

Do Remote Activities in Synchronous Mode Help to Improve the Students' Academic Performance? A Binary Logistic Regression Approach

G. Cecchi¹, S. Mori²

¹Università Telematica degli Studi – IUL

²Istituto Nazionale di Documentazione Innovazione e Ricerca (INDIRE)



Florence, Italy

20/06/2024 – 21/06/2024

Main theme:

- Evaluation of online teaching
- Study of the association between educational success and student demographic characteristics and learning methodology

INTRODUCTION

A BRIEF HISTORICAL EXCURSUS

2000s

Birth of the first online universities

2020

Widespread adoption of distance learning after the Covid-19 pandemic

Now

Great need to evaluate the quality and efficiency of distance learning and the satisfaction of students and teachers

THE CONTEXT

EDUCATIONAL SUCCESS

AVERAGE EXAM GRADES - LINEAR REGRESSION MODELS

NUMBER OF CREDITS EARNED - QUANTILE REGRESSION MODELS

TIME TO FINISH STUDIES / TIME BETWEEN THE END OF STUDIES AND THE FIRST JOB - SURVIVAL ANALYSIS MODELS

PROBABILITY OF PASSING AN EXAM / PROBABILITY OF DROPPING OUT - LOGISTIC REGRESSION MODELS

THE CASE STUDY



Object of study: The probability of passing a university exam within one year



Participants: (n= 127) Students of the first year of the academic year 2020/2021 in the teaching of 'General Psychology' of the degree course in Human Resources Psychological Science and Techniques at IUL University



Data collection method: collection of student data from two different sources: the **Moodle** online platform and the **GOMP** student registry



Analysis: Multiple logistic regression model to evaluate the associative impact of the number of activities (synchronous and asynchronous) carried out on Moodle, gender, age, high school diploma and area of residence on the probability of passing the 'General Psychology' exam within one year

THE DATASET

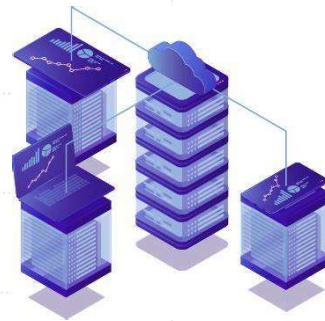


Log file about the number of synchronous and asynchronous activities carried out



Demographic informations about students: gender, age, area of residence, high school diploma and exams results

THE FINAL DATASET



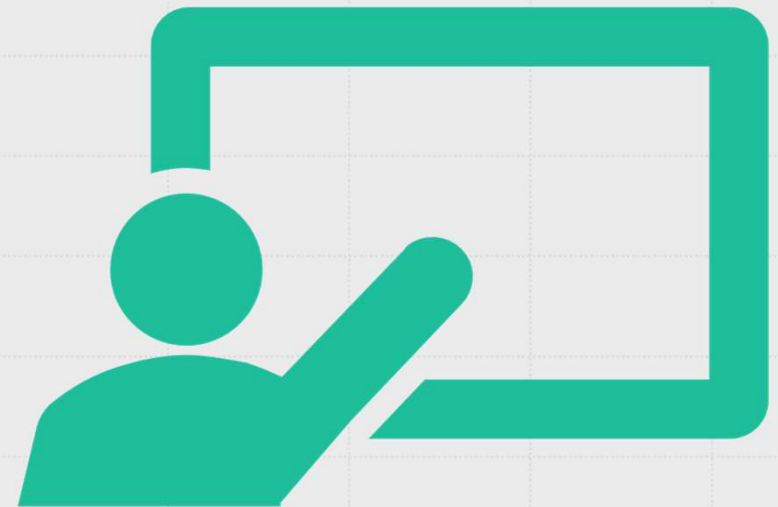
SYNCHRONOUS VS ASYNCHRONOUS ACTIVITIES

Synchronous

- Participate in live lectures
(Min: 0; Max: 5; Mean: 0,8; Sd: 1,4)

Asynchronous

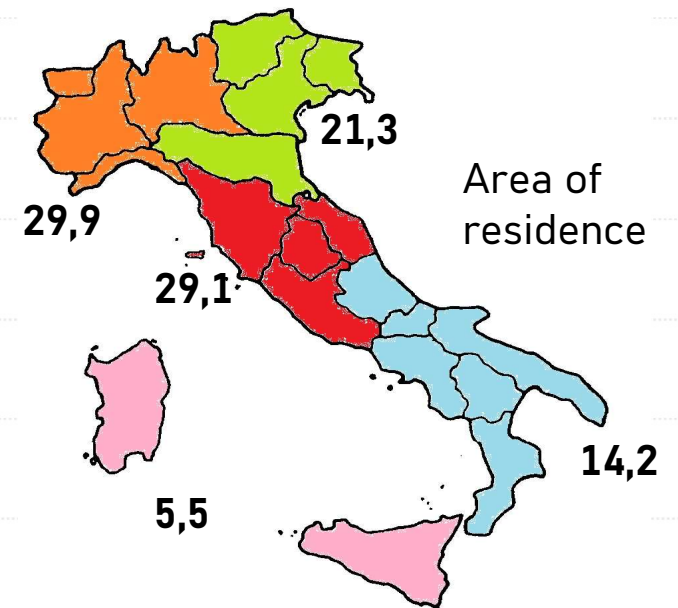
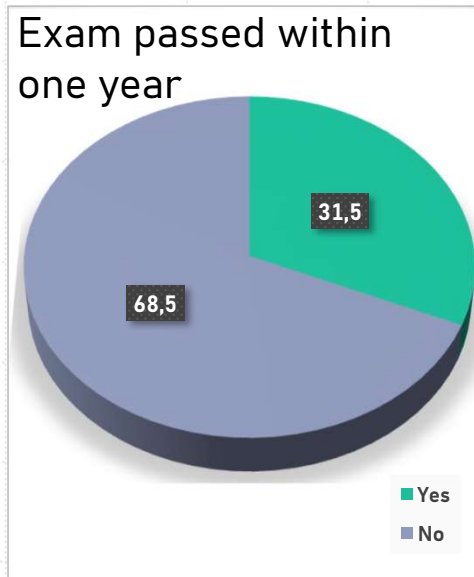
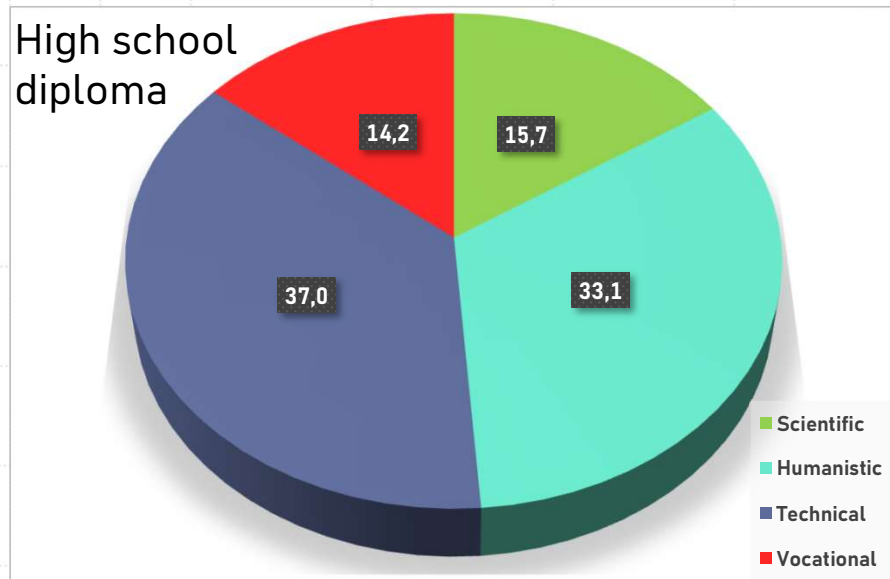
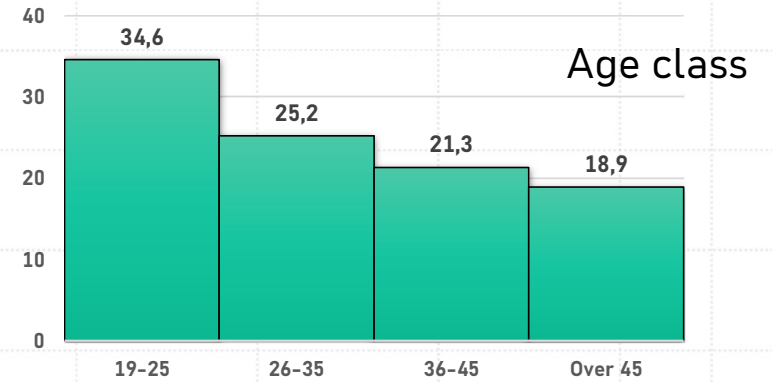
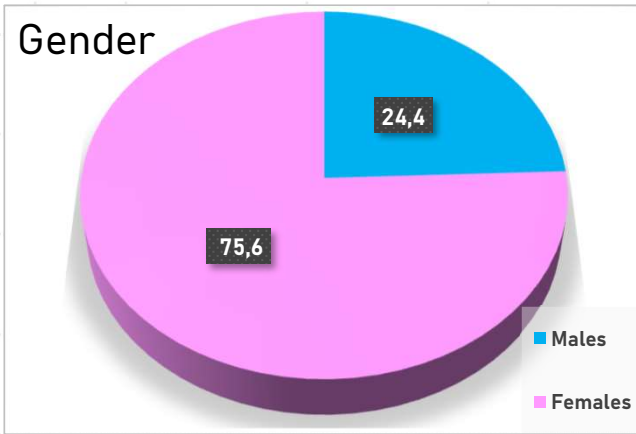
- View the teaching material
- Download the teaching material
- View recordings of live lectures
(Min: 0; Max: 1222; Mean: 211,4; Sd: 221,7)



A LOOK AT THE SAMPLE

percentage distributions

127 IUL students of the course 'General Psychology' a.a. 2020/2021



METHODOLOGY

Multiple logistic regression model

$$\log \left(\frac{\pi(X)}{1-\pi(X)} \right) = \sum_{i=1}^p \beta_i X_i$$

Where:

- p is the number of independent variables
- The vector $\beta = (\beta_0, \dots, \beta_p)$ is an unknown vector of $p + 1$ regression coefficients
- π is the probability of success $P(Y = 1|X)$ (passing the 'General Psychology' exam within one year)
- X is the vector of independent variables (gender, age, high school diploma, area of residence)

To facilitate result interpretation, odds ratios (OR) are provided in place of β coefficients. Essentially, an $OR > 1$ indicates a higher likelihood of the category being associated with a positive outcome; in this case, passing the General Psychology exam within the first year

ANALYSIS RESULTS

Logistic regression model (Odds Ratios estimates) for the probability of passing the General Psychology exam within the first year

Variable		Odds Ratio	Standard Error	P-Value
Gender				
	Females	0,729	0,423	0,586
Age class				
	26-35	1,301	0,784	0,663
	36-45	0,531	0,396	0,396
	Over 45	0,138	0,128	0,033
High school diploma				
	Humanistic	0,595	0,433	0,476
	Technical	0,209	0,167	0,050
	Vocational	1,002	0,893	0,997
Area of residence				
	Northeast	0,720	0,542	0,663
	Centre	2,426	1,601	0,179
	South	2,253	1,716	0,286
	Islands	0,982	1,449	0,990
Number of asynchronous activities (in classes)		1,707	0,299	0,002
Number of synchronous activities		2,219	0,456	0,001
Intercept		0,151	0,147	0,052

Baseline student: Male, from 19 to 25 years old, Scientific High school diploma, from Northwest Italy, 0 synchronous activities, 0 asynchronous activities

CONCLUSIONS



Enhanced Academic Success: Engaging students in both synchronous and asynchronous activities significantly boosts their academic success in online learning



Reduced Dropout Rates: Synchronous activities are crucial for reducing dropout rates and improving educational outcomes through real-time interaction



Adapted Educational Strategies: Tailoring educational strategies to the unique demands of online learning and demographic differences is essential for effectiveness



Strategic Integration of Interactive Elements: Educators should strategically integrate collaborative and interactive elements to create a dynamic learning environment

REFERENCES

- Piazza, R., & Rizzari, S. “Ripensare il nesso tra apprendimento all’università e apprendimento al lavoro per favorire l’occupazione giovanile. Una ricerca sulla formazione di mentori competenti nei percorsi di apprendistato”, *Education Sciences & Society*, 2, 2020, 296–323.
- Mori, S., Giunti, C., & Faggioli, M. “Promuovere la partecipazione attiva e le soft skills nei corsi e-learning: dalla teoria alla pratica”, *Studi sulla Formazione*, 22(2), 2019, 397–408.
- Sansone, N., & Ritella, G. “Formazione insegnanti” aumentata”: integrazione di metodologie e tecnologie al servizio di una didattica sociocostruttivista”, *Qwerty-Open and Interdisciplinary Journal of Technology, Culture and Education*, 15(1), 2020, 70–88.
- La Marca, A., & Cappuccio, G. “Qualità della didattica universitaria e sviluppo della capacità decisionale. Il modello ADVP per garantire i passaggi da L-19 a LM-85bis”, *Lifelong Lifewide Learning*, 16(35), 2020, 37–55.
- Dipace, A. & Tamborra, V. “Insegnare in università. Metodi e strumenti per una didattica efficace”, Franco Angeli, 2019.
- Mori, S., & Baldi, G. “L’apprendimento collaborativo nei percorsi universitari online: dalla conoscenza alla competenza nello sviluppo della professionalità”, *IUL Research*, 2(3), 2021, 86–115. <https://doi.org/10.57568/iulres.v2i3.127>
- Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. “Assessing Teaching presence in a Computer Conference Environment”, *Journal of asynchronous learning networks*, 5(2), 2001, 1–17.
- Kirschner, P. A., Kirschner, F., & Janssen, J. “The collaboration principle in multimedia learning”, In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning*, Cambridge University Press, 2014, 547–575.
- Cecchi, G., Nencioni, P., Giunti, C. & Mori, S. “The use of data for the educational success of students in online universities”, *Proceedings of the 2nd International Conference of the Journal Scuola Democratica “Reinventing Education”*, vol. 2, *Learning with New Technologies, Equality and Inclusion*, 2021, 291-305, ISBN: 978-88-944888-8-3.
- Garrison, D. R., Anderson, T., & Archer, W. “Critical Thinking, Cognitive Presence, and Computer Conferencing in Distance Education”, *American Journal of Distance Education*, 15(1), 2001, 7–23.
- Fiock, H. “Designing a community of inquiry in online courses”, *International Review of Research in Open and Distance Learning*, 21(1), 2020.
- Cecchi G., & Mori S., “Learning Analytics to Predict Students’ Social-Relational Skills in an Online University Course”, *Communications in Computer and Information Science*, vol. 1779. Springer, Cham., 2023. https://doi.org/10.1007/978-3-031-29800-4_7
- Cecchi, G., & Mori S. Risultati, in Cecchi, G. & Mori, S., “Monitoraggio e valutazione negli ambienti di apprendimento online. Prevenire il drop out degli studenti universitari”, IUL PRESS, Firenze, 2024, 101-148, ISBN: 47-76 979-12-81278-13-4.

THANK YOU FOR YOUR ATTENTION!

- Giorgio Cecchi
g.cecchi@iuline.it
- Sara Mori
s.mori@iuline.it



International Conference
The Future of Education
Edition 14