

Gesturing While Tutoring a Student With a Learning Disability Enrolled in Algebra 1

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The researcher conducted a qualitative case study of two sessions of a pre-service teacher tutoring a student with a learning disability on Algebra 1 content. In this study, the focus was the tutor's use of gestures overlaid on the students' offloaded work on paper to help the student make sense of the problems. The student also demonstrated how she could use gestures to communicate about mathematics. There were also considerations for determining the difficulty of which problems to pose to the student. The findings indicate that the tutor's teaching strategies enhanced opportunities for the student to make progress through the problems. However, the struggles of the student are also relevant to the field of education for understanding and addressing the needs of students with learning disabilities in mathematics.

Keywords: Learning Disabilities, Algebra, Gestures, Problem Posing, Offloading

In the United States and other countries, students with learning disabilities (LD) need to succeed at levels comparable to children without disabilities on high-stakes tests and in secondary level mathematics courses to access post-secondary educational opportunities as well as better employment outcomes (Berliner, 2012; Every Student Succeeds, 2015; Ysseldyke et al., 2004). Yet, many students with LD tend to struggle with mathematics (Andersson, 2008; Rotem, & Henik, 2020). However, special education researchers have found ways to support these students to help them access mathematics and advance to higher levels in secondary school (for review, see Marita & Hord, 2017). Even with these gains, more research is needed, especially at the high school level with algebra, to determine how teachers can support students with LD with strategic teaching methods (Foegen, 2008; Marita & Hord, 2017).

Students with LD and Secondary Mathematics

In the United States, the label of a student with LD, is often assigned to children who have not responded with success to extra interventions received in the contexts of small-group and individual settings; these students also have intelligence test scores above the 70 to 75 range (Gresham & Vellutino, 2010). Although this group of learners does often struggle with mathematics (Rotem, & Henik, 2020), they frequently succeed academically at levels similar to peers without disabilities when receiving extra support strategically designed to support their needs (for reviews, see Hord & Xin, 2013; Marita & Hord, 2017). In some studies, this support has led to the success of students with LD with high school mathematics content (Ives, 2008; Walsh & Hord, 2019).

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Students with LD tend to struggle in mathematics often due to difficulties with memory and processing, more specifically, struggles related to working memory (Andersson, 2008; Swanson & Siegel, 2001). Working memory is the processing, storing, and integration of multiple pieces of information (Adams, Nguyen, & Cowan, 2018) and can be a source of struggle for students with LD in general, and especially in multi-step problem-solving situations (Swanson & Beebe-Frankenberger, 2004). Special education researchers have found that teaching students to offload information (store information on paper in strategic ways; see Risko & Dunn, 2015) can alleviate some of the working memory-related struggles they face (Marita & Hord, 2017). For example, students with LD have demonstrated success with offloading information from multi-step word problems into diagrams as well as placing subsets of information into cells in tables and then considering how each item relates to one another while solving the problem (van Garderen, 2007; Xin, Jitendra, & Deadline-Buchman, 2005). In these instances, the student does not have to store information in short term memory while they are considering other parts of the problem to find a solution; they can *process* information one piece at a time, offload and *store* information on paper, and then focus their attention and energy on *integrating* all of the information to find a solution (see Baddeley, 2003; Risko & Dunn, 2015).

Another approach to alleviating the struggles students with LD face with working memory is the use of gestures (Hord et al., 2016). Gestures can be used to support students' working memory when they are learning concepts and when they are explaining their problem-solving processes (Cook, Duffy, & Fenn, 2013; Goldin-Meadow, Nusbaum, Kelly, & Wagner, 2001). In recent studies, students with LD succeeded at learning and explaining algebra concepts while observing and using gestures to demonstrate secondary-level mathematics concepts such as the Pythagorean Theorem, distribution, and logarithms (Hord et al., 2016; Walsh & Hord, 2019). This use of gestures was often used by the researchers to draw attention to key pieces of information on paper (e.g., pointing to parts of equations) or to show the relationships between parts of equations, such as pointing to two parts of an equation and asking how those parts are related (Hord et al., 2016). In general, using a combination of gestures and offloading information can provide support for the memory and processing of students with LD (Hord, Ladrikan, & Saldanha, 2020).

Purpose of Study and Research Questions

While these findings are encouraging, more research is needed to describe how students with LD interact with secondary level concepts. The success of students with LD with previously studied topics has provided researchers and teachers with a description of the nuances of how gestures and offloading information have supported students with some topics; yet, more research is needed on the teaching of more concepts to determine how these teaching techniques can be applied in those situations (Foegen, 2008; Hord, Ladrikan, & Saldanha, 2020). The research questions of this study are as follows: (1) What are the experiences of a student with LD when engaging with Algebra 1 content? and (2) What teaching interventions can a tutor utilize to support and challenge a student with LD with Algebra 1 content?

METHOD

The author conducted a micro-analysis of two purposefully sampled sessions of a tutor working with a student with LD on Algebra 1 content. This study was designed to carefully describe the student's progress and the teaching methods that were supportive of the student in this particular context. The author intended for the descriptive findings of this study to provide a foundation for future research on this topic and related areas to further study and more thoroughly examine the teaching and learning of students with LD in secondary mathematics contexts.

Participants and Setting

The student and the teacher in this study were participating in a tutoring program designed and implemented by a local university. The author used pseudonyms for both the tutor and the student. The tutor, Victoria, was an undergraduate studying to be a special education teacher who was selected for this program due to her strong work ethic and high potential as a teacher she had demonstrated in her college courses. The student, Amelia, who was a 15-year-old white female at the time of the study, was selected due to her label as a student with LD in mathematics and her enrollment in Algebra 1. She had an IQ of 90, which is in the average range, yet she had scored in the low average range on many of the subtests on her most recent achievement test in mathematics. Amelia demonstrated both a tendency to struggle and potential for success at the high school level in mathematics. Her special education teacher described her as a creative person who writes well and puts forth a strong effort in school, yet that she struggled often with multi-step mathematics problems.

The tutor and student worked together in a one-on-one setting to supplement the regular instruction that Amelia was receiving in her mathematics class. The study was conducted in a suburban setting in the United States. Amelia's teacher provided a list of problems for the tutoring sessions, but Victoria sometimes created supplemental problems to strategically support or challenge Amelia. Victoria used a combination of gestures and strategic offloading to minimize Amelia's challenges with working memory. For example, when Amelia had difficulty with thinking about multiple pieces of information at once, Victoria helped Amelia offload information on scratch paper to address this situation. When concepts were difficult to communicate through spoken language alone, Victoria supported her speech with gestures to minimize difficulties with working memory.

DATA COLLECTION AND ANALYSIS

We collected data by video recording tutoring sessions using a document camera to capture the work of the student and the tutor on paper as well as their gestures. We transcribed two purposefully sampled sessions that were focused Algebra 1 such as the factoring of trinomials and multi-step equations. During our first phase of our analysis, we conducted open coding (Strauss & Corbin, 1998) using the transcripts while also watching the videos of the sessions to account for gestures and use of scratch paper. In the second phase, we used these open codes as a foundation for establishing a priori codes and they used these codes to code the data (Stake, 2010).

We arranged the data into columns for transcript and codes with an extra column for subjective comments by the researchers to add context to the codes as

needed. Then, the researchers arranged the coded data into patches in a separate document and searched for emerging themes in these patches (Brantlinger et al., 2005). For triangulation of findings, the researchers consulted with a local teacher of the high school students regarding the interpretation of the data to evaluate the interpretive validity of the researchers' data analysis (Brantlinger et al., 2005). Also, to check interpretive validity, we asked a researcher who was not involved in this study to evaluate the conclusions we made about our data (Maxwell, 1992). In the next section, we report the data upon which we agreed with the local teacher and external auditor.

FINDINGS

Victoria, the tutor, worked with Amelia, the student, on a variety of algebra problems including factoring trinomials which was a challenge for Amelia. Victoria used many gestures with this problem type and others. Also, it was important that, throughout the sessions, Victoria helped Amelia show each step of solving the equations and provided other visuals, in addition to gestures, to support Amelia so that she did not have to do multiple steps mentally or remember multiple pieces of information as she tried to think critically about the mathematics. In the following example, the student and tutor worked on factoring a trinomial.

Tutor: Let's try a little practice with... What would you do with that one? [writes $x^2 + 3x + 2$]

Student: This would be one. [writes $1(x^2 + 3x + 2)$]. I don't know if that's right.

T: Okay, what you were trying to... like what we did up here [pointing to a trinomial problem they had worked on together; see row 1 of Table 1]. You were trying to factor this out. You can pull one out of anything really. How would you make this two parentheses [wrote two sets of parentheses below $1(x^2 + 3x + 2)$; see row 1 of Table 1]

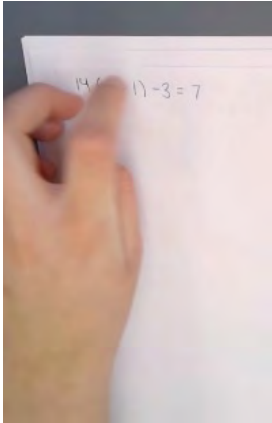
S: I can't think of anything right now.

T: Okay, we've done it in the past, right? [points to the first part of a previous problem (the trinomial), pauses for a few seconds [see row 1 of Table 1] and then points to the second part of the problem where they wrote possible factor combinations [see row 1 of Table 1]

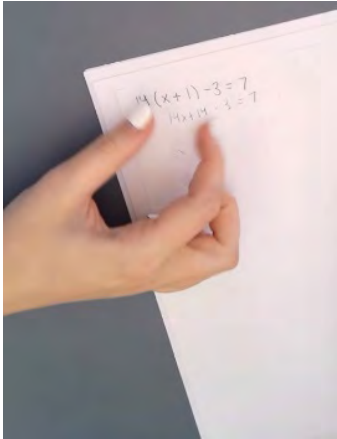
Table 1. Gestures and Offloaded Information

Description of Work	Gestures and Work on Paper
<p>The teacher gestured to a previously worked problem.</p>	
<p>The teacher pointed to a set of factors in a previous problem.</p>	
<p>The teacher drew an arrow to help the student make a connection.</p>	

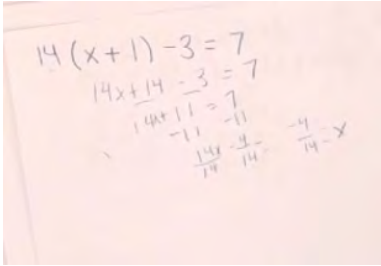
The student gestured to show distribution.



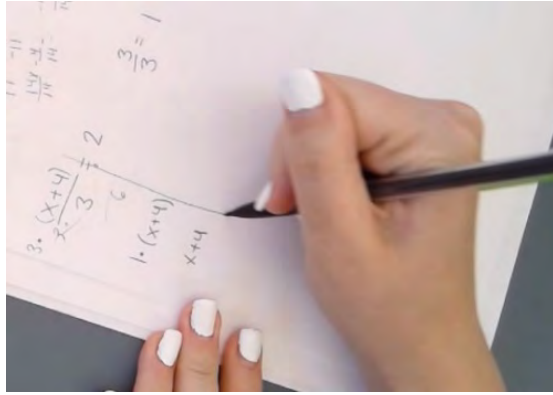
The teacher gestured to a row of terms.



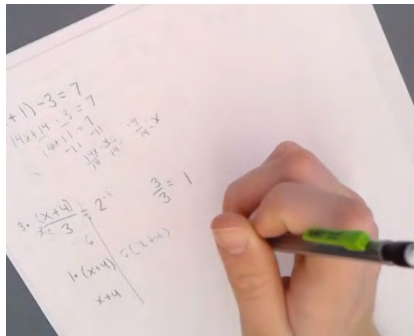
The student worked to solve an equation.



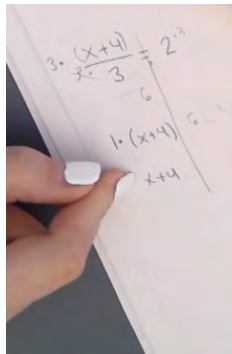
The teacher helped the student keep her work organized on paper.



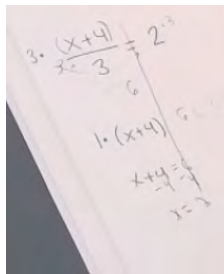
The student made a mistake on the equation.



The teacher gestured to part of an equation.



The student solved the problem.



As we analyzed the video data of Victoria teaching, we noticed that she often strategically gestured back to previously solved problems to remind Amelia of what they had done together. This was a strategic move on Victoria's part, to hopefully get Amelia to see the common structures of the problems and make good decisions about what to do with the problem she was trying to solve.

S: Oh... Would you like... Would it be the same thing? Like would it be 4 together? Because it's... Is it from the exponent [pointing to x^2 in $x^2 + 3x + 2$] or is it from like that? [pointing to the $3x$ in $1(x^2 + 3x + 2)$]

T: Remember, we looked for the factors that equal this [pointing to $x^2 + 4x + 4$ in a previous problem, then covering up x^2 with her finger and pointing to the $4x$ and the 4] and then tried to figure out if those factors could be added up to equal this, right [pointing to the $4x$]?

S: Yes.

T: We did this last time we worked together. What would the factors of 2 be?

S: 2 and oh wait... just 2.

T: [tutor writes $2 = 2$ and leaves time for the student to think] 2 times what equals 2?

S: 1. [tutor writes 1 to make it $2 = 2 \times 1$]

T: Okay, so, if you add those two up do they equal 3?

S: Yeah.

T: How would you write that out [pointing to blank pair of parentheses below the trinomial] now that you have factored it?

S: Would I just put 2 plus 1? [student wrote the number in the wrong place $(2 + 1)(\quad)$]

T: Okay. I think last time we worked on it, it was a little helpful because we had your homework and you could see what you had done in the past.

S: Yeah. Yeah. I just don't remember it.

T: That's okay.

S: Sorry.

T: No, that's okay.

At this point, Victoria decided to simply write out the answer for Amelia because she decided that Amelia was not understanding the material. Victoria used gestures and offloaded information frequently to help Amelia focus on parts of the problem that were relevant at the time. Then, Victoria wrote out another problem for Amelia.

T: So, how about... [wrote $x^2 + 5x + 6$]

S: Wait, does it go to one parenthesis or two?

T: It goes to two parentheses, because you know when you FOIL, you're going back to this [pointing to the two sets of parentheses in the previous problem] right?

S: [writes $(5 + 1)(\quad)$]

T: Okay. You're really close.
 S: Would it be x ?
 T: Yes. make sense to you?
 S: No. Well kind of.
 T: Okay.

At that point, Amelia was confused, but she had made some progress. She did realize that she needed to put an x in the parentheses, but was struggling with which numbers to use; she was moving toward $(x + 5)(x + 1)$ rather than $(x + 2)(x + 3)$. Victoria continued to gesture back to previously completed work and ask Amelia questions about it. Amelia had made some progress though and Victoria worked to build on that progress.

T: Remember when we were talking up here; there were two different things we could have done. We could have done 4 times 1 or we could have done 2 times 2. But which one was right? [goes back to the original problem and points to each set of factors they came up with; see row 2 of Table 1]
 S: 2 times 2 or...
 T: Yeah, and that's because 2 plus 2 is?
 S: 4.
 T: Which was right here right [points to the 2×2 and then to the $4x$ and then draws arrows between the two; see row 3 of Table 1]?

Unfortunately, Amelia continued to struggle and Victoria finished the problem for her. Victoria did much of what is recommended by existing research, yet Amelia still struggled. Victoria drew visuals on paper (e.g., the arrow) to offload information and overlaid gestures on top of these visuals to support Amelia's thinking (Hord, Kastberg, & Marita, 2019; Risko & Dunn, 2015; Xin et al., 2005). But, Amelia continued to struggle and Victoria needed to make a decision about what level of difficulty she needed to focus on regarding which problems she posed to Amelia.

Based on these circumstances, it made sense for Victoria to provide some easier problems for Amelia to solve to eventually work her way back up to factoring trinomials at a later time or day. Then, Victoria chose this equation, $14(x + 1) - 3 = 7$. With this problem, the student and the tutor both used gestures to convey meaning and to focus attention on the parts of the problems they were talking about. Throughout the problem, Victoria did not skip steps which would have caused Amelia to have to think about multiple pieces of information in her head. The constant offloading of information (i.e., showing their work on each step) allowed Amelia to not have to simultaneously remember a lot of information while attempting to think critically about this information.

T: What do you think your first step would be?
 S: You could do parentheses, like $14x$.
 T: Okay. $14x$. Do you remember how the distributive property works?
 S: You would do it to both, so it would be $14x$ and then 14 times 1

[Gestures by pointing to the 14 and arching over the parenthesis to show her understanding; see row 4 of Table 1].

The student used gestures effectively to explain her thinking. The combination of gestures and her speech effectively demonstrated the concept. This use of gestures when students are talking about math tends to help them demonstrate what they are talking about and learn more effectively as they engage with others in conversations about math (Goldin-Meadow et al., 2001). Amelia continued to make progress with this problem.

T: Yeah exactly.

S: Okay.

T: So, do you want to write that?

S: Sure. And then do you just rewrite it... [student writes $14x + 14 - 3 = 7$]

T: That's perfect.

S: And then do you add 3 to 7? Could you do that? Or is there a better thing to do?

T: Well, you can do that but... So, you remember when we first started working together, we did some combining like terms work?

Victoria referred back to previous work to remind Amelia of how they combined like terms. Then, Victoria also combined gestures with her next question about combining like terms.

S: Yes.

T: Do you see any like terms here? [Victoria did a sweeping motion, pointing to the list of terms; see row 5 of Table 1]

S: No... no... Oh, wait, yes. 14 and 3 [student underlined +14 and -3]

T: Yeah, and what would that be?

S: 11?

T: Perfect.

S: I always forget. I always think of like terms like a variable, so sometimes I forget that you can do it without.

T: Right. Yeah. Okay. What would your next step be?

S: You subtract 11?

T: Yes.

S: And, then divide by 14. I don't know what that would be.

T: That's okay. What would your final answer be? You don't have to simplify it. Just base it on the numbers you have left.

S: Negative four fourteenths

T: Okay. When you're doing an equation, you have to tell me that equals something though.

S: Like a decimal or?

T: Not a number.

S: x? [writes $-4/14 = x$; see row 6 of Table 1]

T: x. Yeah, right... Cause we're solving for x, right?

S: Yeah.

Compared to some earlier problems (e.g., factoring trinomials), the student was more successful with this multi-step equation with distribution. In earlier and more challenging situations, Victoria had to do much of the work for Amelia; this led to Victoria making the decision to pose an easier problem. Victoria made a good decision by moving to easier problems to give Amelia a chance at having some success after factoring trinomials became too challenging. Later, though, Amelia's success led to Victoria considering whether Amelia needed a more difficult problem. Victoria decided to challenge her with an equation with a fraction.

T: Do you guys work with division in these problems very often?

S: I think sometimes. I'm not totally sure.

T: Do you ever see problems that are like... [Victoria wrote $(x+4)/3=2$]

S: Yes. I think we used to. But, I forget how to do them.

T: Okay. What does this symbol mean? [pointing to the line (or fraction bar) with her pencil and moved the pencil along the line as she said "this symbol"]

S: Divide?

T: Divide yeah. Are we dividing x by 3 or the whole thing?

S: I think the whole thing.

T: The whole thing. [writes 3 times on the left of the equation] What's the opposite of division?

S: Multiplication.

T: Multiplication. What operation are you going to do to get rid of this divide by 3?

S: Multiply by 3.

T: Okay. Are you just going to this side [pointing to the left side of the equation] or are you going to do both?

S: Both.

T: Both sides.

S: Does this cancel out? [pointing to both 3s on the left side of the equation].

T: Yeah. What do you think? If you divide something by 3 and then multiply it by 3 it's the same as....

S: Then it would be zero? No. Three? I don't know. (crosses out one of the 3s and mistakenly writes 6 as part of the next step of the equation on the left side)

As the student began to struggle and Victoria provided more guidance for her regarding the steps of the problem. She also made a connection to a real-world situation and also provided gestures to support her questioning and the student's thinking. She also helped Amelia offload and organize information on paper to support her thinking processes (Risko & Dunn, 2015).

T: It's the same as one, right? If you had a piece of pizza, and

you cut it into thirds and then you're like, well, I'm going to have three pieces, that's the same as having a whole pizza, right?

S: Okay. Yeah. So, do I just write x plus 4 over 6? How do you rewrite that?

T: Okay. So, like I was saying. Right? If you're multiplying this [pointing again to the 3s], that's the same as having three over three. And, what's three over this three the same as?

S: One.

T: Yeah. Basically, you're multiplying one times x plus four. [writes $1(x + 4)$ on the left side of the equation] And, what's another way to say that.

S: One x plus four.

T: Yeah. We have just x plus four, right? [writes $x+4$ on the left side of the equation below $1(x + 4)$ and draws a vertical line between both sides of the equation; see row 7 of Table 1]

S: Yes.

T: But, then we have to do the same thing to the other side, right?

S: Yes.

T: What do you need to do to that 2 [pointing to the 2 in $(x+4)/3=2$].

S: Div... Wait.

T: We multiplied this side by three [pointing to the left side of the equation]. What do you think we are going to do to this side? [pointing to the right side of the equation]

S: Multiply by three? Six. Where should I... Do I just do 6 times... Is that it? [writes $6(x+4)$ on the right side of the equation; see row 8 of Table 1]

T: Okay. Where did this come from? [pointing to $x + 4$ in the second step of the equation on the right side the student just wrote]

S: Up there. [pointing to $x + 4$ in the original equation]

T: Alright. Which side of the equal sign is this on? [pointing to the $x + 4$ on the left side in the original equation]

S: The left.

T: The left. Are they on the same sides or on different sides?

S: Different.

T: Different sides. We could move all this stuff over here [points to the $6(x + 4)$ on the right side of the equation], but I think there would be an easier step. Do we just have 6 on this side right now? [pointing to the right side of the equation in general]

S: Yes.

T: Do we need this over here [pointing to $(x + 4)$]?

S: No. [erases $(x + 4)$ leaving the 6]

T: Okay, what would your next step be?

S: I don't know. Could you like distribute that [pointing to the 1 in $1(x + 4)$ on the left side of the equation]? Or did we already do that?

T: Well, what's the same as distributing one times?

S: Oh, it's already... yeah.

T: Yeah. So, what does this equal right now? [pointing to the $x + 4$ in the last line; see row 9 of Table 1]

S: x plus 4.

T: Equals? [pointing to the space after $x + 4$]

S: 6. Could you subtract 4? (independently and correctly solves the problem by subtracting 4 from both sides; see row 10 of Table 1)

Victoria's continued use of gestures and offloading helped Amelia make progress. It is important that Amelia succeeded independently when the fraction was eliminated from the problem. It was also no longer a multi-step equation at that point which could have been a factor due to the tendency of students with LD to struggle with multi-step problems (Swanson & Beebe-Frankenberger, 2004). However, it did seem like putting a fraction (or division) in the problem really challenged Amelia and demonstrated how much difficulty a fraction in the problem can create for a student with LD. This is consistent with prior research regarding students with LD struggling with multi-step equations with fractions in the problem (Hord, Ladrikan, & Saldanha, 2020).

It is notable that the student struggled very little with a multi-step equation with distribution, yet struggled considerably with factoring trinomials and to some degree with a multi-step equation with a fraction. These three examples demonstrate how some problem types can create more difficulties for a student with LD than other problem types. And, gestures and other visuals were important for helping the student think more clearly, and supporting the student to make progress through the problem. Also, these examples demonstrate how a tutor might need to consider posing problems with less difficulty in situations where the problems are quite difficult for the student and they may need to be presented with problems that are not too difficult and not too easy so they have opportunities to think critically about mathematics at their level.

DISCUSSION

The findings of this study demonstrate how difficult Algebra 1 content can be for students with LD, as well as how they can succeed more independently with some of this content. The student's success with multi-step equations with distribution was encouraging, while her struggles with factoring trinomials and multi-step equations were indicative of how students with LD can struggle, but also how a teacher can address these struggles even in more complicated teaching situations. Throughout the sessions, the tutor faced complex decisions regarding how to gesture and offload information, such as showing every step of the problem on paper and drawing visuals (e.g., arrows) or overlaying gestures to help the student make connections. Also, the tutor made key decisions about when to challenge the student with more difficult problems and when to pose easier problems to give the student a chance to work more independently.

Gestures and Offloading

The findings of this study were consistent with existing research on how gestures, used by both the student and the teacher, can be effective in supporting verbal

communication (Cook et al., 2013; Goldin-Meadow et al., 2001). From this study and others, it is likely that gestures may be especially crucial for students with LD when they are struggling with mathematics or even when they are communicating with a teacher about mathematics with which they are having success (Hord, Ladrigan, & Saldanha, 2020; Hord et al., 2016). Considering the working memory challenges that students with LD often face, gestures are likely to be a key support in many situations, but especially in a time of need, such as when problems are particularly difficult and/or have multiple steps (Barrouillet & Camos, 2012; Hord et al., 2016; Swanson & Beebe-Frankenberger, 2004).

In addition to considerations regarding gestures, the findings of this study also indicated that the tutor's assistance with keeping information organized on paper and adding supplemental information on paper (e.g., drawing an arrow; showing their work for each step; etc.) was useful for offloading information for the student (Risko & Dunn, 2015). The tutor and the student were then able to look at the information on paper and concentrate on thinking critically about it rather than trying to remember and think through multiple steps mentally. This strategy also gave the tutor and student opportunities to layer gestures on top of their work on paper (Hord, Kastberg, & Marita, 2019). For example, the tutor sometimes pointed to previously completed work to help the student think about the problems they were currently working on.

Considering Problem Posing

The tutor was tasked with finding ways to pose easier problems when the student was struggling with difficult problems (e.g., factoring trinomials) and posing more challenging problems when the student demonstrated success with easier problems (e.g., multi-step equations with distribution). These situations are consistent with studies of how teachers need to adapt to students' needs, regarding their current level of understanding, by posing problems of varying difficulty accordingly (Steffe, 1990; von Glasersfeld, 1995). The tutor offered strategic support that was consistent with existing research on how to provide visuals, such as gestures and offloaded information on paper (Hord, Ladrigan, & Saldanha, 2020; Hord et al., 2016). Yet, sometimes these teaching strategies were not enough to help the student succeed and the tutor also had to make decisions on what problems she asked the student to do. Based on the findings of this study, teachers face making complex decisions when teaching students about mathematics about the difficulty of the problems they choose to pose.

Limitations and Directions for Future Research and Practice

This study was small in scale regarding the amount of sessions analyzed and having only one participant. Future studies on this topic should include more participants and analysis of more sessions. Generalizations cannot be made from the findings of this study. However, the findings of this study are important for guiding future research on gestures, offloading information, and problem posing in the context of teaching Algebra 1 content to students with LD.

Teachers need to consider a complex set of needs and strengths of students with LD as well as how difficult problems are and why these problems are difficult for this group of students (Andersson, 2008; Hord et al., 2018; Swanson & Siegel, 2001).

Problems may be especially difficult for students with LD due to having multiple steps or even more so when many of the multiple steps in a problem are challenging for them (Barrouillet & Camos, 2012; Swanson & Beebe-Frankenberger, 2004). Teachers are also tasked with deciding how and when to use gestures and other visuals to support students' thinking, such as their working memory, as well as how to utilize gestures—sometimes overlaid on drawings or written down intermediate steps of equations—to support their conversations about math with students (Hord, Ladrigan, & Saldanha, 2020).

The findings of this study demonstrate the complex challenges that teachers face when trying to help students develop an understanding of Algebra 1 content and to help them meet the challenges needed to succeed in this important gatekeeper course. Students with LD can access greater opportunities in life if they advance through gatekeeper mathematics courses, and teaching evaluations are dependent on student performance; therefore, teachers and students face enormous pressure to succeed in the context of teaching and learning Algebra 1 (Berliner, 2012; Every Student Succeeds, 2015; Ysseldyke et al., 2004). We encourage teachers to consider how they can support and challenge students with LD regarding the problems they pose and how they use gestures and offloading of information when working with them on mathematics.

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