Reshaping Ability Grouping Through Big Data
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Ability grouping affects millions of students in the country daily. It shapes aspects of schooling that are crucially important for students: the curriculum they study, the resources they receive, the teachers who educate them, and the peers with whom they interact. Critics of ability grouping insist that ability grouping reinforces educational inequalities, directing students from racial and ethnic minorities or from poor families to lower tracks in which they receive inferior schooling. In light of the biases that persistently plague traditional ability grouping, the recent introduction of big data technologies in schools, and their utilization for ability grouping (Data Driven Ability Grouping: DDAG) offers significant promise. It can potentially remove prejudice from educational decisions, offsetting implicit biases that teachers may unknowingly hold. This Article examines the promises and challenges that DDAG holds in terms of equality in educational opportunity, and the ways in which law can intervene in order to ensure equal opportunity.

EVAAS (Education Value-Added Assessment System) is a data based system that uses algorithms for predicting students achievements and assigning them into different tracks in eighth grade mathematics. In a recent study, teachers using EVAAS reported that the algorithm assigned students to a high track that would otherwise not have been identified as suitable, and increased shares of children from racial minorities and low socioeconomic status in the program. Despite these encouraging findings, DDAG may also create unique challenges in terms of educational equality. Studies concerning predictive analytics in other domains (e.g. crime prevention) suggest that instead of eliminating biases, algorithms recreate them, because the biases are embedded in the historical datasets the algorithms use for training. Additionally, students from privileged backgrounds have better access to digital devises outside school, and are more digitally literate, and are therefore likely to have a better digital profile than their disadvantaged peers. Finally, DDAG may create new classes of children who are systematically unfairly disadvantaged.

The fact that DDAG is believed to be scientific makes biases in it especially severe because it may be used justify inequality, and because it is almost impossible to challenge. In the educational context, this is especially troubling because in addition to assessing students' abilities, the algorithmic predictions also constitute her ability by affecting the quality of instruction she receives, the content of education, the level of peer effect, teachers' expectations of her and her own self-expectations.

After discussing the promises and challenges of DDAG, the Article argues that existing equal protection doctrines – intentional discrimination, disparate impact and rational basis test – cannot address the challenges of data driven ability grouping. Instead, the solution lies in integrating technological solutions and legal regulation, both of which must be performed when designing the algorithms.

The nature of algorithms, that enables designers to control the attributes taken into consideration, their weight, and the result (e.g. how many members of a certain category are accepted into the course) suggests that the involvement of legal and normative considerations at the stage of design can be effective in improving the outcomes in terms of equality. In traditional assignment

decisions performed by humans it is almost impossible to impose rules concerning which data to use (and which to disregard) and to assign specific weight to each piece of information, and biases are unavoidable. Thoughtful design of algorithms may be able to overcome these.

Information scientists have begun seeking technological solutions to algorithmic discrimination. These include removing suspect attributes (such as race or gender) from the datasets and manipulating historical datasets by removing biased decisions. Additionally, algorithms may be able to completely reshape grouping by replacing the traditional criterion of academic performance with other attributes that we were previously unable to ascertain, such as different learning styles. Grouping according to these attributes may achieve effective teaching without creating racial and class segregation.

The technological solutions, however, involve numerous normative decisions, that cannot be divorced from legal doctrine. Law determines which classes are protected; whether unequal outcomes constitute an actionable wrongdoing; and whether affirmative action is permissible. These normative decisions must inform the efforts of algorithmic design. The Article therefore offers a practicable framework for the integration of legal and technological solutions for ability grouping in the information era.