# Survival Analysis in Education: A Systematic Literature Review, Bibliometric Insights, and Methodological

Bor Breganta b c \*

aFaculty of Education, University of Primorska, Koper, Slovenia

borcid id 0009-0000-9331-5391

cFaculty of Mechanical Engineering, University of Ljubljana, Ljubljana, Slovenia

dorcid id 0000-0002-6942-6937

\*corresponding author

Corresponding author:

Bor Bregant

Faculty of Mechanical Engineering, University of Ljubljana, Ljubljana, Slovenia

Aškerčeva cesta 6 , Ljubljana, Slovenia

Bor.Bregant@fs.uni-lj.si

Personal phone: +38651362749

## Ethical considerations

Not applicable

## Consent to participate

Not applicable

## Declaration of Competing Interest

The authors have no competing interests to declare.

## Funding

This work was supported by the Research and Innovation Agency grant J1-4031.

## Acknowledgments

The authors have no acknowledgments to declare.

## Data availability statement

All data and statistical code used in this study are publicly available at https://github.com/borbregant/Doktorat\_all/tree/main/clanek\_SLR\_survival\_analysis/data

## Abstract

Background:

Dropout and student retention are critical issues in education, with significant individual and societal implications. Survival analysis provides a powerful statistical framework for examining time-to-event phenomena such as student attrition, yet its application in educational research has not been systematically reviewed.

This study conducts a bibliometric and methodological review of the use of survival analysis in educational contexts, with a focus on identifying prevailing methods, their implementation success rates, and research trends across countries and institutions.

Methods:

We conducted a systematic literature search in the Web of Science database using keywords related to survival analysis and education. In total, 297 peer-reviewed journal articles published between 1991 and 2025 were analyzed. Abstracts were processed using Python to identify mentions of survival methods (e.g., Cox regression, Kaplan-Meier, competing risks) and indicators of model performance (e.g., fit, significance, validation). A bibliometric analysis was also performed to examine publication trends, collaboration networks, and geographical distribution.

Results:

The most frequently used methods were event history analysis (n=51), Cox proportional hazards models (n=36), and Kaplan-Meier estimators (n=27). Success in application, as indicated by mentions of model performance or validation, varied by method. Kaplan-Meier methods exhibited the highest success ratio (59%), while newer techniques like multilevel and dyadic survival models were underutilized. The majority of studies originated from North America and Western Europe, while representation from developing regions remains limited. Collaboration networks revealed strong ties among researchers in the United States, United Kingdom, and Australia.

Conclusion:

Survival analysis is increasingly used in educational research, particularly for modeling dropout and retention. However, the field relies heavily on conventional methods, with limited adoption of advanced techniques. Future research should prioritize innovation in methodology and broader global inclusion.

## Keywords

Survival Analysis, Education Research, Dropout Prediction, Student Retention, Time-to-Event Analysis, Systematic Literature Review, Bibliometric Analysis, Methodological Comparison

## Biography

Bor Bregant is an assistant professor of mathematics at the Faculty of Mechanical Engineering, University of Ljubljana. He is also pursuing a PhD at the Faculty of Education, University of Primorska.