

Marrying Asset- and Deficit-Based Approaches: A Data Feminist Perspective in Learning Analytics

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Abstract

This workshop explores how learning analytics can reconcile deficit- and asset-based approaches. Deficit-based models focus on identifying and remedying learner shortcomings in order to move them towards a specific learning standard. However, this approach may neglect learners' existing strengths. An asset-based approach may support this, where learners' identities, values, and existing knowledge are considered as assets to their learning. In this workshop, we advocate for a combination of both. We ground our discussion in the data feminism framework, which examines power structures in data design and interpretation. We will delve into three core data feminism principles: examine power, challenge power, and rethink binaries and hierarchies, to construct narratives affirming students' diverse identities.

Keywords ¹

Asset-based approach, data feminism, data narratives, identity.

1. Introduction

This workshop serves to bring together experts across learning analytics to think about what it means to marry deficit- and asset-based approaches. By *deficit-based* approaches, we mean approaches that emphasize what learners do not know, and how their performance does not meet academic standards [1, 2]. We are not referring to a cultural deficit perspective which posits that students from certain groups cannot achieve due to their cultural background [3]. This deficit perspective ignores the larger systemic inequity and should not be the aim of learning analytics. Deficit-based models, as we define them, identify problems that might be remediated by intervention. This “find and fix” approach is foundational to learning analytics as it can identify pathways to student achievement or desired knowledge and skills.

We argue that deficit-based approaches are incomplete and constrain data interpretation thus limiting the benefits that learning analytics may have. Deficit framing limits design features to reactive “filling gaps” and “fixing” students who have been (mis)categorized as “lacking,” “low” knowledge or skill, “underprepared,” “unmotivated,” or otherwise broken. Consequently, positive, and meaningful student strengths, cultural sources of knowledge, and schemas—their *assets*—are not adequately recognized or leveraged. Furthermore, this approach implicitly communicates that certain assets do not matter. Thus *asset-based* approaches focus on the knowledge and capabilities that learners already have, whether such strengths stem from formal educational experiences, community and cultural experiences, or family and personal life [4, 5, 6]. In this workshop we argue for a combination of the two, with emphasis on recognizing students' assets, without abandoning the “find and fix” solutions that have been previously successful.

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Our work is informed by the data feminism framework, which takes an intersectional approach to defining the power structures involved in designing, collecting, and interpreting data [7]. Data feminism is built on the idea that data is not neutral, and encodes elements of our identity and cultural experiences, and power within society. Particularly relevant for our context, this framework highlights the ways data can be used to construct narratives that challenge both power structures and our understanding of people. Thus we see data feminism as being an appropriate theoretical frame for constructing asset- and deficit-based narratives that ultimately lead to actionable outcomes that better benefit students and recognize identity and cultural background as assets to their learning. In our workshop, we will focus on three of the seven core tenets of data feminism, described below:

Examine Power. Power refers to structural privileges or oppressions different groups experience [8]. For example, in STEM education, women, girls, and non-binary learners are often marginalized due to oppressive narratives about their ability to persist in STEM fields, as well as lack of identity-affirming spaces [9]. This marginalization is a product of patriarchy. The first principle of data feminism is that we must examine how power operates in our world. For learning analytics, this means we examine how power exists in learning spaces, to produce different experiences and outcomes based on identity. Additionally, this means we must examine how power informs our collection, analysis, and communication of data.

Challenge Power. Asset- and deficit-based data narratives can challenge unequal power structures by communicating understandings of data that are grounded in the lived experiences of learners. In learning analytics, this means we can use data to showcase the ways learner identities are marginalized in the learning space, and their social reality. For example, the work of Stewart et al. [10] uses multimodal behavioral metrics to find that girls' in a computing camp did not verbally engage in large conversations with the instructors – a deficit narrative that focuses on what the girls' did not do compared to dominant standards. However, this was married with the asset-based perspective that girls' did engage in conversations with each other in small group, student-centered activities. These analytics can challenge the traditional classroom power structures that center teachers, and support student-led learning activities.

Rethink Binaries and Hierarchies. Binaries and hierarchies are necessary to collecting and analyzing data. This is because data will always simplify the complexity of each learners' lived experience and the learning environment. However, as we construct asset-based narratives of learners, we must consider the ways in which binaries and hierarchies inadequately characterize a learners' knowledge and experiences. Further, we can reconsider how binaries and hierarchies uphold systems of oppression, for example by aligning with dominant views of how learners are expected to behave in a learning environment. For example, categorizing “good” engagement as speaking out loud in class ignores the ways learners might be processing information non-verbally [10]. By using a data feminism framework, we consider how to marry asset- and deficit-based perspectives..

2. Workshop Speakers

Dr. Angela Stewart is an Assistant Professor in the University of Pittsburgh School of Computing and Information and Research Scientist at the Learning Research and Development Center. Angela conducts research at the intersection of the learning sciences, artificial intelligence, and human-computer interaction. She uses multimodal data to understand students' social and cognitive states, particularly in collaborative STEM learning. She also creates equitable educational spaces by designing technologies that support the agency of students and teachers. Angela applies a culturally-responsive lens to her research, with a particular focus in emboldening Black girls' design of transformative technologies. Angela was named a 2021 - 2022 Emerging Scholar by the International Society of the Learning Sciences, and recently received an NSF Racial Equity in STEM Award for creating an intersectional AI learning ecosystem for Black girls.

Dr. Caitlin Mills joined the Educational Psychology Department at the University of Minnesota as an Assistant Professor in 2022, after spending four years in the Psychology Department at the University of New Hampshire. She received her Ph.D. from the University of Notre Dame in Cognitive Psychology (2016), then spent two years as a postdoctoral fellow at the University of British Columbia (2016-2018) focusing on Cognitive Neuroscience. She is interested in the intersection of cognitive psychology, computer science, and education. Most of her work has focused on mind wandering and engagement- including their relationship to affect, creativity, and learning.

Dr. Stephen Hutt is an Assistant Professor of Computer Science at the University of Denver. His research activities focus at the intersection of Computer Science, Cognitive Science and Learning Science, considering how Artificial Intelligence can be used to support learning and learning technologies. He takes a human-centered computing approach to his work, placing the needs of users as the focal point for research. He is also interested in how AI and learning technology may serve as a force for equity within education and ways in which AI advances may help (or hinder) that goal.

Dr. Alyssa Wise, PhD is Professor of Technology and Education and Director of LIVE, Vanderbilt's Learning Innovation Incubator. Her research focuses on supporting data-informed decision-making in-situ, with attention to actionability, equity and impact, including mixed-method investigations of how learning practices are being reshaped by new sources of data and the growing availability of new artificial intelligence capabilities.

Fanjie Li is a Ph.D. student at Vanderbilt's Peabody College and a doctoral researcher with the LIVE Initiative. With a focus on the socio-technical design of learning analytics (eco)systems, her research draws on human-centered design to explore approaches to LA innovation that are not only informed by technical possibilities but also attuned to the human contexts the tool intends to serve and the humanistic aspects of learning.

Dr. Ryan Baker is a Professor in the Graduate School of Education at the University of Pennsylvania. Dr. Baker researches how students use and learn from educational games, intelligent tutors, and other educational software. Drawing on the fields of learning analytics and learning engineering, he develops methods for mining the data that come out of the interactions between students and educational software. He then uses this information to improve our understanding of how students respond to educational software, and how these responses influence their learning. Prior to joining Penn GSE, Dr. Baker was an associate professor in the Department of Human Development at Teachers College, Columbia University. He has been teaching the "Big Data and Education" MOOC for over a decade, with a total enrollment of more than 100,000 students. He has served as founding president of the International Educational Data Mining Society, where he currently serves on the board of directors. He has been co-author on over a dozen award-winning papers and received the Educational Research Award from the Council of Scientific Society Presidents.

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