Understanding Computational Thinking Assessment through Text Mining

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Abstract

With the ever-increasing need for teaching computational thinking (CT) to learners of the digital age, teacher educators need to better guide teachers to embed CT activities across subjects and contexts while discovering the positive effects of computer programming in K-12 education. However, computational thinking assessment (CTA) have yet to be fully understood in the literature. To address this challenge, this paper used text mining with the aim of reviewing CTA in the literature for both pre-service and in-service educators. By analyzing 267 papers, we identified 14 clusters of CTA topics by exploring the application of computational techniques including rudimentary vector space models and unsupervised machine learning algorithms. We also performed a network analysis for further interpretation of our unsupervised machine learning results. This visualization of the network allows us to select main themes and perform an exploratory factor analysis. Implications for educational design and future research are discussed.