

Multi-scale backward design for data science education

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Abstract

We propose to write a manuscript describing uses of backward design in data science education. As scholarly interest in data science grows at universities and colleges, more institutions are facing the need to create data science curricula for their undergraduate students. Wiggins and McTighe (2005) describe backward design principles and their application to teaching. We envision data science curricula, individual classes, and class activities built from backward design ideas. A central idea in backward design is the identification of specific learning objectives for the curriculum, course, or course activity. For each detailed objective, the instructor lists evidence that would indicate that students had achieved the objective. These become summative and formative assessments. The course designer then develops materials to guide students toward the objectives. Regular, informal feedback from students via formative assessments inform the instructor about student progress, while summative assessments measure achievement. We illustrate these backward design principles with examples from our teaching of courses in statistics and data science and our experiences in undergraduate curriculum design.

References

Wiggins, Grant, and Jay McTighe. 2005. *Understanding by Design*.