



## Research Paper

# Using a flipped classroom and the perspective of families to teach medical students about children with disabilities and special education



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## ABSTRACT

**Background:** The need to teach medical students to care for children with disabilities, work effectively with these patients' families, and collaborate with schools has been well established. Yet, what is not clear is the exact nature of the content to be taught and how medical schools develop the systems and enabling structures required to ensure medical education responds to the needs of children with disabilities and their families.

**Objective:** The aim of this study was to develop and assess the efficacy of an educational intervention designed to introduce the topics of special education law and practices and working with parents of children with disabilities into an undergraduate medical education pediatrics course.

**Methods:** A new curricular element based upon the flipped classroom that included an on-line module followed by participation in a panel discussion comprised of parents of children with disabilities, and concluding with an on-line discussion was implemented. Medical students completed a pre- and post-assessment that evaluated their knowledge of special education law and practices.

**Results:** Students demonstrated increased understanding of special education laws and practices. Qualitative findings showed that students recognized the importance and value of learning the content to support their patients and their patients' families.

**Conclusions:** Based upon study findings, the flipped classroom method improved student knowledge of the topic and students reported they valued the content. This addition to the undergraduate medical curriculum provided students with an effective introductory overview and demonstrated one viable option for incorporating necessary topics into the undergraduate medical curriculum.

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The knowledge of physicians regarding special education laws and services has significant impacts not just on the medical decisions made,<sup>1</sup> but also on the kinds of information that physicians provide to families of children with disabilities,<sup>2</sup> doctor willingness to collaborate with families and schools,<sup>3</sup> parent satisfaction,<sup>4</sup> and the overall quality of care physicians provide.<sup>5</sup> Recognizing the importance of doctor knowledge related to the this topic, the

American Academy of Pediatrics' Council for Children with Disabilities and the Council on School Health (AAP) recommended that physicians understand the basic elements of special education law in order to support children with disabilities and their families through critical stages from the initial referral through the transition into adulthood.<sup>6</sup>

However, there is empirical evidence that the training for physicians in the area of special education is limited,<sup>7</sup> occurs during residency not medical school,<sup>2,8–10</sup> and is dependent upon mentor contributions.<sup>2</sup> Furthermore, physicians acknowledged the need for training in the area of special education law and working with children with disabilities and their families,<sup>11</sup> recommended

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modifying their educational experience to better equip them to care for patients with disabilities through experiential, not theoretical, learning<sup>12</sup> and advised expanding disability-specific education for medical students.<sup>13</sup>

The need to teach medical students to care for children with disabilities, work effectively with these patients' families, and collaborate with schools has been well established with the medical community.<sup>11,12,14–18</sup> Yet, what is not clear is the exact nature of the content to be taught<sup>10</sup> and how medical schools develop the systems and enable the structures required to ensure medical education responds to the needs of children with disabilities and their families in sustainable ways.<sup>19</sup>

When considering the addition of new content that addresses the need to teach medical students to care for children with disabilities, researchers recommend that medical educators work with patients, their families, and collaborate with service providers.<sup>17,19</sup> Incorporating quality improvement (QI) principles into the medical curriculum redesign can provide a framework to guide the process. Boonyasai et al.<sup>20</sup> defined QI theory as a “set of principles that involve knowledge, skills and methods used to evaluate and implement change in a health care system” (p. 1024). Several studies have used these principles to evaluate existing components of the undergraduate and graduate medical curricula, and researchers recommend that the principles be utilized when implementing any new curricular content.<sup>20–22</sup> Researchers have also stressed the importance of ensuring that any additions to the medical curriculum be supported by evidence of effectiveness, “educators must critically evaluate the content of what is taught, how it is taught and the resulting outcomes” (22 p. 1677). The findings of these studies showed that several educational practices resulted in improved outcomes for students.<sup>20–22</sup> Orginc et al.<sup>22</sup> recommended that medical education students be introduced to information through both didactic and experiential learning opportunities. Boonyasai et al.<sup>20</sup> recommended that educational interventions highlight interdisciplinary collaboration and include the point of view of the patient. The flipped classroom, whereby traditional lectures are replaced by self-directed learning activities and quizzes assigned as on-line and out of class work, enable meetings to be utilized for guest speakers, hands on activities, and additional discussions, has been utilized with positive results in the undergraduate science curriculum,<sup>23</sup> the nursing curriculum<sup>24</sup> and the surgery clerkship.<sup>25</sup>

The aim of this study was to develop and assess the efficacy of an educational intervention designed to introduce the topics of special education law and practices and working with parents of children with disabilities into an undergraduate medical education pediatrics course. The following research questions were formulated to drive the study. What do medical students know about special education law and practices? What bearing do an on-line presentation, parent presentation, and an on-line group discussion have on knowledge of special education laws and practices and working with families of children with disabilities? How does the curricular addition impact students' perception of the physician's role in supporting children with disabilities and their families?

## Method

### Participants

The sample utilized for this study consisted of 2nd year medical students enrolled in the course entitled Pediatric Medicine at a school of osteopathic medicine in the North East United States. There were 160 students enrolled in the course. All of the students had the opportunity to participate in the intervention. The number of students who completed the pre-assessment was 112 and the

number of students who completed the post-assessment was 118. The number of students who provided identifying information (a four digit number) for both the pre- and post-assessment for matching purposes was 91. Table 1 presents information on the pre- and post-participants (N = 112 and 118 respectively). Demographic information was collected to establish the diversity of the sample and to determine if any group had more prior knowledge than any other group. Although students were asked to complete the assessments during course time, participation was optional and anonymous. The authors received IRB approval to conduct this study.

### Intervention

On the first day of the pediatrics course in spring of 2016, students were asked to complete the pre-assessment. The assessment was posted on-line (on the Qualtrics platform) and took the students less than 45 min to complete. For pre- and post-test comparison purposes, students were asked to provide a four digit number as an identifier. The survey was made available in English only. Next, as an assignment, the course instructor (3rd author) required students to view, via the Blackboard on-line classroom platform, a PowerPoint slide show that focused on the special education law the Individuals with Disabilities Education Act (IDEA), policies, and procedures, as well as the role of the physician in terms of diagnosis, referral, and on-going support. There were 20 slides in presentation and each contained an audio component explaining the concept presented. Students could control the pace of the presentation in addition to moving backward and forward in the sequence of slides. Students were also provided with examples of Individual Education Programs (IEPs) and 504 plans, a comparison chart of these two documents, and written guide to Early Intervention (EI).

During the second class meeting one week later, five mothers of children with disabilities presented, as a panel, to the class in a discussion facilitated by one of the authors (2nd author). The children of the five parents were identified as having Down syndrome (2 parent panelists), autism spectrum disorder, multiple disabilities, and being twice exceptional (having a learning disability and being gifted). Parents described their experiences working with medical and school personnel to support their children. Medical students had the opportunity to ask questions throughout the panel discussion. As a follow-up assignment, students were required to participate in an on-line discussion with their classmates on Blackboard. The discussion focused on three writing prompts.

When all of this work was complete, students were asked to take the assessment a second time in order to determine changes in

**Table 1**  
Participant characteristics for pre- and post-tests and mean correct for pre-test.

Characteristics	Pre-test			Post-test	
	N	%	Mean Correct	N	%
<b>Gender</b>					
Female	57	50.9	2.46	65	55.1
Male	55	49.1	2.04	53	44.9
Total	112	100	2.25	118	100
<b>Racial/ethnic group</b>					
Caucasian	42	37.5	2.38	49	41.5
Asian or Pacific Islander	41	36.6	2.29	41	34.7
Hispanic/Latino	10	8.90	1.90	8	6.80
African American	7	6.30	2.57	8	2.86
Mixed Race	1	0.90	2.00	0	3.00
Prefer not to respond	11	9.80	1.73	12	3.30
Total	112	100	2.25	118	100

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