

## **IMPACT OF DIGITAL LEARNING ON THE INTERVIEWER'S PERFORMANCE**

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### **1. Introduction**

New organizational and methodological challenges, caused by recent pandemic crisis, have been faced in public statistics in order to pursue the cognitive objectives and the commitments undertaken at national and international level, in compliance with the qualitative standards relating to all stages of production processes.

In this new scenario, as regards the training of the survey network, Istat has chosen to use "distance" training tools instead of the traditional face-to-face approach, as well as new types of training organization and production of training materials.

In this paper, we describe the training strategies with reference to the release of the Permanent Population and Housing Census 2019, before the pandemic crisis, compared to the strategies of 2021 edition (Balì, 2019).

To evaluate the impact on the performance of the interviewers, we propose a statistical analysis based on the logistic model. The comparison will be produced using several indicators relating to the socio-demographic characteristics of the interviewer, his experience in the activity, the assessment of the skills acquired with the use of the training modules and measured during the final training test.

In section 2, the educational context for the Census 2019 and 2021 edition is focused. In section 3, are explained the data and the indicators used in the analysis. Section 4 illustrates the results of the statistical analysis and highlights the differences between the two censuses experiences declined with respect to the characteristics of the interviewers.

Finally, in section 5, some conclusions are drawn, indicating how the training strategy will evolve over time in order to capitalize and optimize the innovations introduced as a result of the pandemic.

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<sup>1</sup>The article was only possible thanks to the joint work of the authors. In particular Claudio Ceccarelli wrote section 1, Alessandra Lugli wrote section 2.1 and 2.2, Maria Teresa Fiori wrote section 2.3, Francesca Rossetti wrote sections 3 and 4, Nunzia Balì wrote section 5.

## 2. The educational context for the Permanent Population and Housing Census

### 2.1 The international experiences for the educational frame for Population and Housing Census

Here we report some experiences of foreign countries in which we indicate how they dealt with the training of interviewers in the COVID 19 pandemic in order to complete the population and housing census (United Nations ECE/CES/GE.41/2022/9).

**Table 1 – International comparisons on training of interviewers during the covid19 pandemic**

COUNTRY	YEAR	BUREAU	EXPERIENCE
IRELAND	2022	Central Statistics Office (CSO)	As the pandemic continued, they decided to delay the census until 3 April 2022
All the field recruitment processes were redesigned and moved online. Interviews were held virtually with required documentation uploaded to a specially designed portal. The whole process became virtually paperless Training for the field staff was redesigned to be provided online.			
FRANCE	2022	French statistical institute (INSEE)	The data collection scheduled for 2021 was postponed to 2022 due to the health crisis.
The 2022 ACS started on 20 January 2022 and was carried out successfully. The 2022 survey, which is currently being processed, will soon enter the usual process for the production of population census results. They did not change the survey because they realized it in 2022 at the end of the pandemic crisis.			
CROATIA	2021	Croatian Bureau of Statistics (CBS)	The 2021 census was carried out from 13 September to 14 November 2021
They realized all the training on-line. Do the benefits of online training outweigh its drawbacks? In the 2021 census, online training was prepared and implemented in Croatia for the first time. Training of enumerators lasted for four days. Online training has many benefits, however, with online training it is more difficult than with face-to-face training to assess which enumerators have attained the required knowledge. This drawback became apparent during data collection in the field, when it was clear that some enumerators and their immediate superiors had not adopted a significant part of the methodology. Some enumerators and supervisors had difficulties joining virtual training which led to their frustration and caused the candidates to either avoid the course (to a lesser extent) or to focus on the technology rather than the content of the course (more often). In those cases, additional trainings were implemented. In addition, training material was recorded and made available to all census personnel.			

COUNTRY	YEAR	BUREAU	EXPERIENCE
POLAND	2021	Statistics Poland	The National Population and Housing Census 2021 was conducted on the territory from 1 April to 30 September 2021.

At the time when the greatest number of cases was recorded, the work carried out for the census was performed remotely, as in the case of remote recruitment of candidates for enumerators or remote training. Due to the COVID-19 pandemic, the recruitment of candidates for census enumerators took place remotely. All training was conducted remotely, using Lync/Skype or Webex communication platforms.

UK	2021	Office for National Statistics (ONS)	A census for England and Wales was carried out in March 2021, and at the same time for Northern Ireland. The Scottish Government decided to delay the census in Scotland by a year because of operational problems caused by the Covid-19 pandemic. Scotland's census took place in March 2022.
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Response rates to the census were high, with forms completed by an estimated 97% of households in England, Wales and Northern Ireland. We do not have any information about the training of the interviewers and if the data collection was as usual.

USA	2020	United States Census Bureau	In 2020, amidst a global pandemic, the United States (U.S.) conducted its once-a-decade census of population and housing.
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The Census Bureau combines administrative data with survey data. Some data are collected from respondents directly (including businesses). Primary sources for additional data are federal, state, and local governments, as well as some commercial entities. We do not have any information about the training of the interviewers and if the data collection was as usual.

MALTA	2021	National Statistics Office Malta (NSO)	The census included technical and methodological innovations, this was a transitional census
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Nearly 30 training sessions for district managers, supervisors, enumerators and call centre personnel were held in Malta and Gozo between September and November 2021. Although the delivery of physical training sessions was a rather cumbersome task in view of COVID-19 restrictions, particularly due to the social distancing protocols which had to be observed at all times, each session covered all salient generic and technical aspects related to the Census and included a practical session with a detailed overview of the systems available to enumerators and other staff.

## 2.2 *The Italian educational frame in 2019*

The design of the training system of the survey network for the 2019 edition of the “permanent population and housing census” did not present a particular complexity, given the experience of the 2018 edition (Bali and Federici, 2014).

In the first place, no distinctions had been thought between operators who worked only for survey “distribution range survey” (from now named survey A in the article) or only for survey “lista based survey”. (from now named survey L in the article). The training conceived for all the operators on both surveys, the idea was that each operator is trained in general for the census operations and is in some way interchangeable on different activities and in different municipalities. Instead, a diversification was introduced between old and new operators in order to lighten and make the innovations more evident for new operators. Centralized training events were also organized for other operators, such as those of the Contact center, the Service desk and the Istat switchboard. The framework of the training was mixed, organized partly through self-learning modules (using the Moodle platform) and partly there were training events organized in person and throughout the Italian territory. The training was compulsory as well as the carrying out of the tests (intermediates and final), the passing of which was subject to a minimum threshold, with subsequent certification of the Distance Training (FAD) carried out. Support materials were also prepared such as survey manuals (for both L and A survey) and other guides were written for the IT part.

Two training courses were built on the ISTAT Moodle platform:

- new municipal operators
- update for the expert municipal operators

Over 14 thousand people were trained for the year 2019. In particular:

- 18,349 people were registered on the Moodle platform
- 14,587 people attended at least one training event and of these 13,422 had completed the final test scheduled at the end of the FAD.

In particular, the situation was the following:

- 13,478 people completed the FAD and attended at least one training event;
- 13,966 started the FAD and were present at a training event;
- 1,822 were not called to any training event.

### **Distance education- Forms**

For the 2019 edition, 18 training modules were carried out for new operators and 10 training modules were carried out for expert operators on the Moodle Platform.

After ending the FAD the operators were gathered for a day training in presence.

### **Test and Grades**

In the FAD in both courses there were several intermediate assessment tests and a final test which gave access to the meeting Classroom in presence.

The intermediates tests were 12 for the new operators while they were seven in the expert operators course, the minimum mark of the intermediate tests was 6/10 while for the final test the minimum mark was 7/10. If the intermediate test was not passed, it was not possible to access to the next module but they could be repeated several times, the same thing was for the final test. 14,173 learners took the final test and the average grade of the final test was 8.8 while the average rating on the Moodle platform was 8.7.

### **Classroom in presence**

Between 19 June and 29 September 2019 there were 599 training events, 16,527 learners were invited to these face-to-face events: of these 14,587 attended at least one training event while 1,822 learners were not called.

### **Satisfaction Questionnaire**

At the end of the training on-line, each participant could fill in the course evaluation questionnaire, divided into 39 questions regarding all the topics of the FAD.

2,268 participants (1158 new and 1100 experts) responded to the questionnaire and the analysis of the data revealed a widespread positive opinion on the training provided. In the majority of cases, the participants expressed a good level of satisfaction (on average 7.9 out of 10). In conclusion, the training platform turned out to be a very or quite useful tool, given that only 7.7% of the participants declared that it needed some improvements in terms of access and internal navigability.

### *2.3 The italian educational frame work in 2021*

The design of the training system of the survey network for the 2021 edition of the “permanent population and housing census” presented a particular complexity, given by the suspension of the 2020 edition of the survey caused by the emergency generated by the pandemic from the Covid19 virus. There was a significant increase in the number of operators to be trained, which numbered more than 20,000 with different roles and profiles (interviewers, managers of the municipal census offices, staff personnel, coordinators, and back office operators). With reference to the two different surveys, most of the operators were involved in both surveys (L survey and A survey), while a minority was involved only in the L survey. Centralized training events (in the virtual classroom) were also organized for other operators, such as

those of the Contact center, the Service desk, the ISTAT switchboard. The articulation of the training was mixed, partly delivered through self-learning modules (through the Moodle platform) and partly in virtual presence (virtual classroom). The use of virtual classrooms in place of face-to-face training also required specific training on the new tools dedicated to the management of the "rooms" and the presence, in addition to teachers, of support figures who would check the number of participants, the management of platform tools and materials presented. The training was mandatory as was the performance of the tests (intermediates and final), the passing of which was subject to a minimum threshold, with subsequent certification of the accomplished Distance Training (FAD). The presence in the virtual classroom was detected, with subsequent insertion of the information in the Survey Management System (SGI). Support materials have also been prepared such as Survey Manuals (for both surveys L and A), guides and tutorials for using the Moodle platform, tablets for data collection, the SGI system, the Rilevo app, the survey questionnaire.

#### **Distance education- Forms**

Due to the framework of the SGI system for the year 2021, it was not possible to distinguish the self-learning FAD path between the two surveys: there was a single course in training modules common to both surveys, intended for all users. The self-learning activities involved 19 training modules, mainly consisting of slides with audio, used independently by the learners. The total number of people who completed the FAD was over 21,000.

#### **Test and Grades**

In the FAD course, there were several intermediates assessment tests (15) in order to verify the level of learning achieved and at the end of the FAD there was a final test consisting of 30 questions. Both the intermediate and the final test had a minimum threshold of more than 70%, the overcoming of which was a prerequisite for access to training in the virtual classroom.

#### **Virtual- Classroom**

In June 2021, a two-day training meeting was organized by Istat (with Istat teachers) for the network of teachers, composed by Istat Territorial Managers (RIT) and teachers from the Statistical Union Italian Municipalities (USCI). A communication and collaboration platform (Microsoft Teams) was used; a follow up event followed in July. A one-day training was organized in the virtual classroom for operators with different roles; those sessions too were organized through the Teams platform starting from September, using the SGI system for the creation of the events and insertion in the various classes of participants. The events carried out

were about 380. Online tools for interaction with the classroom were also tested and subsequently used, which made it possible to carry out quick tests to verify in real time the level of understanding achieved after a single presentation. Finally, over 21,000 participants in the training days in the virtual classroom were registered in the SGI system.

### **Satisfaction Questionnaire**

At the end of the training course, each participant had the opportunity to fill in a course evaluation questionnaire. About 3,400 participants responded to the questionnaire and the analysis of the responses revealed a positive opinion on the training provided. In the majority of cases, the respondents expressed a good level of satisfaction (on average 7.9 out of 10) and 94.7% considered the course useful to start the job. In relation to the duration and timing of the course, 23% of respondents felt that the training in the virtual classroom was too long, while for 21% the time devoted to practice (exercises) was not enough. Various corrections have been suggested both in reference to the FAD and to the support materials and to the organization of the virtual classroom, such as for the latter a relative greater space dedicated to exercises on data collection activities compared to that dedicated to concepts already addressed in self-study.

### **3. Data and indicators in the analysis**

The purpose of the analysis is to verify the impact of different training models, adopted in 2019 and 2021, on the interviewer's performance in the data collection activity of permanent population and housing census. In order to achieve this goal the analysis is carried out using data collected in the training activities selecting only the learners who will play the role of interviewers in the survey and have completed the training cycle: 7,969 in 2019 and 10,127 in 2021.

The training course's outcome for each learner is summarized using a constructed indicator (Ind\_votofin) calculated as the ratio between the mark in the final test and the median value of the marks recorded by all learners in the same year of training. The median value of the marks recorded was 8.75 in 2019 and 9.33 in 2021. The analysis of the interviewer's performance focused on the A survey data collection in the permanent census of population and housing. In particular, the attention is on the interviewers who have completed the training cycle and carried out at least one interview in the relative survey year: 7,131 interviewers in 2019 e 8,499 in 2021.

In order to measure the results obtained in the field, two indicators were built:

- Area\_ind\_perf\_a relating to the activity of filling in the questionnaires, calculated by comparing the total number of questionnaires completed by the

interviewer and the median of the total number of questionnaires completed calculated among all the active interviewers in the A survey for the same year (the median was 37 in 2019, 44 in 2021);

- Area\_ind\_perf\_b relating to the address verification activity, calculated as the comparison between the total number of questionnaires completed on the number of addresses checked by the interviewer and the median of the same ratio recorded among all the active interviewers in the A survey for the same year (the median was 1.38 in 2019, 1.16 in 2021).

#### 4. Logistics models and results

In order to measure the propensity of the interviewer to have a good result at the end of the training course and the propensity to have a good performance in the data collection activity three different logistics models are built using the three indicators described above as dependent variable. The explanatory variables in the models are learners' characteristics<sup>2</sup>.

**Table 2 – Variables used in the logit models**

	DEPENDENT VARIABLES						
	Ind_votofin		Area_ind_perf_a		Area_ind_perf_b		
	odds ratio	Pr>Chi-Sq	odds ratio	Pr>Chi-Sq	odds ratio	Pr>Chi-Sq	
Year's survey			0.943	0.076	1.069	0.05	
Ind_votofin			1.111	0.002	1.023	0.499	
geographical area	1.13	<.0001	0.749	<.0001	0.709	<.0001	
Gender	1.196	<.0001	1.027	0.433	1.094	0.01	
interviewer's experience	1.072	0.054	0.78	<.0001	2.12	<.0001	
Age in classes	1.133	<.0001	1.128	<.0001	1.217	<.0001	
educational level	0.781	<.0001	1.25	<.0001	1.065	<.0001	

Table 2 reports Chi-square statistics with p-value associated for each dependent variables in the models built (the variables without significance in the model are highlighted) and also reports the odds ratio that represent the coefficients in logistic model for explanatory variables<sup>3</sup>. The first model shows that from north to south

<sup>2</sup> The variables in the models have been coded: Ind\_votofin (0-lower median value; 1-upper median value); Area\_ind\_perf\_a (0-lower median value; 1-upper median value); Area\_ind\_perf\_b (0-lower median value; 1-upper median value); Year's survey (0-2019; 1-2021); geographical area (1-Northwest; 2-North East; 3-Center; 4-South; 5-Islands), Gender (0-Male; 1-Female), interviewer's experience (0- absent; 1- present), age in classes (1- "under 35 years"; 2- "35-44 years"; 3- "45-54 years"; 4- "over 54 years") educational level (1- lower secondary school certificate; 2- upper secondary school certificate ; 3-tertiary certificate).

<sup>3</sup> Similar results were obtained applying weights to the model to make the number of observations comparable between the two annuities in the main strata and using indicator variables for each modality of the explanatory



the propensity to have a training course's good results grows about 20% as this propensity is bigger for women than men and for older than younger. Contrary higher is the educational level lower is the propensity to have good results at the final tests.

The second model reports which factors that influence the propensity to have a good performance in the data collection phase with reference only to the filling of the models. Goods learners have 10% propensity more than bad learners, the propensity of the interviewers operating in the northwest is 25% less than those operating in the islands, the propensity of the interviewers with experience is 20% less than interviewers without experience; increasing age and educational level, the propensity grows.

The third model measures the propensity to have a good performance in the data collection phase with reference to the address verification activity: the geographical area, the age and the educational level have similar effect on propensity than in the second model.

The more interesting difference between this model and the second one is on the odds of the interviewer's experience. Using the *Area\_ind\_perf\_b* as dependent variable the propensity for interviewers with experience is more than double greater than propensity for interviewers without experience, opposite effect is observed in the model using the *Area\_ind\_perf\_a* as dependent variable. For both second and third model, the results of training course and the year of survey have a *not significant* or a lower effect on propensity to have a good performance in the data collection.

In conclusion, the main results of the analysis show that there are no significant differences between the two training models in terms of propensity to have a good performance in data collection.

## 5. Conclusions

Our study allow us to design and develop with greater awareness alternative training models to face to face and shows how is important the training for the interviewers network in the data production process and how it is involved in the quality of work in the field. This article underlines the importance of the training models proposed and how these are significantly influenced by technological changes and unpredictable conditions such as those of the Covid-19 health emergency, which led to highly differentiated training proposals also according to the audience of recipients to be to form.

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variables. The analysis reported relates to the group of interviewer who for each year completed the training course and were active in the A survey.

A large investment in innovation has been designed for training, in particular for the Permanent Population and Housing Census, for effective and efficient management of the operators by generalizing a mixed training model made up of self-learning situation and situation in the virtual classroom. The training model of 2021, from the experience gained in the field combined with the results of the consultations carried out with teachers and learners, is resulted effectual but it is also necessary to make changes and innovations for the training of population census operators for future training editions (Benigno and Chifari, 2007).

Hence, the training challenge for the new edition of the second cycle of the permanent population census, is to prepare an e-learning teaching where we should be able to create a greater balance between content and practical aspects of exercises with an interaction between technology, teaching materials, operational phases of delivery and configuration of platforms and tools.

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## SUMMARY

The recent pandemic crisis has placed public statistics, and therefore Istat, in front of new organizational and methodological challenges in order to pursue the cognitive objectives and the commitments undertaken at national and international level, in compliance with the qualitative standards relating to all stages of production processes. In this new scenario for the training of the survey network, Istat has opted for the use of "distance" training tools instead of the traditional approach to face-to-face training, the organization of training and the production of the training materials.

In this paper we intend to illustrate the training objectives, the organization and schedule of the training activity with particular reference to the innovations introduced, the sharing

and training tools to make a comparison between the two training methods, "face to face" and "distance" and compare the effectiveness of the two approaches.

With reference to the Permanent Population and Housing Census, the results observed in the last survey in 2021, for which training took place in the virtual classroom, will be compared with those recorded in the previous survey for the year 2019, for which the training was provided in person.

For this purpose, using a logistic model, the impacts on the performance of the interviewers will be compared with several indicators relating to the socio-demographic characteristics of the interviewer, his experience in the activity, the assessment of the skills acquired with the use of the training modules and measured during the final training test.

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