Exploring higher-order thinking in a MOOC: Automatic identification and the impact on attrition

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Public summary

Massive open online courses have emerged as one of the most potential tools in enabling access for people all over the world to education. However, MOOCs are often criticized, especially in terms of the low-quality learning experience and the high dropout rate. This is possibly because of the lack of information regarding learners’ progress.

As online discussions contain a lot of information about learners’ thoughts, analysing learners’ posts can provide a better understanding of how they think, learn, and predict their performance in the MOOC. The emergence of text mining and machine learning technologies makes this analysis possible, regardless of the massive number of learners and posts generated.

This study aims to explore higher-order thinking processes in MOOCs. First, a supervised text classification model was designed, trained, and validated to automatically identify learners’ higher-order thinking processes from the discussion posts. Following this, a survival analysis was performed to investigate the impact of learners’ higher-order thinking processes towards retention in MOOCs.

The results show that the supervised text classification model can classify learners’ comments from an online discussion into three levels of thinking with 62% accuracy and Cohen’s kappa of 0.58; whereas lower-order thinking and higher-order thinking can be distinguished with 90% accuracy and 0.76 Cohen’s kappa. We also found that learners’ who did not engage in higher-order cognitive efforts through their participation in the online discussion were 75.68% more likely to drop out from the course compared to those who did.