

Introduction to the Special Issue on EDM in Computer Science Education (CSEDM)

INTRODUCTION

Educational Data Mining in Computer Science Education (CSEDM) is an interdisciplinary research community that combines discipline-based computing education research (CER) with educational data-mining (EDM) to advance knowledge in ways that go beyond what either research community could do on its own. The CSEDM community grew out of an ongoing series of seven CSEDM workshops, which have been held at the International Conference on Educational Data Mining (EDM), the International Conference on AI in Education (AIED), and the International Learning Analytics and Knowledge Conference.

These workshops have led to high quality, peer-reviewed proceedings (Price et al., 2020; Akram et al., 2021; Akram et al., 2022), which inspired this special issue in the Journal of Educational Data Mining. These proceedings include new approaches to analyzing data from computer science (CS) classrooms, new intelligent tools for enhancing learning in CS, and studies that use data to inform our understanding of how students learn CS – all of which appear in this special issue as well. The community has also created the First and Second CSEDM Data Challenges¹, which brought CSEDM researchers together to develop new modeling techniques to predict students' learning outcomes in computer science classrooms, based on their submissions to and performance on past programming problems. This special issue presents the approach behind one winning entry to the 2nd CSEDM Data Challenge. For more information on the CSEDM research community, and to learn about future workshops, join the CSEDM Google Group².

The JEDM Special Issue on CSEDM received a total of 12 submissions. Each submission was reviewed by at least three reviewers, who brought expertise from both the EDM and CER communities, as well as one of special issue editors. Ultimately, three papers were accepted, for an acceptance rate of 25%.

These three papers cover a variety of important topics in CSEDM research. Edwards et al. discuss the challenges of collecting, sharing and analyzing programming data, and contribute two high-quality CS datasets. Gitinabard et al. contribute new approaches for analyzing data from pairs of students working on programs together, and show how such data can inform classroom instruction. Finally, Zhang et al. contribute a novel model for predicting students' programming performance based on their past performance. Together, these papers showcase the complexities of data, analytics and modeling in the domain of CS, and contribute to our understanding of how students learn in CS classrooms. We hope you enjoy the special issue.

¹ <https://bit.ly/csedm-dc>

² <https://groups.google.com/g/csedm>

Thomas W. Price (Special Issue Editor), North Carolina State University, USA
Sharon Hsiao (Special Issue Editor), Santa Clara University, USA
Bita Akram (Special Issue Associate Editor), North Carolina State University, USA
Peter Brusilovsky (Special Issue Associate Editor), University of Pittsburgh, USA
Juho Leinonen (Special Issue Associate Editor), The University of Auckland, NEW ZEALAND

REFERENCES

- PRICE, T. W., BRUSILOVSKY, P., HSIAO, S. I. H., KOEDINGER, K. R., AND SHI, Y. 2020. Proceedings of the 4th Workshop on Educational Data Mining in Computer Science Education held at the 13th International Conference on Educational Data Mining. CEUR. <https://ceur-ws.org/Vol-2734/>.
- AKRAM, B., PRICE, T. W., SHI, Y., BRUSILOVSKY, P., AND HSIAO, S. I. H. 2021. Proceedings of the 5th Workshop on Educational Data Mining in Computer Science Education held at the 14th International Conference on Educational Data Mining. CEUR. <https://ceur-ws.org/Vol-3051/>.
- AKRAM, B., PRICE, T. W., SHI, Y., BRUSILOVSKY, P., AND HSIAO, S. I. H. 2022. Proceedings of the 6th Workshop on Educational Data Mining in Computer Science Education held at the 15th International Conference on Educational Data Mining. Zenodo. <https://zenodo.org/communities/csedm22/>.