the researcher is how to achieve sample representativeness so that the research results are valid for the population (Cohen et al., 2007; Mužić, 1973). It is a crucial decision in both the qualitative and the combined methods, but primarily in the qualitative methodological approach. The question arises as to whether the participants were selected using a random or purposive sampling strategy (Cohen et al., 2007). In quantitative research with a large number of participants, it is optimal to select a simple random, systematic, stratified, or cluster sample. In the qualitative approach, a deliberate convenience, quota, target, voluntary, or snowball sample is mainly selected. This categorization is not absolute but is related to the paradigmatic orientation, the research goal, and the data collection tools. It is not a rule, but in the quantitative methodological approach, a survey is often used as a data collection tool. The survey is often used for ease of use (for respondents), a diverse range of form and question types, and the possibility of using a battery of instruments. In the last few decades, due to the frequent use of quantitative methods for collecting data via Internet surveys, the issue of sample representativeness has arisen. A survey constructed using computer tools and digital applications is most often sent directly to respondents at their email addresses or posted on public (or restricted-access) internet platforms,

websites of individual institutions, forums, and social networks/media such as Instagram, TikTok, Facebook, etc. It is necessary to emphasize that, no matter how well-established the recent opinion is that most people use the internet and its applications, there are always people who do not use the internet. In online surveys, only members of the entire population who use the internet or a specific internet application *can be selected for the sample*! Which is not subject to the logic of a staged or multi-stage sample. Therefore, the fundamental question is how to define and categorize survey samples. Unfortunately, it is almost impossible to form a simple random, systematic, stratified, or group sample in online surveys, i.e., to classify them into these categories. Although online surveys are a simple, functional, cost-effective, fast, and efficient method for collecting data, they do not provide an optimal scientific contribution because they do not ensure sample representativeness or data quality. No matter how large the samples are, they are mostly convenience or voluntary, i.e., purposive samples. In other words, online research is generally optimal with purposive samples such as convenience, quota, target, voluntary, or snowball samples.

The main problems of online surveys that, among other things, can affect the representativeness of the sample are very similar to those that occur in different types of surveys: sampling error, coverage error, measurement error, and non-response error (Dillman, 2007; Galešić, 2005; Maliković, 2015; Žmuk, 2019). Therefore, in most countries, online surveys cannot be used in surveys that require representative, probabilistically selected samples of the total population. However, it is quite justified to conclude some target populations based on the results of online surveys (Delphi method).

If all members of the population are available in online surveys (e.g., the email addresses of all participants are known, shared email addresses of institutions, etc.), i.e., then it is no longer a sample but a population of respondents; there is still a justified ethical dilemma. This moral dilemma focuses on who fills out the survey in the first place. Does the desired participant fill it out, or does someone outside the target population have access to the study? Research ethics are an essential part of any research process. Respecting research ethics does not only mean obtaining consent for research. Ethics must be respected *throughout planning, preparation, conducting research, processing results, and publishing*. In this sense, online research presents a special challenge. The most common research that "appears" on the Internet is surveys, which we previously pointed out are most common in education research. The availability of surveys (links) across various online platforms is a serious concern for researchers regarding the research sample itself. *Who are our research participants?* Also, in terms of time frame, the asynchronous method of communication prevails, which is far from the "same" conditions that participants had in paper-and-pencil survey research. The asynchronous

method of communication can also have its advantages, namely that it allows us to respond from the comfort of our homes at a time that suits us best.

Among other ethical dilemmas, in online research, the issue of informed consent, public and private (public and private) data on the Internet, and confidentiality and anonymity are emphasized (Cohen et al., 2018; Galešić, 2005; Maliković, 2015). Informed consent refers to the voluntary consent of research subjects to participate in research. It is often challenging, and sometimes almost impossible, to obtain subjects' consent in online research. The question arises of how to guarantee the anonymity of subjects and, if consent is given, the confidentiality of the data provided. The dilemma about privacy and publicness of data is most often related to the use of data published on the Internet, such as profiles on social networks, portals, databases, etc. The fundamental question is whether a researcher may use such data in research and how to avoid violating subjects' privacy. A*nonymity* means the researcher does not know who the research subjects are. In contrast, *confidentiality* means the researcher knows who the subjects are and the specific data collected, but no one else does or is allowed to access them. In online research, anonymity is a delicate issue, as respondents' personal data is often accessible and challenging to conceal. Other ethical dilemmas include forcing respondents to complete an online survey (repeatedly sending the questionnaire), ensuring respondents are available, using social networks, etc. (Cohen et al., 2018). Finally, in addition to the informed consent of an adult for their own participation in the research, an ethical dilemma is also obtaining consent and anonymity in research with children and young people (Code of Ethics for Research with Children, 2003) when a parent or guardian must give consent for his/her child to participate in the research. In online survey research posted on social networks, in addition to the question of who is completing the survey (the target respondent or someone else), a justified ethical dilemma is focused on the question of whether a specific survey is available to a minor, a child under the age of thirteen/fourteen, without the consent of a parent/guardian. It is precisely one of the serious violations of research ethics, which, like any other, can have serious, unpleasant repercussions for the researcher.

CONCLUSION

Crucial doubts in online survey research focus on the representativeness of the sample and the results (which depend on who comprises the total population – all or only those who use the Internet), and on ethical issues. Forming random samples (simple random, systematic, stratified, etc.) is (almost) impossible. No matter how many respondents participate in the research, these are mostly convenient, targeted, and voluntary samples, which fall into the category of intentional samples. It is justified to conclude that online research

samples can be categorized as types of intentional samples. It is also justified to conclude that samples in quantitative, online survey research deviate from the classic established type of random samples, because it is (almost) impossible to form them as such. It is possible to point out that, in addition to the established categorization of random samples (using the paper-and-pencil method) of research, it is necessary to form a new classification of random samples for online research. It will undoubtedly pose a significant challenge to the scientific pedagogical community in the future. Another challenge for the scientific community is to develop optimal ethical protocols for conducting online research, as ethics in such research is extremely sensitive. Ethical dilemmas in online (survey) research include informed consent for (one's own or a child's) participation, who is participating in the research, and anonymity and confidentiality.

It is important to emphasize that the Internet cannot wholly replace classical data collection methods, but in some cases it can (and should) still be used successfully. Depending on the target population and research goals, available resources, and time availability, we decide on the appropriate method for conducting the survey. One should not shy away from (survey) online research, but instead plan, implement, and conduct it meaningfully.

In researching pedagogical phenomena, it is best to use *triangulation*, which allows the researcher to adopt a more comprehensive approach to the research problem and achieve a more accurate and valid evaluation of qualitative results. In addition to the above, more representative results would be obtained by combining qualitative and quantitative research methods, which, through their advantages and disadvantages, complement each other and contribute to the research. In addition to reviewing the current state of research, these methods also offer more specific explanations and ideas for resolving the situation described above.

Further methodological development should align with global trends in pedagogical and educational research. The entire academic community should contribute to this by encouraging pluralism in scientific paradigms, giving equal importance to research methods across qualitative, quantitative, and mixed methodologies, and by creating patterns (at all levels of education) that foster such appreciation.

Also, previous research shows that most Croatian journals publishing papers in pedagogy and education favor positivist research and most often use a single research method – surveys (which are most often categorized at the highest level). Changing this view of research would no longer focus on the research instrument, but on the synthesis of certain content and knowledge, the redefinition of concepts and established definitions, and the desired change in the practice of the phenomenon being researched.

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