THE EFFECTS OF PERFORMANCE FEEDBACK ON OPPORTUNITIES TO RESPOND AND STUDENT ENGAGEMENT IN A HYBRID HIGH SCHOOL CLASSROOM

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ABSTRACT

During the height of the COVID-19 pandemic, remote and hybrid learning became a new normal for most students and schools. However, research on child behavior and intervention efficacy during online learning remains sparse. In an online classroom, engaging students is more challenging, even with the availability of online engagement tools (Lieberman, 2020; Rila et al., 2019). Utilization of performance feedback (e.g., providing teachers with data about their implementation of an intervention) may help indirectly increase student engagement by increasing teacher provision of opportunities to respond (e.g., Fallon et al., 2015). The purpose of this study was to examine the efficacy of email-based performance feedback on a hybrid high school classroom teacher's usage of opportunities to respond. This study utilized a single case ABAB experimental design where performance feedback was administered to the teacher via email and teacher observations were conducted to measure the number of teacher-delivered opportunities to respond. Observations lasted for five weeks (three days per phase) with one goal-setting intervention between the first A and B phases. Results indicated that the implementation of performance feedback had little to no effect on the teacher's usage of opportunities to respond. Implications and suggestions for future research are discussed.

Keywords: engagement, online learning, hybrid learning, opportunities to respond, performance feedback, ABAB, single case

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INTRODUCTION

With the swift arrival of the COVID-19 pandemic in early 2020 came mass isolation and quarantine protocols for workplaces and schools. Traditional in-person formats turned virtual, and with this transition came dramatic impacts on health and learning for both students and teachers. Among high school students nationwide, 37% experienced poor mental health due to the pandemic, 44% experienced persistent feelings of sadness or hopelessness, and 20% seriously considered suicide (Jones et al., 2022). Similarly, 27% of teachers reported symptoms of depression, 37% reported symptoms of anxiety, and 53% considered leaving the teaching profession altogether (CDC Foundation, 2021). Preliminary estimates of learning loss suggest that elementary students made gains in reading and math at a lower rate compared to pre-pandemic trends, ending the 2020-21 school year with lower achievement than in prior years (Lewis et al., 2021). Over 97% of K-12 educators reported learning loss experienced by their students, with 57% estimating a total loss of three months or more in social-emotional learning progress (Horace Mann Educators Corporation, 2021). None of this may be surprising when considered in light of the substantial perceived loss in academic engagement suffered by students during COVID-related transitions in virtual and hybrid settings (Lieberman, 2020; EdWeek Research Center, 2021).

Academic engagement, or the degree to which students actively participate in the classroom, has been conceptualized as a critical component of a student's academic and social-emotional success in schools (Greenwood et al., 2002). Contained to classroom behavior, the effects of low engagement among students are pervasive and disruptive. According to Common and colleagues (2020), a decrease in student engagement often results in an increase in off-task behavior, such as having cameras turned off, using cell phones, and sleeping. A decrease

in student engagement also increases disruptive behaviors, such as staying muted when asked a question, or unmuting when not prompted. Overall, if a classroom is not engaging, students often find little enjoyment in their learning, have more of an incentive to disrupt class to entertain themselves and their peers, and are removed from the classroom at a higher rate (Haydon et al., 2012).

Outside of the classroom and over time, low engagement may affect students' academic performance and social skills. When classrooms have low instances of engagement and students exhibit challenging behaviors such as those mentioned above, students may become passive learners rather than active learners, give up more easily on tasks, and harbor feelings of anxiety, withdrawal, or anger towards their school and classes (Montague & Bergeron, 1997). As students engage in more disruptive or withdrawn behaviors, students tend to demonstrate a decrease in positive social behaviors (Haydon et al., 2012), which further contributes to the continuation of the disruptive and withdrawn behaviors. According to Brophy and Good (1986), academic engagement is a critical predictor of school achievement and academic performance. As low engagement culminates into negative behaviors and negative classroom practices, students are at risk of performing worse academically, further damaging their potential for academic and social-emotional success.

This is particularly worrying in a COVID context, as in California, 83% of public school parents reported that their children are falling behind academically due to the pandemic and its subsequent effects on engagement (Public Policy Institute of California, 2021). In a national survey conducted by the EdWeek Research Center (2021), morale, motivation, engagement, and attendance were perceived and experienced differently due to the onset of the pandemic. A quarter of surveyed students said their morale was somewhat lower than before the pandemic,

and 36% of teachers reported their morale as much lower; moreover, 32% of students and 33% of teachers reported being a little less motivated than before. One particularly unique discovery during virtual and hybrid learning was the power of turning one's camera on or off. When asked about why students turned their cameras off, 35% of students said they didn't turn them on because it wasn't required, 27% said they were embarrassed about how they looked, and 17% said they were not paying attention. However, 71% of teachers perceived the students who had their cameras off as not paying attention, and 60% perceived them as not being at their computers. When asked about why students turned their cameras on, 64% said it was to get credit, 47% said it was to stay focused, and 40% said it was to avoid getting in trouble.

The Role of Opportunities to Respond

Given the central role of engagement in educational settings, it is critical that educators have access to strategies that can promote this behavior. One such strategy is opportunities to respond (OTR), which are teacher behaviors that provide a student with the opportunity to actively engage with class material during instruction (Haydon et al., 2012); examples include choral responding, asking students to raise their hands in response to a question, or a student writing the answer to a math problem on a whiteboard and holding it up in the air for feedback. More specifically, the procedure for engaging in OTR involves presenting content materials to students, asking students questions based on the material at a high rate, promoting rapid student response through various modalities and formats, and providing immediate feedback that furthers students' understanding (Common et al., 2020). OTR can be mediated in several ways, either through the teacher (e.g., the teacher asks the students a question verbally), through technology (e.g., the teacher displays a quiz question on a game website), or through peers (e.g., peer tutoring). The response formats for OTR also vary considerably, such that students can respond

to OTRs verbally, physically (e.g., thumbs up, raising hands), or electronically (e.g., submitting their response via their phone). Responses can also be prompted to occur chorally (e.g., multiple students in unison), individually, or in a mixed combination (Common et al., 2020; Menzies et al., 2017).

As described by Lane and colleagues (2015), implementing OTR in the classroom involves three main elements: identifying the content or skills to be targeted, preparing an extensive set of questions or prompts that offer students practice with the material, and leading the session with a high rate of questioning, rapid student responding, and immediate teacher feedback. Menzies and colleagues (2017) provide further details and suggestions for these main elements, breaking down the process into eight steps: (1) identify the lesson content to be taught and the instructional objective, (2) prepare a list of questions, prompts, or cues related to the content, (3) determine the modality by which the content will be delivered, (4) determine the modality by which the students will respond, (5) explain the format and the rationale for using it, (6) conduct the lesson with the desired amount of opportunities to respond, (7) respond to student answers with evaluative and encouraging feedback, and (8) offer students an opportunity to give feedback on the strategy.

In order for OTR to be an effective tool for increasing student engagement, researchers have identified optimal standard rates for effectively increasing student engagement and participation. The standard recommended rate of OTR falls between three per minute (Sutherland & Wehby, 2001) and three and a half per minute (Stichter et al., 2009). However, Stichter and colleagues (2009) found that rates of OTR tend to fall below these recommended levels, with an average of 2.61 per minute (SD = 0.66). Research has demonstrated that by

increasing OTR in the classroom, student engagement increases, and challenging behaviors decrease (e.g., Lane et al., 2015; Common et al., 2020).

Although there is research demonstrating the benefits of using technology to implement OTR (Rila et al., 2019), there is little to no research on OTR in virtual K-12 classrooms. The standard rates mentioned previously have only been recorded and observed in in-person classrooms; therefore, there is no established standard rate for virtual classrooms. OTR as a practice in an online format is still new, and unanswered questions remain regarding its efficacy and feasibility in this new environment.

Strategy for Implementation: Performance Feedback

One potential method for promoting the provision of OTR is performance feedback, an intervention wherein a consultant provides process data, outcome data, and positive and constructive feedback to a consultee with the goal of changing consultee behavior (Fallon et al., 2015). Performance feedback can be delivered in verbal and/or graphic form, and popular methods of performance feedback include conversational meetings, paper/worksheet delivery, email correspondence, and text message correspondence.

Performance feedback often includes and outlines how consistently the intervention is being implemented, any improvements in the target behaviors, what is not being implemented, what is being implemented differently/incorrectly, and strategies to improve implementation (Fallon et al., 2015). Performance feedback is also often coupled with other elements, such as videos, graphics, visual data, and/or checklists to ensure and encourage correct implementation. Timing of performance feedback can vary from being delivered immediately following intervention implementation to daily, weekly, or contingent on resulting data. Performance feedback has increasingly been delivered virtually, with research supporting the effective use of

performance feedback via text message (Barton et al., 2019; Pakter & Chen, 2013) and email (Fallon et al., 2018a; Barton & Wholery, 2007; Pianta et al., 2008). Web-based performance feedback may be particularly appealing, as it often provides a more convenient and quicker means of intervention implementation. However, while evidence supports the use of web-based performance feedback delivery, no published research to date has examined the effectiveness of performance feedback being delivered in virtual classrooms.

For performance feedback to be effective, it cannot be provided alone. Research indicates that performance feedback must be coupled with additional supports for increased effectiveness and treatment fidelity of the target intervention (Sanetti et al., 2014; Collier-Meek et al., 2016). One specific support that further increases the success of performance feedback and the intervention is implementation planning. As described by Sanetti and colleagues (2014), implementation planning using the PRIME model is an evidence-based tool for increasing treatment fidelity and treatment success. The PRIME model directs the consultant to list all of the intervention steps for the consultee in behavioral and observable terms, while explicitly discussing the following questions: (a) When will the step be implemented? (b) How often will the step be implemented? (c) For how long will the step be implemented? (d) At what point will the step be implemented? and (e) What resources are needed to implement the step? (Sanetti et al., 2014). The consultant and consultee then work together to identify anticipated barriers and develop coping strategies for these potential obstacles, with extant research supporting this model's effectiveness for improving implementation (see Sanetti et al., 2014; Collier-Meek et al., 2016; Collier-Meek et al., 2019). Through implementation planning, the intervention and treatment have a greater chance of success, adherence, and fidelity (Collier-Meek et al., 2019)

and are more likely to increase compatibility and feasibility for the consultant and consultee (Sanetti et al., 2018).

Using Performance Feedback to Increase Rates of Opportunities to Respond

Research suggests that using performance feedback to increase the rate of opportunities to respond is an effective strategy for increasing student engagement in the classroom. In a study completed by Cuticelli and colleagues (2015), verbal and graphic performance feedback delivered through one-on-one consultation increased the rate of OTR in kindergarten and first-grade classrooms from 1.71 per minute to 2.59 per minute during a core reading program delivered using whole-class instruction. In another study by Simonsen and colleagues (2010), performance feedback was associated with an increase in consistency, frequency, and maintenance of OTR among classes in an alternative school that served students identified with emotional disturbance, autism, and mild cognitive disabilities. Stichter and colleagues (2006) examined the effects of performance feedback in the form of peer coaching, determining that this method was effective at increasing the rates of OTR for most of the elementary teachers in the sample.

Alongside these positive findings, other researchers studying the effects of performance feedback to increase rates of OTR have shown mixed results. Capizzi and colleagues (2010) measured rates of OTR after delivering performance feedback to elementary, middle school, and high school teachers, which involved reviewing recorded videos of the teachers' lessons. The data in this study showed high variability among participants, with varying increasing/decreasing trends. Although there was a slight positive effect, there was little experimental control demonstrated over the rates of OTR. These mixed results leave unanswered questions of whether the efficacy of performance feedback on increasing rates of OTR is dependent upon certain

conditions or environments (e.g., grade level, teacher training, educational content, school environment, class size, school resources).

Although the evidence for the efficacy of performance feedback on increasing rates of OTR is mixed, most results do show promising implications for increasing student engagement (Cuticelli et al., 2015; Simonsen et al., 2010; Stichter et al., 2006). These promising results, combined with the need to provide more answers and data to this area of study in different settings and contexts, provide the foundation and empirical basis for this study. By investigating the effects of performance feedback on OTR in a virtual/hybrid high school classroom, the feasibility and efficacy of a web-based intervention approach are examined and analyzed.

Purpose

By measuring the target teacher behavior of opportunities to respond, and by implementing web-based performance feedback, this study investigates the effectiveness of performance feedback on a teacher's usage of OTR in a hybrid high school classroom. The study was guided by the following research question: does the implementation of email-based performance feedback in a hybrid learning environment result in increases in teacher OTRs? It was hypothesized that an email-based performance feedback intervention would increase the teacher's usage of opportunities to respond in a hybrid classroom, considering empirical evidence available on intervention efficacy using online tools, such as email and text messaging (Fallon et al., 2018; Barton et al., 2019), as well as the abundance of research on online tools used to help increase OTR (Common et al., 2020; Haydon et al., 2012; Menzies et al., 2017; Rila et al., 2019). Ultimately, this study seeks to investigate the dynamics of student engagement in a virtual environment and to find potential solutions to the ever-adapting mode of remote learning to promote positive outcomes for students, teachers, families, and schools.

METHOD

Setting and Participants

One high school teacher was recruited for this study on the basis that the teacher designated that student engagement in the classroom was relatively low. The high school that served as the setting for this study was operating on a block schedule at the time, meaning that the classroom of interest was in session on Monday, Wednesday, and Friday for one week, then alternated to being in session on Tuesday and Thursday the next week, and then alternated back. Observations by the lead researcher took place every consecutive day that class was in session for a total of five weeks, with a second observer observing for a total of four days, one day in each phase, to evaluate inter-observer agreement. Observations were conducted for the first 50 minutes of each day. Each phase lasted for three school days.

Data Collection

The teacher's hybrid classroom was the setting of systematic direct observations by two observers. Systematic direct observations were used as they are effective and accurate measures of treatment fidelity (Sanetti & Collier-Meek, 2014). The two observers observed the hybrid classroom via Zoom with their cameras and microphones off. The hybrid classroom included a majority of students attending via Zoom and the other students attending in person. Only the teacher's behavior of giving opportunities to respond was measured by the observers.

Baseline

For both baseline phases, the researcher observed the hybrid classroom for a total of three days for 50 minutes each. The researcher counted the frequency of the teacher's usage of opportunities to respond over the course of one-minute intervals. To wit, the observers used Google Sheets to divide each observation period into 50 one-minute intervals. Every time an

instance of OTR occurred (e.g., verbal questions, online quiz questions, prompts for gestures), a tally was recorded for the specific minute it occurred. Once every observation period ended, a total and the average rate was calculated. This process occurred every day for the first baseline phase and the second baseline phase.

Goal-Setting Intervention

After the first baseline phase ended and before the first treatment phase began, the researcher and teacher met for a goal-setting intervention. This intervention utilized the action plan worksheet developed by Haydon and colleagues (2012), which was used by the researcher and teacher to record daily rates of OTR, set a new goal, specify which types of OTR to increase, and outline steps to reach this goal (see Appendix A for full worksheet). In addition, the goal-setting intervention utilized an implementation planning procedure that focused on reviewing the purpose of the intervention, the goals, the treatment steps, the logistics of how the treatment was implemented, and a coping plan (Sanetti et al., 2014; Collier-Meek et al., 2016; Collier-Meek et al., 2019).

Before the goal-setting meeting, the action plan worksheet was completed to present the baseline data to the teacher from the first phase formatted as the average rate per minute. It was shared with the teacher that the standard rate of opportunities to respond for in-person learning is three per minute (Sutherland & Wehby, 2001), but that there has not been an established standard for online learning. The researcher emphasized that the goal should be higher than the baseline rate. Then, a menu of opportunities to respond was given to allow the teacher to decide whether they wanted to use and incorporate these certain types. The teacher was then given steps to implement opportunities to respond. These steps come from the eight-step checklist developed by Menzies and colleagues (2017). All items used in the goal-setting intervention can be found in

the Appendix. The teacher selected a personal goal of one OTR per minute or 50 total per observation period.

Treatment

During treatment phases, the observers completed the same observations as described in the baseline phases. After each observation of the treatment phase, a performance feedback email was sent to the teacher on the following day in order to provide ample time for the teacher to implement OTR into lesson plans conducted the day after the performance feedback email was sent. The email was created using a template from Fallon and colleagues (2018a; see Appendix D for item) and provided a bar graph of the number of opportunities to respond given the day prior and where it compared to the goal that the teacher set. It also included the eight-step checklist (Menzies et al., 2017) and a menu of opportunities to respond. This email was sent after observations during the first treatment phase, discontinued during the second baseline phase, and then resumed during the second treatment phase.

Social Validity

At the end of the last phase, the teacher's perceptions of performance feedback efficacy and feasibility were measured using the User Rating Profile-Intervention, Revised (Chafouleas et al., 2011). This is a self-report questionnaire with 29 items that examines the treatment acceptability of an intervention. This questionnaire asks users to answer different questions about their perceptions of the intervention on a six-point Likert-type scale (1 = *strongly disagree* to 6 = *strongly agree*). The questionnaire is divided into six scales, with previous evidence for the internal consistency of resulting data (Briesch et al., 2013): acceptability ($\alpha = .95$), understanding ($\alpha = .80$), home-school collaboration ($\alpha = .79$), feasibility ($\alpha = .84$), system climate ($\alpha = .91$), and system support ($\alpha = .72$). Total scores derived from the URP-IR have demonstrated

acceptable levels of internal consistency reliability ($\alpha \geq .70$), and data from the majority of the subscales are weakly correlated with one another ($\alpha \leq .50$; Briesch et al., 2013).

Inter-observer Agreement

Prior to engaging in any experimental observations, the second observer (used for inter-observer agreement calculations) was first trained by the researcher on the operational definition of OTR and was provided with examples and non-examples of the behavior. The observer was given a guide for what qualified as an instance of OTR and what did not. The observer was then taught how to input data into the coding sheet as well as the instructions for the days of observation.

As part of the training, the observer was given an assignment to complete to promote reliability of measurement. Specifically, the observer was tasked with watching five 15-minute example videos showing the behavior of interest. The observer watched a video and then recorded the frequency of OTR per minute. If the observer exhibited ≥ 90% agreement with the researcher's master code, then they moved on to the next video. If they received less than 90% agreement, feedback was given by the researcher and the observer coded the video again. These steps were repeated until the observer correctly measured three videos consecutively. The observer completed training by watching and coding four 15-minute videos with ≥ 90% agreement.

During the study, the observer co-measured the frequency of OTR for a total of four days (one day per phase, 50 minutes each). For the observations, the observer and the researcher exhibited 87% agreement, 87% agreement, 100% agreement, and 90% agreement, respectively. As all shared observations were taken in each phase, constituted 20% of all sessions, and yielded more than 80% agreement, inter-observer reliability was considered adequate for this study.

RESULTS

Visual Analysis

To evaluate the impact of the performance feedback intervention, visual analysis of level, trend, variability, and immediacy of effect were used. Figure 1 depicts the single case experimental design graph for the study.

The results of the visual analysis demonstrate little to no effect of the intervention from the baseline phases to the treatment phases. Although the data demonstrated an average increase in frequency from the first baseline phase ($M = 14.0$) to the first treatment phase ($M = 25.7$), such change did not occur between the last two phases. The average increase between the second baseline phase ($M = 15.7$) and the second treatment phase ($M = 18.7$) was not as substantial as the effect between the first two phases, particularly when overlap of data points is considered.

The results of the visual analysis demonstrate no consistent patterns of variability in any phase. The first baseline phase demonstrates the most variability, with a range of 0 to 30 OTR. The variability of this phase can be partly explained by the context of the classroom. During the session with 30 OTRs, a review session for an exam was conducted, resulting in an abnormally high frequency. During the session with 0 OTRs, an exam was held, resulting in an abnormally low frequency. The other three phases have an average range of 9 OTRs, which is substantially less than phase one. The final three phases show a marked decrease in variability; however, there is no consistent pattern.

Across all phases, no substantial trend was observed. In phase one, we see an overall decreasing trend in the frequency. In phase two, the trend is relatively flat. However, across both of these phases, there is a substantial increasing trend which could indicate that the intervention increased target behavior frequency once implemented in phase two. In phase three, the data

increases slightly over time. This is an abnormal trend for a baseline phase, where ideally the data would stay relatively consistent or even decrease. However, across both phase two and phase three, a large decrease was observed, which could indicate that once the intervention was removed, the frequency decreased as the data returned to baseline. In phase four, a slight increase is observed. Across both phase three and phase four, there is also a slight increase, but not nearly as substantial as the trend across phase one and phase two. This insignificant trend fails to replicate the effects seen in the first two phases. Due to the variability in trend across all four phases, no substantial trend or change in trend was observed.

The immediacy of effect between all phases is minimal. Between phase one and phase two, we observed an immediate increase from 12 to 23 OTRs, suggesting that the intervention may have initially worked quickly and efficiently. Between phase two and phase three, we see an immediate decrease from 22 to 12 OTRs, indicating that once the intervention was removed, the results returned to baseline. However, between phase three and phase four, we see a small decrease from 20 to 19 OTRs, indicating that the intervention failed to immediately increase the results from baseline. Although we see the standard baseline-treatment-baseline results within the first three phases, the stagnancy of the final phase indicates that the intervention effects could not be replicated a second time.

Overall, the visual analysis that was conducted does not demonstrate an effect of the intervention upon teacher-provided OTR. The data failed to provide support for the control of the performance feedback intervention over the increase in the frequency of OTR due to the high variability and minimal immediacy of effect. The implications of these results, specifically the impacts of student engagement and online learning, are discussed in the Discussion section.

Social Validity

The post-implementation results for the URP-IR indicated that the teacher found the performance feedback intervention to be acceptable and understandable. Six of the nine items in the acceptability subscale received a rating of 5 or higher with an overall average rating of 4.3. The teacher strongly agreed with the statement: "This intervention is an effective choice for addressing a variety of problems." All three of the items in the understanding subscale received a rating of 5 or higher with an overall average rating of 5.3. The teacher strongly agreed with the statement: "I understand how to use this intervention." These results support the intervention as being generally well-accepted and easy to understand by this teacher.

For the home-school collaboration subscale, all three of the items received a rating of 1, indicating that the teacher strongly disagreed with the idea that a strong home-school relationship is needed to implement this intervention. These results support the idea that this intervention does not need additional support or resources from the students' families.

For the feasibility subscale, the average rating was a 3.8, indicating that the teacher felt relatively neutral about such items as: "This intervention is too complex to carry out," "The amount of time required for record-keeping would be reasonable," and "The total time required to implement the intervention procedures would be manageable." These results indicate that the intervention could improve markedly on its ease of implementation and manageability.

Lastly, the remaining results indicate that the teacher found that the intervention coincides with the school system's climate, but that additional support from the school system would be needed. For the system climate subscale, three out of the five items received a rating of 5 or higher, with an overall average rating of 4.8. The teacher strongly agreed with the statement: "Use of this intervention would be consistent with the mission of my school." For the system support subscale, the average rating of the items was 5. The teacher strongly agreed with the

statement: “I would need additional resources to carry out this intervention.” These results indicate that the intervention could improve drastically on its ability to be implemented without additional personnel and resources.

DISCUSSION

The purpose of this study was to determine the effectiveness of performance feedback on increasing a teacher’s usage of OTR in a hybrid high school classroom. This study utilized an ABAB single-case design, where the intervention phases consisted of delivering email-based performance feedback to increase the rate of OTR. The results of the visual analysis demonstrated little to no effect of the intervention, with no substantial increases from baseline to treatment phases, no consistent variability across phases, and no overall substantial trends. Overall, the results indicate a minimal effect of performance feedback on increasing rates of OTR in a hybrid high school classroom.

The findings of this study are mostly inconsistent with previous studies examining performance feedback in elementary school classrooms; however, this study focused on a high school setting, and the findings are consistent with previous research examining the same effects in high school classrooms. In studies where the intervention was implemented in an elementary setting, large increases in rates of OTR have been witnessed (Cuticelli et al., 2015; Stichter et al., 2006) with demonstrations of a relationship between the implementation of performance feedback and increases in OTR (Simonsen et al., 2010). The findings of this study are more consistent with the findings of Capizzi and colleagues (2010), where high levels of variability were observed and there was little support for performance feedback’s effect on rates of OTR. However, in Capizzi and colleagues (2010), slight increases were observed in all participants except for one high school teacher, which is consistent with the data presented in this study.

Limitations and Implications

Several limitations of this study should be examined in order to contextualize these results, as well as to interrogate possible explanations for these findings. One of the main limitations of this study was the restrictions put in place by the timing of the pandemic and the remainder of online learning. This study's main goal was to examine student engagement in an online learning environment; therefore, this study relied on measurements and observations that took place during the online learning portion of the pandemic. However, by the time the study had been approved and consent had been obtained, only a few weeks were remaining in the spring semester of 2021, which was the last semester of consistent online learning when this study took place. Therefore, the study was conducted using fewer sessions than the ideal, with only three sessions per phase. Ideally, this study would have included at least five sessions per phase in order to meet What Works Clearinghouse design standards, but due to the speed at which the study had to be conducted, fewer sessions were observed (Kratochwill et al., 2010). This might have influenced the results as fewer data points leave fewer opportunities to observe an increase in the delivery of OTR.

Another limitation that could have influenced the results of this study is the implementation of the intervention in a high school setting, rather than an elementary or middle school one. As stated previously, the results of this study are consistent with the findings of Capizzi and colleagues (2010). The data from the Capizzi study suggest that higher rates of OTR are observed in elementary classes compared to high school classes, with the authors arguing that this may be attributable to elementary classes being more interactive, while high school classes are more lecture-based. Capizzi and colleagues (2010) also suggest that the developmental progress of the students is a key factor as well, as elementary students may be expected to be

more conversational and talkative with their teachers in comparison to high school students. Because the findings of this study are consistent with the findings of Capizzi and colleagues' study, it is possible that the methods to increase OTR in different grade levels vary, and that some are more effective than others depending on different developmental contexts. Capizzi and colleagues also suggest that perhaps a lower OTR rate for high school students is acceptable and that the current standard of three per minute (Sutherland & Wehby, 2001) is only feasible and/or optimal for elementary students.

Another possible limitation that could have affected the results is the use of an external consultant versus the use of an internal consultant. In a study conducted by Sanetti and colleagues (2014a), data suggest that the use of internal consultants (e.g., school staff, administration) is more effective for intervention implementation and treatment fidelity compared to the use of an external consultant (e.g., someone outside of the school system). Sanetti suggests that the use of internal consultants results in more efficient interpersonal communication, as well as less reliance on "expert power" which may undermine the consultation. This study, however, did not utilize an internal consultant, despite the evidence that supports its effectiveness. Although an external consultant was used (in this case, an undergraduate student researcher), a mutual and respectful relationship existed between the researcher and the teacher; therefore, interpersonal communication was efficient and an expert power dynamic was less likely to be present.

This study examined the use of indirect training; however, the use of direct training has been identified as an effective method of ensuring intervention implementation and treatment fidelity (Fallon et al., 2018b). According to Fallon and colleagues, direct training involves (a) verbally describing each intervention component, (b) modeling components, (c) facilitating

implementer role play or rehearsal (i.e., practice) to criterion, and (d) providing positive and corrective feedback to the implementer about performance. In order to keep the study feasible and dependent on a virtual format, indirect training was used in order to streamline the process of delivering performance feedback and increasing OTR. The use of direct training instead of indirect training might have resulted in larger increases in OTR.

In a study completed by Long and colleagues (2016), teachers identified frequent barriers to intervention implementation, some of which might have been encountered in this study. For example, 57.9% of teachers perceived frequent implementation barriers to be related to the intervention itself (e.g., compatibility, time/materials required, complexity, feasibility). According to the social validity results of this study, the neutral ratings on the feasibility subscale suggest that the intervention could have been easier to implement and manage, which is consistent with the findings from Long's study. Another finding from Long's study shows that 26.3% of teachers perceived implementation barriers to be related to the organization of the intervention (e.g., time for implementation, access to materials, integration). According to the social validity results, the high ratings on the system support subscale suggest that the teacher felt that additional resources and support were needed to implement the intervention. Again, these ratings are consistent with the findings from Long's study and provide an insight into the possible influences of the results.

In a literature review conducted by Cavanaugh (2013), possible explanations are suggested as to why performance feedback may not increase the rates of OTR. Cavanaugh specifically states the following:

> Perhaps the use of OTRs requires more than simply a prompt to improve, increase, and maintain their use… OTRs are more context-dependent and may require other variables

> to be understood or put into place. For example, teachers may require a command of content knowledge to provide a large number of OTRs. It has also been found that teacher-student interactions during instructional tasks are most effective when teachers provide lines of questioning that extend children's understanding of their own knowledge as opposed to only asking fact-based questions. Perhaps teachers require additional training or more nuanced performance feedback as it relates to OTRs. This could include further training in curriculum implementation, content knowledge, or conditions in which OTRs are most useful or necessary. (pp. 125-126)

This analysis suggests that performance feedback alone may not be enough to increase a complex method of increasing student engagement such as OTR. The rates at which a teacher delivers OTR depend on different contexts and many different factors, such as grade level, content knowledge, and feasibility. An intervention such as performance feedback may be too limiting or simple for a nuanced and situation-specific behavior like OTR, especially within a high school classroom. Therefore, it is possible that other intervention methods may be more effective in increasing rates of OTR, and that the results of this study are highly influenced by the limitations of performance feedback.

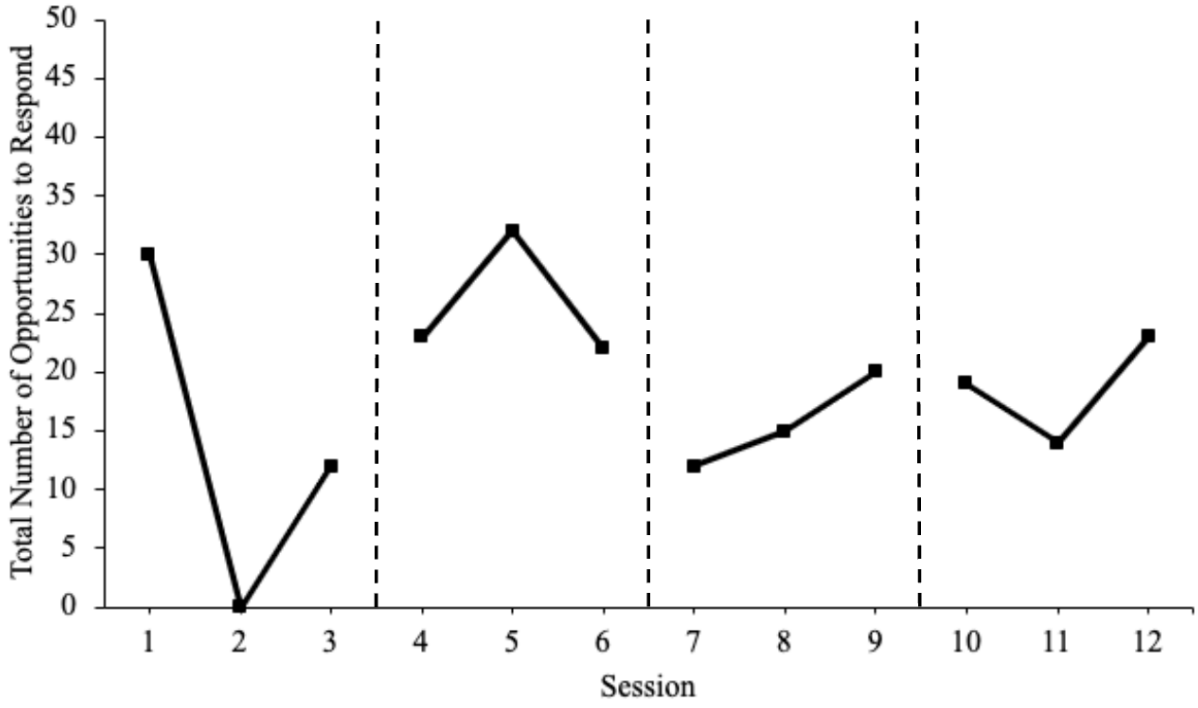
Conclusion

With COVID's strong impact on student engagement and the subsequent challenges to mental health and learning that took place (Jones et al., 2022; CDC Foundation, 2021; Lewis et al., 2021; Horace Mann Educators Corporation, 2021), evidence-based strategies are needed to ameliorate student engagement losses to ensure the academic and social/emotional success of students. Indeed, with ongoing fluctuations in infection rates, the next shift to online learning may be right around the corner. With these potential transitions looming, researchers, educators,

and administrators must be prepared to tackle the virtual student engagement problem. The results of this study may provide insight into future plans and strategies for increasing student engagement. Overall, our response to the next shift to online learning must be aggressive and comprehensive, as we cannot allow the negative effects of COVID-19 on student engagement to take any more from our students, our teachers, our families, or our communities.

FIGURE 1

Total Number of Opportunities to Respond



Note. Single-case ABAB design for the data. The y-axis represents the Total Number of Opportunities to Respond and the x-axis represents data collection time points. Numbers adjacent to data points represent the number of opportunities to respond given during each session.

APPENDIX A

Action Plan Worksheet to Increase OTR (from Haydon et al., 2012)

Action Plan to Increase Opportunities to Respond (OTRs)					
1. Determine individual present level of performance.					
Who will collect data?	☐ I will collect my own data ☐ I will ask _____ to collect data				
How will data be collected?	☐ Tally ☐ Counter ☐ Other: _____				
What is your current rate of OTRs?	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**
	☐/☐ = ☐ # min rate	☐/☐ = ☐ # min rate	☐/☐ = ☐ # min rate	☐/☐ = ☐ # min rate	☐/☐ = ☐ min rate
2. Develop a plan to increase OTRs.					
What is your goal rate of OTRs?	Currently, I present an average of ___ OTRs per minute across 5 sampled opportunities. My goal is to increase my use of OTRs to an average of ___ OTRs per minute across 5 sampled opportunities.				
What types of OTRs will you increase?	**Individual/Mixed**	**Unison**	**Class-wide Peer Tutoring**		
	List specific examples: • _____ • _____ • _____	*List specific examples:* • _____ • _____ • _____	*List specific examples:* • _____ • _____ • _____		
What steps will you take and when?	**Changes to Instruction**	**Additional Activities**	**Self-delivered Reinforcer**		
	List specific changes: • _____ • _____ • _____	*List specific changes:* • _____ • _____ • _____	*List specific changes:* • _____ • _____ • _____		
3. Implement plan, monitor progress, and adjust supports					
What is your rate of OTRs?	**Day1**	**Day2**	**Day3**	**Day4**	**Day5**
	☐/☐ = ☐ # min rate	☐/☐ = ☐ # min rate	☐/☐ = ☐ # min rate	☐/☐ = ☐ # min rate	☐/☐ = ☐ # min rate
Do you need to adjust supports?	*List specific adjustments to supports needed to meet goal:*				

APPENDIX B

Menu of OTRs

	Tech Mediated	Teacher Mediated	Hybrid
Choral	• Zoom features (i.e., polls, annotations, gestures, chat) • Other online features (i.e., Kahoot, PollEv, Menti)	• Verbal (i.e., ask questions, read aloud) • Gestures (i.e., raising hand, thumbs up) • Response cards	• In-person students use verbal, while remote students use chat • In-person students gesture, while remote students use reactions on Zoom
Individual	• Zoom features (i.e., annotations, gestures, chat)	• Verbal (i.e., ask questions, ask to read aloud) • Gestures (i.e., raising hand, thumbs up) • Response cards	• Target an online student and say they can either verbally respond or chat. • Target an online student and say they can either gesture in person, or via reactions.

APPENDIX C

Eight-Step Checklist (from Menzies et al., 2017)

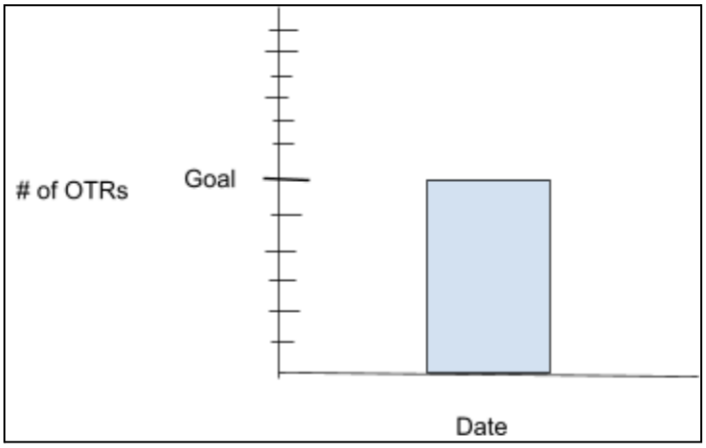
Step 1	**Identify the lesson content to be taught and the instructional objective.** For example, some types of new content might best be taught by using direct instruction. Other content lends itself to a problem-solving or inquiry approach. In addition to the content and students' familiarity with it, the teacher must also reflect on the preferences and skills of the students themselves, the amount of time available to devote to the lesson, and the desired learning outcomes.
Step 2	**Prepare a list of questions, prompts, or cues related to the content.** These might be questions about the topic, problems to solve, or key vocabulary terms to identify. The goal is to have enough prompts to provide a minimum of x OTR per minute so the number of minutes in the instructional period is multiplied by three to calculate the total number of prompts to be prepared.
Step 3	**Determine the modality by which the content (prompts or questions) will be delivered.**
Step 4	**Determine the modality by which students will respond.**
Step 5	**Explain the format and the rationale for using it.** It is always a good idea for students to understand how a lesson is structured, its purpose, and the teacher's expectations for how to participate.
Step 6	**You will conduct the lesson with a minimum of x opportunities to respond per minute.**
Step 7	**Respond to student answers with evaluative and encouraging feedback.** Establishing an environment where what counts most is participating and doing your best will help students feel comfortable even when they get the wrong answer. This, in

	turn, increases participation.
Step 8	**Students are offered an opportunity to give feedback on the strategy.** Understanding what students think about particular activities and techniques can help a teacher refine them.

APPENDIX D

Performance Feedback Email Template (adapted from Fallon et al., 2018a)

Hello,
Below is a graph of how many opportunities to respond were given during the observation on (DATE).



The graph shows the number of opportunities to respond that you gave in accordance with your specific goal. Specifically, you gave (#) opportunities to respond today. You reached your goal % of the time.
Based on the data collected, one step you might target while implementing OTRs is to __. This will __.
For more ideas and specifics about implementing opportunities to respond, see below.

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