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# Credit achievement ability during distance learning era: the case of Statistics in Medicine course.

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# Credit achievement ability during distance learning era: the case of Statistics in Medicine course

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## ABSTRACT

### AIM

In this study, the effects of the DL on academic career were investigated.

### BACKGROUND

Distance Learning (DL) became mandatory in Italy from March 2020, due to COVID19 emergency.

### DESIGN

The performances of students in Medical Statistics course of the Nursing degree in three campus of the University of Turin (Aosta, Beinasco and Cuneo) in the Academic Years 2019-2020 and 2020-2021 were considered.

### METHODS

The study is based on 308 students, 48% of whom both attended the lessons and took the exams in DL. The effect of DL on student's performance was evaluated using Logistic regression models and the results are showed in terms of odds ratios adjusted for gender, age and campus.

### RESULTS

The results show that DL did not bring particular limitations to the students, highlighting on the contrary evident benefits in terms of organization and management of lessons and exams. Moreover, the level of students' satisfaction at the end of the course increased in DL.

### CONCLUSION

DL seems to do not affect the student's ability on achieve credits, at least in mathematical subjects. More investigations are needed considering all courses' types.

**Keywords**: distance learning; academic success; Italy; medical education; comparative study.

## INTRODUCTION

Distance Learning (DL) became mandatory in all the Italian Universities in March 2020 [5], due to the outbreak of COVID19 emergency. One of the main questions in this new framework was if DL will be enough for teaching and learning as in presence setting.

The quality of teaching and learning depend on multiple factors, which cannot be easily defined. Many papers, in the last two years, tried to focus on some of them: students' performance [7][9][12], students' perception [6][10][11], teaching and learning instruments [1][2][3], teachers' preparation and motivation [8].

Moreover, also the students' performance is not easy to define and there is no consensus on how the performance must be measured. In some cases the researchers created a new score: Foo considered standardized scores given by the tutors of the students [7]; Jacques used the median radar diagrams of the students after an engineering project [9]; Ziganshin focused the attention on clinical training [12]. New scores could be useful for understanding abilities, but this approach is time consuming and not always applicable.

In this paper, students' performance is studied as ability of achieve credits. The achievement of credits cannot be strictly matched with quality of learning or preparation, but it could be a yardstick of the ability of the students to reach the minimum standards that teachers require. In other words, we would like to study the ability of the students on passing the exam.

Indeed, two opposite perceptions are present up to now, at least in Italy: someone emphasize the attention deficit in online lessons and the difficulties of the students in understand new subjects in this new framework. For the supporters of this idea, distance learning is not enough, and a decline of students' performance will be assessed. However, attention deficit is a fact, but don't forget that recordings, books, lecture notes, exercises and other materials are always available to students.

Other people emphasize instead the ease of cheating during online exams, which will lead to an improvement of students' performance. It is true that students are facilitated in coping definitions or theoretical answers. However, online examinations allow the teacher to randomize the questions and make sure that each student has a different question. Moreover, many subjects, especially the mathematical ones, cannot be passed with an only theoretical knowledge. Therefore, coping in these examinations is not very easy.

Considering these two-opposite theses, we want to understand if there is a true difference in credit achievement between in presence and online lessons.

As an explorative study, we considered the last two years of one course, the course "Statistics in Medicine" in the degree course of Nursing at the University of Turin

## THE EXPERIENCE OF THE UNIVERSITY OF TURIN

The University of Turin gave a large variety of instruments for DL [4].

Generally, WebEx is the most used platform for lessons and conferences. This platform allows the teachers to both perform lessons simultaneously and register them. During the session, the teacher can share his/her desktop, use a virtual blackboard, have the students' feedback through audio, video and/or chat. Moreover, each course was provided with a Moodle web page in with share WebEx links, WebEx registrations, slides, additional materials (e.g. video-pills), exercises and also exam tests.

As concerns the course of Statistics considered in this paper, during in presence lessons the teacher showed PowerPoint slides and made some exercises and additional explanation on the blackboard. Online lessons were provided with WebEx sessions using PowerPoint slides, the virtual blackboard and Excel sheets for calculations. In Moodle page, both slides and lesson's recording were provided to students.

As concerns the exams, in both cases (online or classroom mode) students must be connected via WebEx during all the exam, with video and audio turned on. A disconnection of more than five minutes leads to the cancellation of the exam (but there were no cases of this in our samples). Students received the test via e-mail as Word document, then they could both write on the document or on a white paper sheet and take a picture of it. They must create a PDF document with their exam and upload it on a dedicated block in Moodle. The teacher can then see, annotate and correct the files directly on Moodle.

## OBJECTIVE

In order to evaluate the effects of the DL on the academic career, we are developing a study on academic careers at the Degree Courses of Medicine, Nursing and Dentistry at the University of Turin, comparing student's performance by lessons types (in presence or DL) and by exams types (in presence or online). For now, only the data of the degree course in Nursing relating three campus of the University of Turin (Aosta, Beinasco, Cuneo) are available.

The present paper aims to present some preliminary results relating to 308 students attended to the Medical Statistics course of the Nursing degree in three campus of the University of Turin (Cuneo, Aosta and Beinasco) in the Academic Years 2019-2020 and 2020-2021.

## MATERIALS AND METHODS

In this explorative study, only the Statistics in Medicine course at the course degree in Nursing at University of Turin (Italy) was considered. In particular, three campus were included: Cuneo (Section A and Section B), Beinasco (Section A) and Aosta. The observation period is Academic Years 2019/2020 (first semester) and 2020/2021 (first semester), for the lessons and January 2020, June 2020, July 2020, September 2020, December 2020, January 2021 and February 2021 for the examination sessions. The students were divided in two groups according to the lessons attendance: 'DL mode' (DLgroup) or 'classroom mode' (CRgroup). Exams performance were analyzed by exam mode (online vs classroom mode).

The study is based on 308 students of which 52% belong to DLgroup and took the exams in online mode.

In the CRgroup, the 15% took the exam in online mode, for this reason, it was possible to analyse the effects of DL both in general (students who attended lessons and took the exam in

DL) and separately only for the exams (students who have attended the lessons 'in classroom mode' but took the exam online mode) in order to see if an ease of coping is really present.

Differences between DLgroup and CRgroup were evaluated using chi-square test or Mann-Whitney test.

In order to analyze the effect of DL on exams performance, Logistic regression models were performed, and the results are showed in terms of odds ratios (OR) and relative 95% Confidence Intervals (95%CI) adjusted for gender, age and campus.

Finally, students' satisfaction was also considered. After the end of each course, students must compile an evaluation of it and aggregated data are available to teachers by Edumeter. The average of the three campus were considered in order to compare the statisfaction between the two years.

## RESULTS

A total of 308 students was analyzed (DLgroup: 160 (51.9%) and CRgroup: 148 (48%)): 20 from Aosta, 78 from Beinasco and 210 from Cuneo campus.

In our sample, 125 (40%) took the exam in presence and 183 (60%) in online mode, among the latter 23 belonged to CRgroup.

In the first two exam sessions, the 68.3% of the students of CRgroup and 71.2% of the students of DLgroup were passed ($p = 0.5881$).

The 70% of students who took the exam in classroom mode and 68.9% of students who took the exams in online mode passed the exam within the first two sessions ($p = 0.8379$).

Therefore, no significant differences were found in passing the exam between lesson and exam types. However, it is interesting to underline that among the students of CRgroup who took the exam in online mode, the percentage of students who passed the exam within the first two exam sessions was 89.2%.

Even adjusting the estimates for gender, age and campus using Logistic regression models, no statistically significant effects were found between taking exams in classroom mode compared to taking exams in online mode ($OR = 0.53$ 95%CI from 0.21 to 1.31). However, it is worth highlighting the association, also although it is not statistically significant, with passing the exam within the first two exam session with the students of DLgroup compared to students of CRgroup ($OR = 1.79$ 95%CI from 0.74 to 4.38). The result must also be read in relation to an average improvement in the final evaluations.

Another aspect that is worth highlighting is related to the satisfaction index of students who seem to have statistically increased in online mode, passing from a level of satisfaction average of 80% at a level of 92% ($p = 0.02$).

## DISCUSSION

The presented results do not highlight significant effects of DL on student performance. Similar results were reported by [9] and [12], while [7] underlined a decrease in performance. It worth underlining that the investigated subjects are very different. Jacques focused their attention on engineering students [9]; Ziganshin emphasized that the performance of young medical students was unchanged while the older students' one was worsened [12], as Foo reported considering only medical students at the fourth year [7].

The difference in these results are therefore due to the subjects: learning mathematical, engineering, basic subjects in DL is more suitable than learning more specific and/or clinical ones. For this reason, a more in-depth work is planned by our group in order to compare all the years of the Degree course in Nursing (and maybe in Medicine) and all the subjects. A difference in performance between basic and/or scientific versus clinical subjects is expected.

Another aspect that is worth highlighting is related to the students' satisfaction who seem to have statistically increased levels in comparison to previous years. This is probably due to the greater ease of interaction between teacher and students: indeed, during in presence lessons the students often wait the lesson time to ask questions, or at least they write an email to the Professor. On the contrary, in online mode the teacher can connect via WebEx with a single or a small group of students in order to answer to their doubts, also away from lesson time.

On the other side, some limitations must be underlined. Only the Medical Statistics course was considered, which is not necessarily representative of the whole Nursing degree. However, some positive aspects of the design can be highlighted which have allowed to control the possible bias. For example, the teacher of these courses was the same, and the program, the exam difficulties, books and exercises types were not changed between in presence and in DL lessons.

## CONCLUSIONS

Even with all the limitations that our study presents, our study is one of the first aimed at highlighting any effects of DL on the student's university performance.

The results seem to show that DL did not bring particular limitations to the students, highlighting on the contrary evident benefits in terms of organization and management of lessons and exams, appreciated by students as evidenced by their level of satisfaction at the end of the course, even in a subject that usually is not particularly popular (especially in clinical curse degree) as the Statistics in Medicine.

## RIFERIMENTI BIBLIOGRAFICI

[1]  Aleshkovskiy, I.A., A.T. Gasparishvili, O.V. Krukhmaleva, N.P. Narbut, and N.E. Savina. 2020. "Russian University Students about Distance Learning: Assessments and Opportunities." Vysshee Obrazovanie v Rossii 29 (10): 86–100. https://doi.org/10.31992/0869-3617-2020-29-10-86-100.

[2] Casado-Aranda, L.-A., S.S. Caeiro, J. Trindade, A. Paço, D. Lizcano Casas, and A. Landeta. 2020. "Are Distance Higher Education Institutions Sustainable Enough? – A Comparison between Two Distance Learning Universities." International Journal of Sustainability in Higher Education. https://doi.org/10.1108/IJSHE-07-2020-0260.

[3] Co, Michael, and Kent-Man Chu. 2020. "Distant Surgical Teaching during COVID-19 - A Pilot Study on Final Year Medical Students." Surgical Practice 24 (3): 105–9. https://doi.org/10.1111/1744-1633.12436.

[4] "Didattica alternativa." 2020. Università di Torino. March 25, 2020. https://www.unito.it/ateneo/gli-speciali/coronavirus-aggiornamenti-la-comunita-universitaria/didattica-alternativa.

[5] "DPCM-8-Marzo-2020-1.Pdf." n.d. Accessed March 5, 2021. https://re.istruzioneer.gov.it/wp-content/uploads/sites/10/2020/04/DPCM-8-marzo-2020-1.pdf.

[6] Ferraro, F.V., F.I. Ambra, L. Aruta, and M.L. Iavarone. 2020. "Distance Learning in the Covid-19 Era: Perceptions in Southern Italy." Education Sciences 10 (12): 1–10. https://doi.org/10.3390/educsci10120355.

[7] Foo, C.-C., B. Cheung, and K.-M. Chu. 2021. "A Comparative Study Regarding Distance Learning and the Conventional Face-to-Face Approach Conducted Problem-Based Learning Tutorial during the COVID-19 Pandemic." BMC Medical Education 21 (1). https://doi.org/10.1186/s12909-021-02575-1.

[8] Halpern, C. 2021. "Distant Learning: The Experiences of Brazilian Schoolteachers during the Covid-19 School Closures." Journal of Ethnic and Cultural Studies 8 (1): 206–25. https://doi.org/10.29333/ejecs/595.

[9] Jacques, S., A. Ouahabi, and T. Lequeu. 2021. "Remote Knowledge Acquisition and Assessment during the Covid-19 Pandemic." International Journal of Engineering Pedagogy 10 (6): 120–38. https://doi.org/10.3991/IJEP.V10I6.16205.

[10] Kaila, E., and H. Kajasilta. 2020. "Blended or Distance Learning?: Comparing Student Performance between University and Open University." Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) 12128 LNCS: 477–84. https://doi.org/10.1007/978-3-030-50578-3_32.

[11] Ramos-Morcillo, A.J., C. Leal-Costa, J.E. Moral-García, and M. Ruzafa-Martínez. 2020. "Experiences of Nursing Students during the Abrupt Change from Face-to-Face to e-Learning Education during the First Month of Confinement Due to COVID-19 in Spain." International Journal of Environmental Research and Public Health 17 (15): 1–15. https://doi.org/10.3390/ijerph17155519.

[12] Ziganshin, A.M., V.A. Mudrov, S.F. Nasyrova, V.Z. Galimzyanov, D.A. Salimonenko, A.Yu. Alekseeva, I.M. Nasibulin, and A.G. Yaschuk. 2020. "Distance Learning Opportunities during the COVID-19 Epidemic." Kazan Medical Journal 101 (6): 876–82. https://doi.org/10.17816/KMJ2020-876.