

Satisfaction with online teaching of medical statistics during the COVID-19 pandemic: a survey by the Education Committee of the Italian Society of Medical Statistics and Clinical Epidemiology (SISMEC)

Matteo Rota¹, Giulia Peveri^{1,2}, Margherita Fanelli², Lucio Torelli³, Marco Rocchi⁴, Claudia Specchia¹

1. Department of Molecular and Translational Medicine, University of Brescia, Brescia, Italy
2. Department of Clinical Sciences and Community Health, University of Milan, Milan, Italy
3. Department of Interdisciplinary Medicine, "Aldo Moro" University of Bari, Bari, Italy
4. Department of Medicine, Surgery and Health Sciences, University of Trieste, Trieste, Italy
5. Department of Biomolecular Sciences, University of Urbino "Carlo Bo", Urbino, Italy

CORRESPONDING AUTHOR:

Dr. Matteo Rota, Ph.D.

Department of Molecular and Translational Medicine, University of Brescia, Brescia, Italy

Viale Europa 11 – 25123 Brescia (BS), Italy

Telephone: +39 03037177755

E-mail: matteo.rota@unibs.it

Abstract

Background

The COVID-19 pandemic prompted the Italian universities to continue educational activities by offering online courses to the students. In May 2020, after two months of online teaching with no face-to-face lectures, the Education Committee of the Italian scientific Society for Medical Statistics and Clinical Epidemiology conceived an online survey to assess satisfaction of Italian academics of medical statistics with online teaching and remote exams.

Methods

The academic community involved in courses of medical statistics, biostatistics and epidemiology was invited to an online survey. The questionnaire contained a total of 45 questions and was built using Microsoft Forms. Data were collected between May 18th and 31st, 2020. Satisfaction with online teaching and remote exams was defined with a self-reported score of 7 or more out of 10. Descriptive statistics were carried out.

Results

Ninety-four questionnaires were returned. Only 37 (39%) professors declared a previous experience with online teaching. The online teaching experience during the first months of the COVID-19 pandemic was heterogeneous with regards to the number of teaching hours, the number of courses and the number of students. Despite some technical difficulties experienced, 66 (75%) and 40 (62%) professors were satisfied with online teaching and remote exams, respectively. No factor, among those considered, was found to be statistically significantly associated to teachers' satisfaction.

Conclusion

This survey highlighted teachers' perceptions as well as opportunities and limitations of online teaching of medical statistics, biostatistics and epidemiology. Although 61% of Italian academics of medical statistics declared to be favorable to provide online teaching of medical statistics, biostatistics and epidemiology in the future, we recognize that distance education cannot substitute the unique value of teaching and knowledge exchange that could only be transmitted through a personal interaction between students and teachers. These indications may be useful to improve the quality of the teaching process in the future.

Introduction

On March 9th 2020, the Italian government imposed the first national lockdown in response to the pandemic of COVID-19 in the country. This caused the closure of the universities, leading to the suspension of face-to-face classes and forcing distance learning to be the core method of teaching. Distance learning has its pros and cons, and its success depends on many factors including accessibility, i.e. availability of web access and a broadband connection, use of appropriate modalities, course contents, and assessment criteria for learning verification [1].

There are many ways of approaching distance learning: synchronous, asynchronous and mixed-mode. Clear indications about the modalities to deliver distance learning were often missing and varied a lot between academic institutions. Moreover, the choice of one modality over the other did not have the same weight within various degree courses and disciplines. None of the Italian public universities traditionally used distance learning and was prepared to approach this modality of teaching.

The Education Committee of the Italian scientific Society for Medical Statistics and Clinical Epidemiology (SISMEC) [2] has the mission to promote initiatives aimed at harmonizing the objectives and the teaching of medical statistics in tertiary education degree courses. With the suspension of face-to-face teaching activities, the Committee wondered at a national level about the comparison of the methods for delivering online courses of medical statistics, biostatistics and epidemiology, as well as possible tools for evaluating the students' acquired knowledge. A crucial role is, in fact, played both by the modality for carrying out online teaching and exams and by instruments for students' remote controlling (e-proctoring).

After two months of distance learning with no face-to-face lectures, in May 2020 the Committee conceived an online survey to be administered to the Italian academics with a twofold aim: on the one hand, to highlight the limitations of online teaching, and on the other hand, to highlight some opportunities that the situation had generated, including the degree of teachers' satisfaction.

Methods

Survey development

This online survey, conceived by the Education Committee of the Italian scientific Society for Medical Statistics and Clinical epidemiology (SISMEC) [2], aimed to collect data on the provision and effectiveness of online teaching and exams of medical statistics, biostatistics and epidemiology during the suspension of face-to-face didactic activities ordered by the decree of the Presidency of the Council of Ministers of February 23rd 2020 to contain the effects of the COVID-19 pandemic. Data has been collected anonymously, for the sole purpose of the research, in compliance with the EU General Data Protection Regulation (GDPR) n. 679/2016 and with the Italian Legislative Decree no. 196/2003 (amended by Legislative Decree no. 101 of 10.08.2018).

The survey was built using Microsoft Forms and was structured into four sections containing a total of 45 questions. The first part collected information about the academic role, age and gender of the respondent. The second one included 21 questions on online teaching, ranging from the number of courses provided online and the number of students expected to attend them, to the perceived teacher's satisfaction with online teaching. Similarly, the third part of the survey was focused on online exams and included 17 questions ranging from the modalities of delivery to the technical problems encountered during online exam sessions, to the perceived teacher's satisfaction. The final section of the survey included 4 questions on future perspectives of online teaching of medical statistics, biostatistics and epidemiology. The full list of questions is reported in the Supplementary Table 1.

Survey administration

On April 30th 2020, we accessed the online freely available official database of the Italian Ministry of Education, University and Research [3] in order to identify the list of Italian academics of medical statistics. The institutional e-mail addresses of the identified academics were then retrieved either from the SISMEC members list and profiles, or directly from their university's website.

On May 18th 2020, an e-mail providing with information about the aims of the survey, and the URL link to access it, was sent out to the 122 Italian academics of medical statistics. No incentives were provided to complete the online questionnaire, which took approximately 10 minutes. After one week, a follow-up e-mail was sent out, while a final reminder was sent three days before the closing date planned on May 31st 2020. The survey was also publicized on the SISMEC website [2] and through the society's newsletter in order to reach the adjunct professors who were not listed in the national database [3]. All responses were anonymous and confidential.

Statistical analysis

Categorical variables were described in terms of frequencies while continuous variables in terms of median and range. Bar plots were used to graphically represent results from selected questions.

Satisfaction was defined with a score greater than or equal to 7/10 at the survey questions "From 1 to 10, how much did you enjoy delivering online teaching?" and "From 1 to 10, how much did you enjoy delivering online exams?", respectively. Relative association measures were computed as ratio of satisfaction proportions within strata of factors influencing teachers' satisfaction with online teaching and online exams. Uncertainty among estimates was assessed through the 95% confidence intervals (CIs).

Analyses were carried out through SAS version 9.4 (SAS Institute Inc., Cary, NC, USA) and graphs were drawn with R version 4.0.2 (R Development Core Team).

Results

A total of 94 questionnaires were completed by Italian academics of medical statistics, including 5 adjunct professors (Table 1). Among all the responders, 23 (24%) were full professors, 39 (41%) associate professors, 27 (29%) assistant professors and 5 (5%) adjunct professors. Gender resulted fairly balanced with a slight predominance of females (54%).

The main items of the survey are summarized in Table 1. By the time the survey was sent out and completed, 88 academics (94%) had switched to online teaching, while only 37 (39%) declared a previous experience with online teaching.

The online teaching experience during the first months of the COVID-19 pandemic was different with regards to the number of teaching hours, the number of courses and the number of students. Educational provision varied across our sample: 21 (24%) chose to provide their lessons only asynchronously, 31 (35%) only synchronously, 18 (20%) synchronously but also provided asynchronous material, and 18 (20%) alternating the two modalities. Although technical difficulties during online teaching were experienced by 19 (22%) academics, a satisfaction score of 7 or more out of 10 was reached by 66 of them (75%).

Overall, the effort put into online teaching was high: three out of four academics declared they had dedicated themselves to study in deep online teaching from a moderate amount to a lot. Nevertheless, 42% still found online teaching less effective than traditional modalities (Figure 1).

Among 69 academics who had already delivered online exams at the time of the survey (73%), 20 (22%) choose an oral, 26 (29%) a written and 37 (41%) a mixed (oral and written) modality. In the presence of large classes it was necessary to organize multiple online rounds for the same exam. A satisfaction score of 7 or more out of 10 for online exams was declared by 40 academics (62%).

The experience with online exams was judged more difficult compared to the experience with online teaching, and relatively more negative evaluations were expressed (12% scores of 1 or 2 out of 10) (Figure 2). students' evaluations with online compared to traditional exams were comparable for more than half of the sample (52.4%).

Association between teaching variables and satisfaction with online teaching are reported in Table 2. Although there was no statistical significance, 67% of academics aged 40 or lower were satisfied with online teaching as compared to 87% of those aged 61 years or older. A slightly higher satisfaction was declared by males (78%) than females (72%). With reference to the academic role, 65% of full professors were satisfied as compared to 78% of associate professors and 76% of assistant professors.

Satisfaction was higher when the number of teaching hours and the amount of teaching courses increased. Conversely, it was negatively influenced by an excessive number of students and technical difficulties.

The adoption of multiple teaching modalities has been judged as the most satisfactory solution.

Association between teaching variables and satisfaction with online exams are reported in Table 3. Having experienced technical difficulties was strongly associated with a lower satisfaction. No other factor, among

those considered, was found to be statistically significant, but indicators of more complex exam administration modalities, such as the need to create multiple rounds for the same exam and provision of both oral and written online exams, were inversely associated with satisfaction.

For what concerns future perspectives, 61% of the academics declared to be keen to provide again online teaching in the future and 35% would be open to explore different modalities for online teaching. Overall, 65% of them gave to their perceived effectiveness of online teaching of medical statistics, biostatistics and epidemiology a score of at least 7 out of 10 (Figure 3).

Discussion

The COVID-19 pandemic has changed our lives and determined a deep change in all educational activities. Although a year has already passed since the outbreak, at the time of writing higher tertiary education is still provided online in Italy and in other countries in the world. For this reason, a continuous assessment of teachers' opinions, students' needs and critical points related to distance educational activities is mandatory to improve the quality of the teaching process [4].

The Education Committee of the Italian scientific Society for Medical Statistics and Clinical epidemiology (SISMEC) [2] has long been promoting initiatives aimed at harmonizing the objectives and the contents of medical statistics, biostatistics and epidemiology courses in higher tertiary education, including Bachelor and Master of Science degree courses, postgraduate first and second level masters, specialization schools in the medical area and Ph.D. courses. In May 2020, the Committee carried out a survey to evaluate the perception of Italian academics of medical statistics on online teaching and remote exams during the COVID-19 pandemic. The response rate was 73%, showing a widespread interest towards issues related to online teaching of medical statistics and administration of remote exams.

Although only 39% of Italian academics declared a previous experience with online teaching before the suspension of in-presence didactic activities due to the COVID-19 pandemic, our survey showed a median satisfaction score with online teaching of 7 out of 10. Indeed, the survey showed that there was a balance between teachers who judged online teaching comparable or even more effective than in-presence teaching as compared to those who did not. It has also to be pointed out that 75% of Italian academics of medical statistics had dedicated themselves to study in deep the modalities to provide online teaching. Despite such a positive framework, some drawbacks were highlighted, including the lack of adequate personal interaction between students and teachers even when lessons were carried out through synchronous modalities [5]. The lack of a personal relationship also prevents teachers to get a feedback of students' learning. Several recent pieces of research [6-8] showed that online teaching increased gaps in students' success, resulting in a lower performance for those students with weak academic backgrounds who suffered most from the loss of the teacher-student interaction. In contrast to these findings, our survey highlighted that student's performance were comparable (52%) or even higher (19%) in online as compared to in-presence exams, in line with the

findings by Ni [9] and with a review by Merisotis and Phipps [10]. The effectiveness of teaching statistics through a distance learning course as compared to a face-to-face course was a matter of discussion for a long time. A survey by Harrington [11] published more than 20 years ago suggested that students can learn statistics successfully through distance courses, but some students might need additional assistance or do better in a traditional format.

One of the success keys of online teaching lies in the easy way to quickly share educational materials to students through the University's LMS. Previous published research showed that electronic delivery of course contents was associated with improved students outcomes [12]. Conversely, the most frequent problem was related to network connectivity. Several teachers experienced slow web connections or network problems which led sometimes to a temporary suspension of synchronous lessons. For teachers who chose to deliver didactic activities through asynchronous modalities, difficulties arose during the upload of educational material, including lessons registrations, to the University's LMS, either due to a system overload, or due to a slow internet connection.

Experience with remote exams was less satisfactory as compared to online teaching. Although the median satisfaction score with remote exams was 7 out of 10, more than 25% of Italian academics of medical statistics declared to be not fully satisfied. The most preferred modality to deliver remote exams was a combination of oral and online tests, the latter being administered either through the University's LMS or through other software. One in five teachers delivered oral exams only. However, the drawback of oral exams for large classes was the need to organize multiple online rounds for the same exam session. This translated into a full-time engagement lasting several days for those academics involved in more than one course. Despite such evident limitation, satisfaction with remote exams did not appear to be related to the need of organizing multiple online rounds for the same exam. More interestingly, our survey showed that satisfaction with remote exams was significantly lower in those who experienced technical difficulties or problems. These difficulties included network connectivity issues, as well as the lack of teachers' knowledge on software to deliver remote exams. To this aim, the university's IT service has a pivotal role in the continuous dissemination of advancements and updates of didactic software and services available to teachers. Nowadays, university's LMSs allows to deliver written exams structured as online quiz using e-proctoring services [13] to ensure remote control of students while taking examinations. Indeed, several academics were not aware of these advance functionalities at the time of the survey conduction.

Our survey had some limitations. First, it was administered to the Italian academics of medical statistics, a small community including only 122 among full, associate and assistant professors at the time of the survey conduction. Although the sample was relatively small, the response rate (73%) was satisfactorily and similar across categories defined by the academic role. Second, we only got 5 replies from adjunct (contract) professors despite the survey has been publicized on the SISMEC website [2] and through the society's newsletter. In fact, Italian universities yearly enrolled several external teachers of medical statistics to cover

all the didactic needs. Third, the survey was based on self-reported data and it was conducted within the COVID-19 pandemic context. These limitations may hamper the generalization of the findings.

Online teaching could have been initially considered only as a rescue modality to deliver educational activities during the COVID-19 pandemic. As written by Gallo et al. [14] in a recent report of the Education Committee of the Italian Society of Medical Statistics and Clinical Epidemiology, a change of education routines might be perceived as some loss of teacher identity. However, the 61% of Italian academics declared to be favorable to provide online teaching of medical statistics, biostatistics and epidemiology in the future, with a median perceived effectiveness of at least 7 out of 10. However, this positive view toward online teaching should be interpreted with caution, as it seems clear that technology cannot substitute the human factor [4, 12]. Today, one year after the start of the experience with online teaching in Italian universities, we could state that outcomes will improve over time as faculties and institutions progressively gain more experience. At the same time, we recognize that distance education cannot substitute the unique value of teaching and knowledge exchange that could only be transmitted through a personal interaction between students and teachers. Further research on online teaching is needed to understand how academics can better provide online course of medical statistics, biostatistics and epidemiology allowing students to learn best in an online environment.

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Table 1. Descriptive statistics of selected items of the survey on online teaching and remote exams administered to the Italian academics of medical statistics in May 2020.

Academic role and demographic data		
Number of respondents		94
Academic role		
	Full professor	23 (24%)
	Associate professor	39 (41%)
	Assistant professor	27 (29%)
	Adjunct professor	5 (5%)
Age (years)		
	≤40	14 (15%)
	41-50	35 (37%)
	51-60	29 (31%)
	≥61	16 (17%)
Gender		
	Female	51 (54%)
	Male	43 (46%)
Section on online teaching		
Previous experience[†] with online teaching		
	No	57 (61%)
	Yes	37 (39%)
Current experience[†] with online teaching		
	No	6 (6%)
	Yes	88 (94%)
Degree courses within which the academic delivered online teaching[‡]		
	Single cycle degree in Medicine and Surgery	34 (39%)
	Single cycle degree in Dentistry and Dental Prosthetics	15 (17%)
	Bachelor's and master's degrees in Healthcare Professions	52 (59%)
	1 st and 2 nd level Master degrees, PhD Schools and Schools of Medical Specialties	41 (47%)
	Other courses	50 (57%)
Number of teaching hours[§]		
	≤50	45 (51%)
	>50	42 (48%)
	missing	1 (1%)
	Median (IQR)	49 (30-69)
Number of online teaching courses[§]		
	≤2	51 (58%)
	>2	36 (41%)
	missing	1 (1%)
	Median (IQR)	2 (1-7)
Number of Students expected to attend the largest course the academic delivered online[§]		
	≤100	54 (61%)
	>100	32 (36%)
	missing	2 (2%)

	Median (IQR)	100 (50-120)
Online teaching modality[§]		
	Asynchronous	21 (24%)
	Synchronous	31 (35%)
	Both	18 (20%)
	Mixed	18 (20%)
Ever experienced technical difficulties with online teaching[§]		
	No	69 (78%)
	Yes	19 (22%)
Satisfaction with online teaching[§]		
	<7/10	22 (25%)
	≥7/10	66 (75%)
	Median (IQR)	7 (7-8)
Section on online exams		
Current experience[†] with online exams		
	No	3 (3%)
	Not yet but I will	22 (23%)
	Yes	69 (73%)
Students' number to be examined[*]		
	≤100	55 (60%)
	>100	36 (40%)
	Median (IQR)	100 (60-235)
Online exams modality[*]		
	Oral only	20 (22%)
	Online written only	26 (29%)
	Oral and online written	37 (41%)
	Other	8 (8%)
Need to create multiple rounds for the same exam[*]		
	No	29 (32%)
	Yes	49 (54%)
	Don't know	7 (8%)
	missing	6 (7%)
Ever experienced technical difficulties with online exams		
	No	46 (49%)
	Not yet delivered online exams	22 (23%)
	Yes	19 (20%)
	missing	6 (6%)
Satisfaction with online exams		
	<7/10	25 (27%)
	≥7/10	40 (44%)
	Not yet delivered online exams	20 (22%)
	missing	6 (7%)
	Median (IQR)	7 (6-8)

[†] before the decree of the Presidency of the Council of Ministers of 23 February 2020 and subsequent which has ordered the suspension of in-presence didactic activities.

[‡] the sum does not add up to the total since academics generally teach in more than one degree course.

[§] question to be compiled only by those who provided online teaching following the suspension of in-presence didactic activities due to the decree of the Presidency of the Council of Ministers of 23 February 2020 and later.

* question to be compiled only by those who provided or will provide online exams following the suspension of in-presence didactic activities due to the decree of the Presidency of the Council of Ministers of 23 February 2020 and later.

Table 2. Association between teaching variables and satisfaction with online teaching.

	Fully satisfied [†] with online teaching	RR (95% CI)	P
n	66/88 (75%)		
Age (years)			0.60
≤40	8/12 (67%)	1 (Reference)	
41-50	25/33 (76%)	1.14 (0.73-1.77)	
51-60	20/28 (71%)	1.07 (0.67-1.70)	
≥61	13/15 (87%)	1.30 (0.83-2.03)	
Gender			0.54
M	32/41 (78%)	1 (Reference)	
F	34/47 (72%)	0.93 (0.73-1.18)	
Academic role			0.91
Assistant professor	19/25 (76%)	1 (Reference)	
Associate professor	28/36 (78%)	1.02 (0.80-1.29)	
Full professor	15/23 (65%)	0.90 (0.67-1.21)	
Adjunct professor	4/4 (100%)	--	
Previous experience with online teaching			0.53
No	41/53 (77%)	1 (Reference)	
Yes	25/35 (71%)	0.92 (0.72-1.19)	
Teaching hours (number)			0.57
≤50	33/45 (73%)	1 (Reference)	
>50	33/42 (79%)	1.07 (0.85-1.36)	
Number of online teaching courses			0.19
≤2	36/51 (71%)	1 (Reference)	
>2	29/36 (81%)	1.17 (0.93-1.48)	
Number of students expected to attend the largest course you delivered online			0.15
≤100	43/54 (80%)	1 (Reference)	
>100	21/32 (66%)	0.82 (0.62-1.10)	
Online teaching modality			0.18
Asynchronous	13/21 (62%)	1 (Reference)	
Synchronous	22/31 (71%)	1.15 (0.77-1.72)	
Both	16/18 (89%)	1.44 (0.99 – 2.09)	
Mixed	15/18 (83%)	1.35 (0.91-2.00)	
Ever experienced technical difficulties with online teaching			0.46
No	53/69 (77%)	1 (Reference)	
Yes	13/19 (68%)	0.89 (0.64-1.24)	

[†]Satisfaction was defined as a score $\geq 7/10$ at the question: "From 1 to 10, how much did you enjoy delivery online teaching?"

Table 3. Association between teaching variables and satisfaction with online exams.

	Fully satisfied with online exams	RR (95% CI)	P
n	40/65 (62%)		
Age (years)			0.49
≤40	6/11 (55%)	1 (Reference)	
41-50	13/24 (54%)	0.99 (0.52-1.91)	
51-60	15/20 (75%)	1.38 (0.76-2.50)	
≥61	6/10 (60%)	1.10 (0.53-2.30)	
Gender			0.07
M	22/30 (73%)	1 (Reference)	
F	18/35 (51%)	0.70 (0.48-1.03)	
Academic role			0.91
Assistant professor	13/20 (65%)	1 (Reference)	
Associate professor	17/27 (63%)	0.98 (0.70-1.37-)	
Full professor	8/16 (50%)	0.85 (0.56-1.31)	
Adjunct professor	2/2 (100%)	--	
Students' number to be examined			0.56
≤100	22/37 (59%)	1 (Reference)	
>100	18/28 (64%)	1.12 (0.76-1.66)	
Online exams modality			0.36
Oral only	7/12 (58%)	1 (Reference)	
Online written only	15/21 (71%)	1.14 (0.75-1.73)	
Oral and online written	15/29 (52%)	0.93 (0.60-1.44)	
Need to create multiple rounds for the same exam			0.87
No	15/23 (65%)	1 (Reference)	
Yes	24/40 (60%)	0.92 (0.62-1.36)	
Don't know	1/2 (50%)	0.76 (0.19-3.16)	
Ever experienced technical difficulties with online exams			<0.01
No	36/46 (78%)	1 (Reference)	
Yes	4/19 (21%)	0.27 (0.11-0.65)	

[†]Satisfaction was defined as a score $\geq 7/10$ at the question: "From 1 to 10, how much did you enjoy delivery online exams?"

Figure 1. The experience with online teaching in a sample of Italian academics of medical statistics.

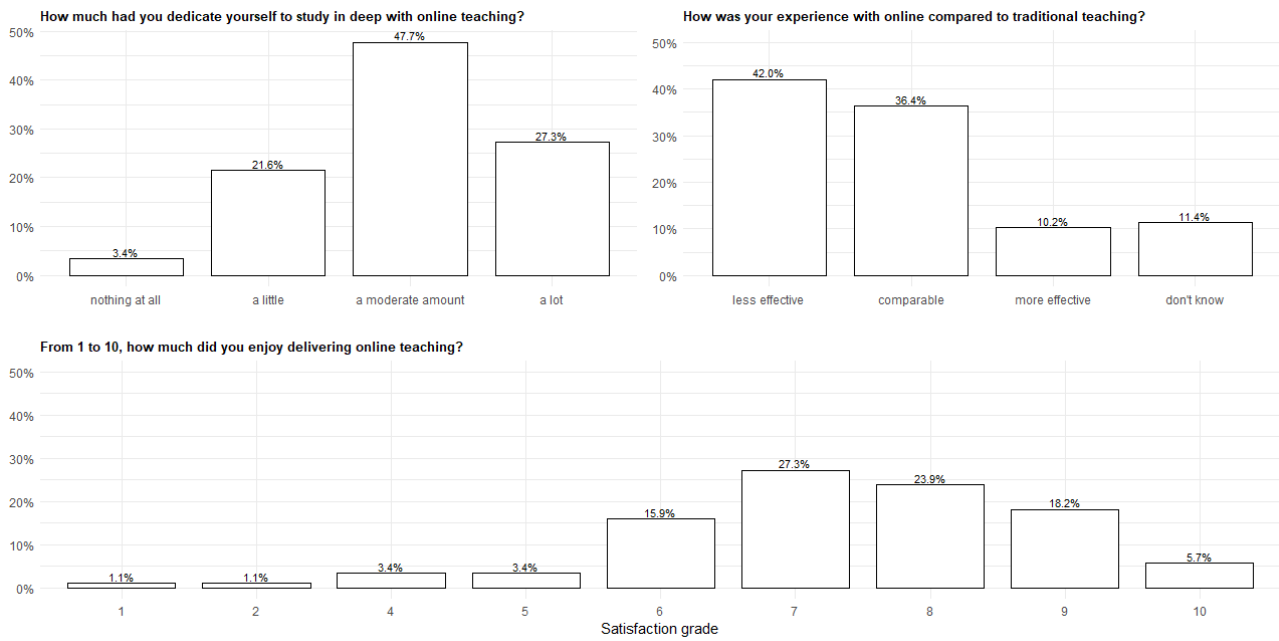


Figure 2. The experience with online exams in a sample of Italian academics of medical statistics.

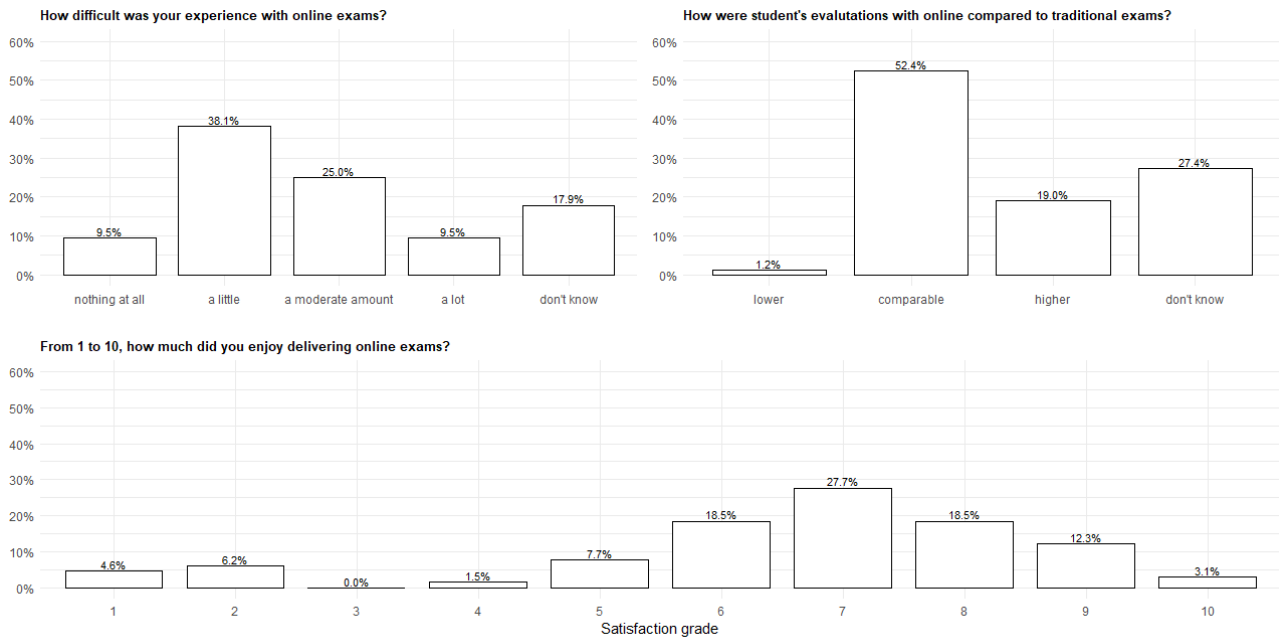
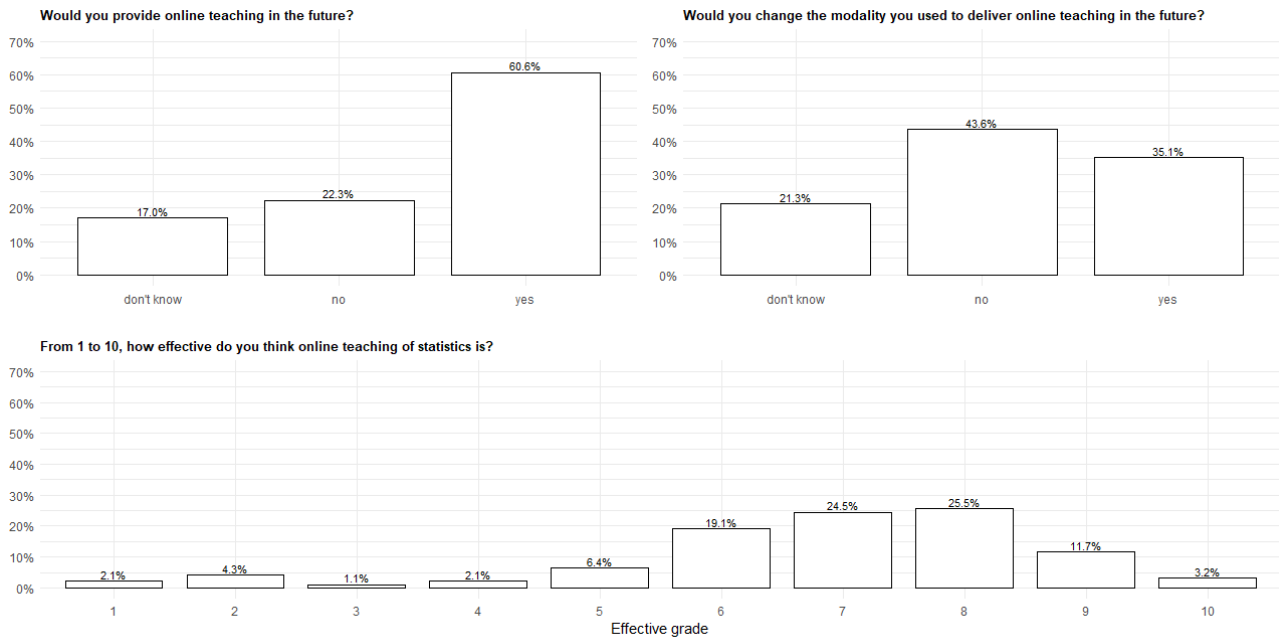


Figure 3. Perspectives of online teaching of medical statistics, biostatistics and epidemiology in a sample of Italian academics of medical statistics.



Supplementary Table 1. Survey on online teaching and online exams administered to the Italian academics of medical statistics in May 2020.

Role and demographic data	
Academic role	<input type="radio"/> Full professor <input type="radio"/> Associate professor <input type="radio"/> Assistant professor <input type="radio"/> Adjunct professor <input type="radio"/> Other [please specify]
Age (years)	<input type="radio"/> ≤40 <input type="radio"/> 41-50 <input type="radio"/> 51-60 <input type="radio"/> ≥61
Gender	<input type="radio"/> Female <input type="radio"/> Male
Section on online teaching	
In the past[†], did your university admit the possibility of providing online teaching?	<input type="radio"/> Yes <input type="radio"/> No
In the past[†], have you ever delivered online teaching?	<input type="radio"/> Yes <input type="radio"/> No
Are you providing online teaching following the suspension of in-presence didactic activities due to the decree of the Presidency of the Council of Ministers of 23 February 2020 and later?	<input type="radio"/> Yes <input type="radio"/> No
How much had you dedicate yourself to study in deep with online teaching?	<input type="radio"/> Nothing at all <input type="radio"/> A little <input type="radio"/> A moderate amount <input type="radio"/> A lot
Has your university made available a technical and IT assistance service support for teachers involved in the provision of online teaching?	<input type="radio"/> Yes <input type="radio"/> No
Have you made use of this technical and IT assistance service?	<input type="radio"/> Yes <input type="radio"/> No
Which degree course do the teachings you are delivering online belong to? (multiple answers are possible)	<input type="radio"/> Single cycle degree in Medicine and Surgery <input type="radio"/> Single cycle degree in Dentistry and Dental Prosthetics <input type="radio"/> Single cycle degree in Veterinary Medicine <input type="radio"/> Single cycle degree in Pharmacy <input type="radio"/> Bachelor's and master's degrees in Healthcare Professions <input type="radio"/> Bachelor's and Master's degrees in Motor Sciences <input type="radio"/> Bachelor's degrees in Biotechnology and Biological Sciences <input type="radio"/> Master's Degrees in Biology and Medical Biotechnology, Veterinary and Pharmaceuticals Sciences <input type="radio"/> Bachelor's degrees in Statistics

	<ul style="list-style-type: none"> ○ Master's degrees in Statistical, Actuarial and Financial Sciences ○ 1st and 2nd level Master degrees, PhD Schools and Schools of Medical Specialties
How many teachings are you delivering online?	[Open field]
Overall, how many hours of online teaching are you providing?	[Open field]
How many students are expected to attend the largest teaching you are delivering online?	[Open field]
Is online teaching leading to a reduction of the didactic program?	<ul style="list-style-type: none"> ○ Yes ○ No ○ Don't know
How did you share the teaching material (slides, articles, code, etc.) with the students?	<ul style="list-style-type: none"> ○ By uploading it on the University's LMS ("Learning Management System") platform ○ Through clouding services (DropBox, OneDrive, Google Drive, etc ..) ○ By e-mail
Which modality did you choose to deliver online teaching?	<ul style="list-style-type: none"> ○ Asynchronous (only video lessons uploaded on the University LMS platform) ○ Synchronous (only live lessons in virtual classrooms called by videoconference) ○ Both (live lessons in virtual classrooms recorded and then uploaded to the University LMS platform) ○ Mixed (some live lessons and some video lessons uploaded on the University LMS platform)
If you chose to use the asynchronous modality, which LMS ("Learning Management System") platform/services are you using to deliver online teaching? (multiple answers are possible)	<ul style="list-style-type: none"> ○ Moodle (through Kaltura media-server or other plug-in software) ○ Blackboard Learn ○ Edmodo ○ Ilias ○ Google Suite for Education ○ Office 365 Educational Suite ○ Other [please specify]
If you chose to use the synchronous modality, which software are you using to deliver online teaching? (multiple answers are possible)	<ul style="list-style-type: none"> ○ Google Meet / Hanghouts ○ Microsoft Teams ○ Blackboard Collaborate ○ Skype ○ Zoom ○ WebEx ○ GoToMeeting ○ Jitsi ○ BigBlueButton ○ Adobe Connect ○ SkyMeeting ○ Other [please specify]
Have you dealt with, or are you planning to deal with statistical/epidemiological topics related to the Covid-19 epidemic within the online teachings you are providing?	<ul style="list-style-type: none"> ○ Yes ○ No ○ Don't know

How was your experience with online compared to traditional teaching?	<input type="radio"/> Less effective <input type="radio"/> Comparable <input type="radio"/> More effective <input type="radio"/> Don't know
Have you experienced technical difficulties with online teaching?	<input type="radio"/> Yes <input type="radio"/> No
If so, what kind of technical problems have you experienced? (multiple answers are possible)	<input type="radio"/> Connection problems (e.g. overload on the network and/or on the University LMS platform, interruptions on the connection, etc.) <input type="radio"/> Students' difficulties in configuring the connection to the online lessons <input type="radio"/> Lack of knowledge and/or students' difficulties with software platforms used to deliver online teaching <input type="radio"/> Other [please specify]
From 1 to 10, how much did you enjoy delivering online teaching?	[1 2 3 4 5 6 7 8 9 10]
Use the space below if you want to share additional consideration on online teaching	[Open field]
Section on online exams	
Are you administering online exams following the suspension of in-presence didactic activities due to the decree of the Presidency of the Council of Ministers of 23 February 2020 and later?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not yet but I will
Has your university issued a regulation covering technical aspects (modalities of connection with the examinees, identity verification, etc.) on the modalities to delivery online exams?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Don't know
Overall, how many students did you examine, are you examining, or do you expect to examine online?	[Open field]
Which modality are you using or are you planning to use to deliver online exams? (multiple answers are possible)	<input type="radio"/> Oral <input type="radio"/> Traditional written exam with online control of the examinees <input type="radio"/> online administered quiz with online control of the examinees <input type="radio"/> Homeworks prepared by the examinees <input type="radio"/> I have not yet decided <input type="radio"/> Other [please specify]
If you chose to deliver written exams or online quizzes, have you used or are you planning to use an "e-proctoring" software (e.g. Respondus, Edx etc.) officially supplied by the university?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> I would have used it if available <input type="radio"/> I don't know what an "e-proctoring" software is
If you chose to deliver written exams or online quizzes, have you used or will you use a lock-down browser (e.g. Safe Exam Browser) integrated into the university LMS ("Learning Management System") platform?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> I don't know what a lock-down browser is

<p>Have you found or do you expect to find yourself forced to create multiple rounds for the same exam due to the high number of examinees?</p>	<ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> I don't know, I have not yet delivered online exams
<p>Which software are you using to connect with the examinees to deliver online exams? (multiple answers are possible)</p>	<ul style="list-style-type: none"> <input type="radio"/> Google Meet / Hangouts <input type="radio"/> Microsoft Teams <input type="radio"/> Blackboard Collaborate <input type="radio"/> Skype <input type="radio"/> Zoom <input type="radio"/> WebEx <input type="radio"/> GoToMeeting <input type="radio"/> Jitsi <input type="radio"/> BigBlueButton <input type="radio"/> Adobe Connect <input type="radio"/> SkyMeeting <input type="radio"/> Other [please specify]
<p>Which modality are you using to connect with the examinees to deliver online exams? (multiple answers are possible)</p>	<ul style="list-style-type: none"> <input type="radio"/> Examinees connected only through a PC equipped with a webcam <input type="radio"/> Examinees connected only through a smartphone that frames the examinee's workstation <input type="radio"/> Examinees connected only through a smartphone <input type="radio"/> Examinees connected through a PC equipped with a webcam and also with a smartphone <input type="radio"/> I have not yet decided <input type="radio"/> Other [please specify]
<p>Have you verified or are you planning to verify online the identity of the examinees according to the university's procedures?</p>	<ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Don't know, I have not yet delivered online exams
<p>Have you ever had to reprimand a student because he/she didn't follow the university's rules of conduct for taking online exams?</p>	<ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> I have not yet delivered online exams
<p>How difficult was your experience with online exams?</p>	<ul style="list-style-type: none"> <input type="radio"/> Not at all <input type="radio"/> A little <input type="radio"/> A moderate amount <input type="radio"/> A lot <input type="radio"/> I have not delivered online exams so far
<p>How were student's evaluations with online compared to traditional exams?</p>	<ul style="list-style-type: none"> <input type="radio"/> Lower <input type="radio"/> Comparable <input type="radio"/> Higher <input type="radio"/> Don't know <input type="radio"/> I have not yet delivered online exams
<p>Have you experienced any difficulties with online exams?</p>	<ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> I have not yet delivered online exams
<p>If so, what kind of problems have you experienced? (multiple answers possible)</p>	<ul style="list-style-type: none"> <input type="radio"/> Difficulty and/or doubts in verifying the identity of the examinees <input type="radio"/> Connection problems (e.g. overload on the network and/or on the University LMS)

	<p>platform, interruptions on the connection, etc.)</p> <ul style="list-style-type: none"> ○ Students' difficulties in configuring the connection to the online exams ○ My lack of knowledge of the functionalities of the software platform to deliver online exams (including "e-proctoring" software) ○ Difficulty of examinees in using the software platform used to deliver the online exam ○ Lack of adequate software and hardware equipment of the examinees ○ Other [please specify]
From 1 to 10, how much did you enjoy delivering online exams?	[1 2 3 4 5 6 7 8 9 10]
Use the space below if you want to share additional consideration on online exams	[Open field]
Section on perspectives of online teaching	
Would you provide online teaching in the future?	<ul style="list-style-type: none"> ○ Yes ○ No ○ Don't know
Would you change the modality you used to deliver online teaching in the future?	<ul style="list-style-type: none"> ○ Yes ○ No ○ Don't know
Would you change the modality you used to deliver online exams in the future?	<ul style="list-style-type: none"> ○ Yes ○ No ○ Don't know
From 1 to 10, how effective do you think online teaching of statistics is?	[1 2 3 4 5 6 7 8 9 10]

[†] before the decree of the Presidency of the Council of Ministers of 23 February 2020 and subsequent which has ordered the suspension of in-presence didactic activities.