

Exploration of Teachers' Opinions and Feelings about the Lead Learner Instructional Model Implementation

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Abstract: This research details the thoughts and opinions of five teachers participating in the CODE.org Computer Science Discoveries (CSD) program (CODE's introductory CS course for 6 - 10th-grade students) and CSD's use of the pedagogical model "Lead Learner." Lead Learner is an instructional model that shifts the instructor's position from the traditional role of "content expert" and primary source of knowledge for students to that of a collaborative source of discovery. This research focuses on teachers opinions about this shift in instructional practice, particularly how it changes their opinion of 'their role as teacher.' The study is divided into two parts (Observations of monthly professional development and Teacher interviews); and presents two areas that details teachers comfortable with Lead Learner.

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Purposes

This research examined teachers' feelings and experiences with the CODE.ORG collaborative instructional model, Lead Learner. Additionally, this study sought to explore how CODE.org program leads could better introduce teachers to collaborative learning and instruction practices.

Perspective

The field of implementation science has exploded in recent years, partly due to the pressing need to understand whether programs work and, most importantly, how they become successful. The attention to the mechanisms that drive complex systems changes, such as those occurring in K-12 educational organizations, can help enormously from frameworks and practices that conceptualize the factors influencing implementation. Indeed, program implementation involves planning, monitoring progress, making adjustments, and evaluating the impact. For teachers that work in complex systems like those we recognize in the field of education, this process requires work and focus is in and out of classrooms (Benckendorff et al., 2009; Holmlund et al., 2018).

Core Concepts

CODE.ORG's The Lead Learner Model as Collaborative Instruction

Although notions of pedagogy, teacher learning, and program implementation span many spectrums, this research focuses on a collaborative pedagogical teaching practice named the Lead Learner Model. Lead Learner is a pedagogical model used by groups like CODE.org to intentionally shift the instructor's position from what some consider the traditional role of "content expert" and primary source of knowledge for students to that of a collaborative source of discovery. Moreover, to reinforce this pedagogical practice, CODE.org, the curriculum designer of the study, uses the mantra, "I may not know the answer, but I know that together we can figure it out (Code.org, 2021)."

Collaborative learning; as a concept

Smith & MacGregor (1992) define collaborative learning as an umbrella term for various educational approaches involving a collaborative intellectual effort by students and teachers. Typically structured, students work in groups of two or more, communally searching for understanding, solutions, or meanings or creating a product. Collaborative learning activities vary widely but mostly center on students' exploration or application of the course material, not simply the teacher's presentation or explication of it (p. 1). The core structure of collaborative learning is a structure that determines all forms of collaborative learning, ranging from the simplest to the most complex forms. Eisenfeld (2019), regards this core as consisting of three elements (A) Individual work, B) Cooperation, and C) Presentation of results.

The Study

Overview

The following research examines Computer Science Discoveries (CSD) teachers' opinions, values, and ideas about the Lead Learner Model. The study was conducted in Milwaukee Public Schools (MPS), which we regard as in the early stages of connecting all their computer science

(CS) programming and work into a traditional K-12 Educational Pathway¹. The research is part of a more extensive research project that seeks to understand and document the growing pains of a K-12 CS pathway. The study was divided into two parts, PLC Observations and Teacher interviews.

Methods

Research Site

The study was conducted in Milwaukee, Wisconsin, in the mid-western region of the United States. MPS is the largest school district in Wisconsin. MPS serves a student population of 77,746, with 88% of that population being minoritized students.

Participants

The research consists of five teachers participating in Computer Science Discoveries (CSD) programming in Milwaukee Public Schools.

INSERT TABLE 1

Data Collection

The authors conducted video interviews with five teachers. The lead author analyzed interview data using inductive coding methods (Miles & Huberman, 1994; Saldana, 2009). We analyzed data that identified emerging patterns and themes. This exploration yielded three primary focus areas that informed the rest of the data analysis approach—much of the data was derived from recent interviews and five years of data collected from a previous study. Additional data was collected from short email conversations and clarification phone calls.

Findings

This research is part of a more extensive examination of MPS' desire to create a K-12 CS pathway. The work is an outgrowth of an earlier study focused on program implementation. A key finding from prior research is that there appeared to be a disconnect between information teachers felt they needed and was missing and the program's Lead Learner logic mode. This realization was at the core of why we undertook this research.

Finding 1: PLC Observations

The first part of the research focuses on observations of teacher CS conversations and training that were connected to their education and ongoing understanding of the Lead Learner Model. Topics covered ranged from CS accessibility for students with disability, Artificial Intelligence (AI), students' struggles with coding, managing classrooms, and organization, et cetera. The conversation between teachers and the district lead was steeped in equity and how classrooms can become more equitable places for students to enter CS pathways.

Takeaways from PLC Observations

- Teachers wanted to know more basic computer science knowledge. The districts responded to this desire by creating an implementation guide. Additionally, PLCs

¹ Educational Pathway, series of increasingly sophisticated and demanding educational challenges that support the development of academic and technical skills (Feinstein & Peck, 2008, p. 1).

address this issue head-on by providing teachers with cogent information tailored to emphasize student-teacher learning partnerships.

- **Community:** one of the concerns raised in the literature and by teachers in earlier studies was the possibility of being isolated in their school because often, CS teachers are the only teacher in the building. The PLCs focused on creating a supportive community that shares pedagogical practices and tips for improving CS education. Additionally, the PLCs serve as a place teachers describe as giving them moral support as they navigate CS instruction. Teachers expressed frustration with not being in person and not having more people participate.
- Finally, we found that teachers liked how the PLC lead used their meeting time to demonstrate new lessons, subjects, and ideas, which was a desire of teachers who participated in the earlier studies.

Finding 2: Teacher Voice (Interviews)

The second part of the research yielded three overarching areas of focus and improvement that the teachers felt best could improve teachers comfortably with the Lead Learner's model theory of change;

Area One: Teaching Practice Evolution

We find this idea of learning how to be collaborative one of the most significant issues the trainers can address to get teachers more comfortable with the model. Three of the five teachers interviewed were what we considered veteran teachers (minimum of ten years of experience in the classroom) (Akin, 2021). When asked about how they had come to incorporate collaborative pedagogical practices within their classrooms, these teachers spoke about "*having to learn it over the years of teaching because when I entered the profession, students learned differently.*" This insight into how teacher training and preparation change over the years raises a concern that many teachers might be interpreting Code.org's Lead Learner theory of change differently. Younger professionals interviewed spoke about their training (in undergrad and graduate school) that focused on active learning and involving students in the learning process. They were more discouraged from enacting the traditional system (i.e., Banking Models of Learning²) of teachers standing before the classroom lecturing.

When veteran teachers were asked about their early career encounters with collaborative social and pedagogical practices, teachers described "*having to become comfortable collaborating with students.*" Moreover, they didn't learn the tradition of collaborating with students in teacher prep programs (outside of reading instruction). This required them to learn an entirely new form of teaching as they progressed through their career.

Area Two: Student Leadership

Teachers liked the PLC's emphasis on peer-to-peer teacher lessons and curriculum design modeling. However, some teachers desire to see how students lead lessons or peer-to-peer

² Model of education in which teachers "deposit" information and skills into students. The emphasis is on memorization of basic facts rather than on understanding and critical thinking.

instruction. In other words, teachers want to see how students work with other students and how they can better facilitate and encourage this practice. In schools with two or more CS teachers, there appears to be a strong culture of student-to-student instruction.

Area Three: The Teacher's Identity was Student-Centered

The teachers were highly focused on students when speaking about the principles of the lead learner model. Their desire to engage the model's principles of collaboration are driven by their desire to help build students' skill sets (professionally or socially). Teachers also express their teacher identity as student-centered and focused on students having fun but also learning a professional skill that they can use in the future; for example, *"my goal is to kind of like not only to prepare them for the workforce but kind of like give them the skills that they're lacking..."* (Pat, winter 2023). Additionally, teachers felt they had to get comfortable with the idea of not knowing; this is a role shift in the positionity of teachers. Jess is speaking about her disposition when she doesn't know something.

Implications for the field

The following section highlights areas of improvement and implications identified by teachers becoming more comfortable with the Lead Learner Model or Student/ Teacher Collaborative instructional and learning models.

1. Connect Collaborative Instruction and the Lead Learner Model

Teachers were confused about the definition of the Lead Learner Model, particularly its connection to collaborative instruction. Teachers believe CS trainers and facilitators must improve how they present the concept of lead learner. According to the teachers, they need to connect the two explicitly. When asked if they knew what the Lead Learner Model was, all participants failed to define or make the connection that it was a part of CODE.org theory of change.

2. Teaching Training in Collaborative Instruction

Along with making explicit connections between Collaborative Instruction and the Lead Learner Model, veteran teachers reported not learning skills, strategies, and practices of student-teacher collaborative learning outside of reading subjects in their teacher preparation programs. The teacher described *"becoming comfortable collaborating with students,"* which they reported occurred over years of practice and training. CODE.org's Lead Learner Model assumes that teachers are familiar, trained, and comfortable shifting their professional practice to collaboration. Although this assumption isn't stated on their website or literature, we believe the Lead Learner theory of change implies this assumption. However, according to our teachers, this assumption might need to be rethought.

3. The Teacher's Role as a Social Position

Another minor aspect of the interviews is the position of teacher, being that of a social position with power and professional privilege. Some interviewees spoke about enjoying the role of being able to help their students and having the knowledge to assist them when they are in need. Many occupations are seen as professions; this also includes teaching. However, during our research, we asked the participants how they had become a teacher; many first began the profession as a change or as a person who wanted to affect students as a teacher had done for them positively.

This notion of teaching as a calling served as a powerful motivator for many trying to start CS programming and push through the challenging “ask” MPS requires of them.

Conclusion

Seeing the finding from the Implementation study and its implications for teachers’ willingness or unwillingness to implement CSD curriculums served as the impetus for this research. We realized there appeared to be a disconnect between information teachers felt was needed and missing and the program’s logic, learning designs for teachers, and goals. However, most importantly, we found teachers’ confusion about collaborative instruction and the need to shift from traditional modes of teaching to Lead Learner. Although this work is just a part of a much larger project, we felt highlighting an overlooked aspect of implementation would be helpful for curriculum designers and teacher educators.

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APPENDIX 1: Tables

Name	Gender	Race	Age	Years Teaching K-12	Taught CS Before
5. Jess	Female	White	50+	26	5+
4. Pat	Female	White	50+	24	5+
3. Barbara	Female	White	50+	18	4
2. Peter	Male	Black or AA	30-40	5	3
1. Jackie	Female	Black or AA	30-40	2	1