

Lead Teacher Perspectives of Virtual CASE Institute Professional Development

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Abstract

The purpose of this study was to explore the experiences of Curriculum for Agricultural Science Education (CASE) lead teachers (LTs) who facilitated a CASE virtual professional development (PD) institute during the summer of 2021. The central research question that guided the study was: how did LTs characterize their experience of delivering online CASE PD originally designed to be implemented in person? This research employed a single case study design where the CASE virtual PD institutes held during summer 2021 served as the case. Participants included 23 CASE LTs who participated in focus group interviews and feedback via Flipgrid technology. Secondary data sources included a document analysis of the CASE LTs and Hosts Facebook group. Three overarching themes emerged from data analysis: maintaining the integrity of CASE, challenges with collaboration and community, and logistical hurdles in the virtual environment. Recommendations for practice include streamlining processes associated with virtual PD including building community and engagement strategies, alignment with the CASE model and philosophy, and additional training for LTs on technology use and delivery methods for virtual platforms. Recommendations for future research include a qualitative exploration into the experiences of participants and follow-up studies to gauge participant implementation of CASE curriculum after attending virtual PD.

Introduction and Framework

Professional development (PD) is a formal process in-service teachers use to improve their knowledge and skills related to classroom practice and instruction (Greiman, 2010; Guskey, 2000). Researchers have emphasized the importance of PD for teacher change within agricultural education (Shoulders & Myers, 2014). PD design has four main characteristics to consider from the literature: the teachers, the facilitator(s), the context, and the program design (Borko, 2004). It is also important to remember teacher learning is inherently social and rarely occurs in a vacuum (Guskey, 2002; Putnam & Borko, 2000; Shulman & Shulman, 2004). More specifically, the facilitator(s) of the PD shape the community of learners and experience for the participants (Borko, 2004). When PD happens in online environments, the learning process must include three unique dimensions of “empowering online teachers, promoting critical reflection, and integrating technology into pedagogical inquiry” (Baran et al., 2001; p. 430) to maximize the benefits to teachers.

PD opportunities allow a teacher to continue to enhance and refine their teaching and learning practices since teachers must be able to hone their skills throughout their careers (Darling-Hammond & Bransford, 2005). Washburn et al. (2001) indicated identifying which PD opportunities to offer teachers can be difficult when trying to meet the needs of the population since teachers’ needs can change over

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time due to their vast array of experiences (Cannon et al., 2012). The most effective type and delivery mode of PD has also been debated in the literature. Mizell (2010) indicated the most visible PD has been offered in various forms such as formal conferences, seminars, or workshops. Teachers also benefit from other forms of PD such as peer observations, readings, or networking (Desimone, 2009). Research has identified and confirmed five characteristics of PD leading to teacher change: duration, collective participation, active learning, coherence, and content focus (Desimone et al., 2002; Garet et al., 2001), which served as the primary framework for this study.

The first characteristic, duration, speaks to the length of the PD experience. The traditional “one and done” approach associated with day long workshops may have insignificant effects on practice due to its abbreviated length (Desimone, 2009; Desimone et al., 2002; Garet et al., 2001). However, agriculture teachers identified these types of PD workshops as useful sources of technical knowledge (Hurst et al., 2015; Rice & Kitchel, 2015). Collective participation occurs when groups of similar teachers (e.g., school district, grade level, or content area) take part in PD together (Desimone et al., 2002; Garet et al., 2001). This facilitates teachers in developing a community of practice, which allows them to work through the complexities of changing classroom instruction with a support network familiar with the situation (Greiman, 2010). Career and Technical Education (CTE) teachers have noted the importance of communities of practice when integrating new literacy material into the classroom (Santamaria et al., 2010).

Active learning and participation allow teachers to actively engage with the content versus being passive listeners. Active participation can be physical or mental and takes on a variety of appearances (Desimone et al., 2002; Garet et al., 2001). Teachers must be given opportunities to think about how new information can be integrated into their classroom practice (Putnam & Borko, 2000). Coherence examines the connection teachers have with the PD to their personal goals and alignment with state standards and curriculum frameworks (Desimone et al., 2002; Garet et al., 2001). Agriculture teachers are more likely to use PD material if they feel it supports their personal or school educational goals (Greiman, 2010). The final aspect to be considered in PD design is content focus, which centers on the material being taught.

Ekinici et al. (2019) proposed a PD model based on primary school teachers’ beliefs related to PD, which served as a secondary framework for this study. The model incorporated three distinct categories of perceptions, process, and suggestions. Perceptions surrounding the idea of PD included concepts related to change, experience, and burnout. When discussing the process component, physical conditions, technology, academic resources, and training process arose as prevailing themes. Suggestions associated with effective PD focused on the needs of teachers, right of choice, appropriate content selection, development strategy, active learning environment, and collaboration. Participants identified the need to improve themselves through PD, with a specific emphasis on technological advancements.

As a result of the global pandemic of 2020, the demand for remote and online learning opportunities increased significantly for individuals with access to the digital environment (Li & Lalani, 2020). Making the transition from face-to-face PD to online PD delivery has caused challenges to orientate teaching in a new environment (Baran et al., 2011). Given the rapid shift to online offerings, designing effective online PD for teachers became critical. Rabbit et al. (2019) outlined six quality drivers specifically for online learning, which begins with a quality platform to enable a baseline engagement. Additionally, a focus on three high-quality learning experiences that translate to change include having a rigorous content focus, active learning, and mastery of learning. Finally, it was noted that motivating factors deepen commitment and outcomes should focus on connection and personalization. The connection needs to build a social presence, and collaborative learning should meet the personal needs and interests of participants.

One PD initiative in agricultural education that has undergone recent changes due to the global pandemic and shift to online delivery is the Curriculum for Agricultural Science Education (CASE). The National Council for Agricultural Education (NCAE) established CASE in 2005 (CASE, n.d.) to provide teachers with PD and curriculum in Science, Technology, Engineering, and Mathematics (STEM), which was established due to lack of agriculture curriculum and PD opportunity within CTE. CASE has developed curriculum for agricultural education teachers in the areas of animal systems, plant systems, agricultural engineering, and natural resources, with fourteen courses currently available. The PD is offered in a traditional (i.e., typically an 8-10 day in-person institute), FastTrack (i.e., typically a 5 day in-person institute) and Brief CASE (i.e., typically a two day in-person institute) formats. The CASE PD institutes allow teachers to complete the activities, projects, and problems (APPs) associated with the curriculum for a course and become CASE certified. All PD sessions are led by two experienced teachers, known as lead teachers (LTs), who have taught the courses in their own secondary programs.

During the COVID-19 pandemic, CASE PD was only offered online during the summer of 2021. Due to the unique nature of CASE PD, institutes were offered in a virtual capacity for the first time. The potential impacts virtual PD can have on teacher adoption and use of CASE curriculum warranted further research. Specifically, this study aims to shed light on the LT perspectives of facilitating a virtual PD institute as they have unique power in the delivery of this PD model. Future efforts to facilitate PD opportunities for agriculture teachers in a virtual space, both within and beyond CASE, will benefit from this study.

Purpose of Study and Central Research Question

The purpose of this study was to explore the experiences of CASE LTs who facilitated a CASE virtual PD institute during the summer of 2021. By examining perspectives of the LTs using the frameworks from Desimone et al. (2002), Garet et al. (2001), and Ekinci et al. (2019), information can be gleaned to improve practice for both CASE and future PD initiatives in education that wish to pursue online delivery. As the LTs were instrumental in the delivery of the CASE institute PD as facilitators and have the power to shape the experiences of participants in the PD literature (Borko, 2004), their perspective was valued. The following central research question guided the study: How did LTs characterize their experience of delivering online CASE PD originally designed to be implemented in person?

Methods

For this research we employed a single case study design where the CASE virtual PD institutes held during summer 2021 served as the case (Hancock & Algozzine, 2011). Case studies are bound by time and explore contemporary phenomena using empirical investigation through multiple data sources (Hancock & Algozzine, 2011). This case was chosen to explore the experiences of LTs during CASE virtual PD institutes because of the unique nature of a full conversion to virtual PD for CASE and the opportunity to examine the experience of their delivery from the LT perspective. As virtual PD is expected to gain permeance in educational settings, this is a timely and worthy topic.

We approached this study from a constructivist lens. Constructivists posit that knowledge is not absolute but is instead co-constructed by individuals experiencing a phenomenon (Boghossion, 2006). Our research team included three agriculture teacher educators at land grant universities. All of us currently serve on the national CASE advisory committee as representatives from our respective states, two of us have served as CASE institute hosts, and one of us has served as a CASE LT. It is important to disclose our positionality, and to continually reflect on its role in the research process, to avoid bias (Creswell, 2013).

Description of the Case

This study focused solely on the experiences of LTs who led summer 2021 CASE virtual PD institutes. In total, 88 LTs taught one or multiple CASE institutes in the summer of 2021. There were 10 CASE courses offered in 2021 across 41 individual institutes including: Introduction to Agriculture, Food, and Natural Resources (AFNR), Animal and Plant Biotechnology (APB), Agricultural Power and Technology (APT), Agricultural Research and Development (ARD), Principles of Agricultural Science-Animal (ASA), Principles of Agricultural Science- Plant (ASP), Environmental Science Issues (ESI), Food Science and Safety (FSS), Mechanical Systems in Agriculture (MSA), and Natural Resources and Ecology (NRE). A total of 856 participants became CASE certified in one or more CASE courses. Except for MSA, all courses were offered exclusively online in summer 2021. In the fall, MSA was offered in a hybrid modality with five days online and five days in-person at the host location (CASE, 2021).

While this study focuses on experiences of LTs, it is important to discuss the other individuals that are instrumental in the planning and delivery of CASE institutes. CASE institutes are structured with four participating parties: LTs, hosts, participants, and National CASE staff. LTs serve as the teachers at the institute and are responsible for adhering to the CASE institute daily schedule, delivering each of the APPs, facilitating the inquiry-based learning process, and building community amongst participants. LTs are current middle or secondary agriculture teachers or university level instructors. There are typically two LTs per institute; however, for the summer of 2021, some institutes had three LTs. Historically, hosts provided the physical site for the institute prior to the shift to virtual delivery. Host duties included: managing participant registration, acquiring all supplies, securing lodging and meals, and leading the initial orientation meeting. For summer 2021 virtual institutes, hosts purchased and shipped supplies to all LTs and participants, managed registration, and led the virtual orientation meeting. Hosts are typically university level personnel but can also include high school teachers.

Participants are enrolled in the CASE institute and fully participate in the programming. At the completion of their institute, they become certified in the CASE curriculum for that course and the majority implement the curriculum in their schools. The typical CASE participants are in-service and pre-service agriculture teachers. Occasionally university personnel (teacher educators) or teachers in other related fields (such as science or other CTE areas) attend CASE institutes. Finally, National CASE staff organize CASE institutes, determine the type and frequency of institutes offered, assign LTs to institutes, collaborate with hosts on implementation, create daily schedules, and serve as a liaison between all parties.

Participants

To recruit participants, an email was sent to all 88 LTs who taught a CASE virtual PD institute during the summer of 2021 with a link to a short Qualtrics questionnaire. Out of the 88 LTs, 45 indicated interest in participating in one of eight focus groups. Of those 45 LTs, 19 ultimately participated in a focus group. To capture additional LT insight, an email was sent out to the 26 LTs who indicated interest but did not participate in a focus group to leave their comments via Flipgrid, a video discussion sharing application. Four LTs provided Flipgrid responses, and their data were integrated with the original 19 for a total of 23 LT participants. An effort was made to capture a wide variety of LTs from across various states, experience levels, and courses. LTs from every CASE course offered in the summer of 2021 participated, except for ESI and ARD. Four of the LTs were first time LTs during summer 2021, eight identified as men, and 15 identified as women. See Table 1 for further information on participants.

Table 1.*CASE LT Participants (n = 23)*

Pseudonym	CASE Institute(s)	New LT (Yes or No)	Gender Identity	Participation Mode
Joan	AFNR	No	Woman	Flip Grid
Natalie	APT, MSA	No	Woman	Flip Grid
Rebecca	ASA	No	Woman	Flip Grid
Maria	APT	Yes	Woman	Flip Grid
Veronica	NRE	No	Woman	Focus Group
George	ASP, NRE	No	Man	Focus Group
Tracey	MSA	No	Woman	Focus Group
Isabel	AFNR	No	Woman	Focus Group
Jose	APB	No	Man	Focus Group
Crystal	APT	Yes	Woman	Focus Group
James	FSS	Yes	Man	Focus Group
April	ASA	No	Woman	Focus Group
Dawn	ASA	No	Woman	Focus Group
Sarah	ASA	No	Woman	Focus Group
Grant	ASA	No	Man	Focus Group
Tony	ASA	No	Man	Focus Group
Dennis	AFNR	No	Man	Focus Group
Kaycie	AFNR	No	Woman	Focus Group
Courtney	AFNR	Yes	Woman	Focus Group
Erin	AFNR	No	Woman	Focus Group
Walter	AFNR	No	Man	Focus Group
Kelly	ASP	No	Woman	Focus Group
Logan	ASP	No	Man	Focus Group

Data Collection and Analysis

Data were collected from August through October 2021. Eight focus groups were conducted via Zoom and structured to allow for LTs who taught the same courses to participate together. Each of the focus groups was mediated by two or three researchers and consisted of semi-structured interview questions focused on three phases- prior to the institute, during the institute, and reflection on the institute. An example of a focus group question was: Would you describe your online facilitation experience at your institute? Participants in the focus groups ranged from one to five individuals. Four participants could not attend the focus groups due to scheduling conflicts and instead participated via Flipgrid, which allowed them to video record their responses to the same interview questions. This data were then integrated with the focus group data for analysis. To capture the voices of additional LTs, a document analysis was conducted of the Facebook group called “CASE LTs and Hosts.” Posts, pictures, and videos from this Facebook group were reviewed for additional insight on the experiences of LTs and effectiveness of the summer virtual institutes. The analysis of Facebook content spanned from March when Lead Teacher Training (LTO) occurred through mid-August when all institutes were complete.

Data were analyzed utilizing all three sources- focus group interviews, Flipgrid responses, and documents from the “CASE LTs and Hosts” Facebook group. Using a variety of sources allows for triangulation in the case study method (Hancock & Algozzine, 2011). Data were analyzed for trends in the data corresponding to the central research question. A three-step coding process was employed consisting of initial codes, categories, and emergent themes. The data were analyzed deductively using the

conceptual frameworks and again inductively to capture emergent ideas that lay outside of the conceptual frameworks (Gelo et al., 2008).

To ensure trustworthiness of the study, a variety of strategies were employed as recommended by Tracy (2010) for quality, qualitative research. First, a variety of data sources were utilized in collection and analysis to achieve triangulation. Second, rich, thick description was used in the form of participant quotes. Third, memoing occurred throughout the research process to uncover emergent themes. Fourth, member checking was employed with select participants on emergent findings to ensure they were reflective of their experiences and perspectives. Finally, the positionality of the researchers was disclosed and reflected on throughout the research process as we realize we are the instrument in qualitative research.

Findings

Three overarching themes emerged from the data and included: *maintaining the integrity of CASE*, *challenges with collaboration and community*, and *logistical hurdles in the virtual environment*. Theme one, *maintaining the integrity of CASE*, was the overarching theme that permeated each data source, and the other two themes were representative of the human elements and the pragmatic elements inherent in PD design and delivery. Collectively, these three themes and their subthemes showcase the experiences of the LTs who participated in the CASE summer 2021 virtual PD institutes. We acknowledge that not all LTs who delivered PD during summer 2021 were captured in this study.

Theme 1: Maintaining the Integrity of CASE

The majority of LTs were concerned with maintaining the integrity of CASE institutes, particularly if they had served as a LT for an in-person institute previously. This theme encompasses discussion around what constitutes a true and authentic PD experience within CASE, conversations about the underlying philosophy of CASE and if this is reflected in virtual institutes, acknowledgement of the lack of relationship building present in virtual formats that were deemed integral to maintaining the integrity of CASE, the importance of the stressing the traditional CASE model for PD, hesitations about the content rigor present in virtual CASE institutes, and suggestions for diversifying future delivery methods all in an effort to uphold the CASE brand.

One emergent idea related to maintaining the integrity of CASE revolved around what constituted a “true” and authentic CASE PD experience. The word “true” was used by multiple LTs when comparing in-person and virtual CASE institutes and experiences. Joan commented, “You just don’t get that collaboration and building relationships like you do in a true CASE institute.” Rebecca also used the word “true” when comparing modalities. She said, “I would really like to return to teaching in-person. Not just because of the familiarity, but because of giving participants the true CASE experience that we have come to know, that’s really based on how those relationships are formed.”

CASE has a specific model and philosophy that underpins the entire initiative. This philosophy is reflected in the mission and vision on the CASE website and within historical CASE documents. Reference to the CASE model and philosophy is routinely espoused by individuals who were trained as a CASE LT, particularly if they were involved in the early days of CASE’s inception. LTs were concerned that the virtual environment was not conducive to the model of CASE. Joan shared, “I think it helps to be in-person and the layout of things because you get to bring in that pedagogy of CASE and all the things that surround CASE and make CASE what it is.”

Sarah reflected on her experience as a LT for an animal science focused course (ASA). She wished for ASA to stay an in-person institute and considered if having the capability for virtual delivery

was reason enough to maintain this option. “But I don't know if the reasoning of it being doable is a good enough excuse for us to settle for it to be in a virtual environment.” Erin shared, “Those upper-level [courses], I don't think that a virtual option would serve the CASE model at all.” Walter acknowledged that participants would desire virtual options but wasn't sure if the modality adhered to the existing model of CASE. “People are going to push CASE to do virtual in the future and I don't know that we quite reached the same bar of teacher preparedness in the virtual thing as we do live.”

Other comments about an authentic PD experience included worries about the value and outcomes of the virtual training. Maria shared, “I really don't feel like they [participants] got the same value as if they had done it in person.” Dawn also commented on value in another direct comparison between in-person and virtual. She said, “I know the value of in-person, I've done a lot [of institutes], and it's obviously better in terms of the participants, especially people who have not had CASE before.” While all the comments regarding the value of virtual training applied to all participants, there was particular concern for individuals taking a CASE institute for the first time. Natalie elaborated, “I'm not sure that the participants have the value of CASE defined in their mind and how successful it can be to have more than one certification.”

LTs also commented on the rigor of the content itself, which is intended to be STEM focused and inquiry-based in nature. Erin shared that as a LT she was unsure how in-depth to go with the content in the virtual setting. She said, “We [her and her LT teaching partner] really struggled with knowing what we needed to just briefly go over and what we were going to go in-depth.” Veronica directly connected this hesitation about rigor with the integrity of the CASE brand:

I am a little concerned about the integrity of CASE and what it's supposed to be. It's supposed to be hard; it's supposed to make you think, it's not something that is a cookie cutter. It's supposed to be inquiry based; it's supposed to hurt your brain at the end of the day. I think, virtually, you can tune out and get away from that component. Not everybody likes their brain to hurt so they can tap out.

Walter called for CASE to consider the philosophy and CASE model when making future decisions and commented that we “cheated the philosophy a little bit” with virtual institutes. By altering the curriculum for virtual delivery, LTs shared that uniqueness of CASE might be compromised.

Theme 2: Challenges with Collaboration and Community

The second theme focused on the LTs challenges with collaboration and community building within the virtual environment- the people side of the equation. Overwhelmingly, LTs discussed that in-person was the ideal method for delivering CASE curriculum, which again connected back to the philosophy of CASE and the heavy emphasis that collaboration was perceived to play with the CASE model and PD design. The nature of the CASE curriculum for the majority of CASE LTs was dependent upon collaboration between participants and LTs at the institute. For each course, the primary teaching method utilized is inquiry-based instruction, which requires participants to converse with one another as they work through each APP. In a virtual setting, the LTs described many barriers to collaboration between participants, which in turn yielded negative perceived impacts on community building.

April shared, “You lose those connections and the networking and the collaboration that you get from being face-to-face.” Grant elaborated, “I didn't have that connection with the participants that you normally have when you're all in the trenches together.” Dawn commented that participants, “enjoyed synchronous time because they got some of that time they would get in an in-person institute.” Kaycie described the difference she saw between virtual and in-person institutes:

If you had failure or if you had success, you only had one of them if you're at home. Whereas if you're in an institute you get to see four or five or more experiments all at one time, failure or success. I'll use the example the lab where you boil the leaf and alcohol,

and you then look at what the results. You know that's a really difficult lab and when you're by yourself, you only really have one physical example, but if you're together, you can kind of, say, 'oh look at that that worked better what did you do different?' So those conversations just really enrich the experience.

Many of the LTs employed strategies to facilitate collaboration at their virtual institutes. Erin revealed, "We tried to be intentional about putting them in different groups, so they got some time with other people. It was really hard to pop into every group when you did that, so who knows what they actually discussed." Kelly took it a step further, "We stacked our breakout rooms strategically. Okay this person knows what's going on, so I should pair them with this person that doesn't really know." She went on to describe how this was different from an in-person institute, "There was a lot more thought put into our breakout rooms, as opposed to our random grouping strategies that we use at a typical CASE institute." Veronica said that breakout rooms were less effective for her. The strategy she shared was, "If we had a lot of questions, we just brought everybody back to the whole group and we talked about it, rather than dividing them up." Tony reflected on his previous experience with in-person CASE institutes, "I'd much rather be able to move around the room and interact with everyone."

Dawn shared how she wished that the supplies were different so participants could see the various dissections to enhance collaboration. She said, "The activity is written so they have a cow, sheep, and a pig, and they all got cows. So, if you could split it up, some participants get sheep, some get cows, you could actually do the entire lab." To counteract the similarity of supplies she said she put pictures in a folder on the learning management system. Sarah described her methods of pivoting instruction to account for the virtual setting. She said, "If you don't have a great specimen [LT], then you just adjust for more time for them to work with their specimens because they may have better examples, and then they share with their groups." Within the CASE LT Facebook group, common posts included group problem-solving, troubleshooting, and incorporating idea generation time across several institutes.

Due to the lack of collaboration witnessed in virtual institutes, LTs discussed if participants would reach out to their LTs or fellow participants if they struggled in the future. Isabel commented, "Some of them, I would say yes. Some of them have already reached out with a couple of questions so that's good. But it's not going to be the same as my [State] Institute two years ago." George expressed his fears, "It was difficult to have people replicate [the APP] themselves, and I fear that by not doing it, they're just not going to do it at home with their own students."

From the participant side, LTs desired clearer expectations for participants from National CASE. This included absentee agreements, what constituted engagement in the virtual setting, and how to hold participants accountable for their participation. Rebecca requested, "Clearer expectations from CASE about the absentee agreement and how to handle that. It's tougher to have the excuse of going home when you're in an in-person institute away from home." Kelly shared, "There definitely has to be a hard line on attendance. Making sure they are going to be present and reinforcing that if you miss more than X amount of live class time you aren't allowed to make it up." LTs mentioned both true emergencies like family illness and death that prevented participants from being fully engaged, but also non-emergency situations like "poor planning", "engagement pictures", "double booking", "being on their phone", "taking other meetings", and "presenting at conferences" that inhibited full engagement.

Isabel commented on the difficulty of balancing home life and the institute when virtual. She said, "I think the hard thing is striking a balance between giving them scheduled time to be at the institute and still take care of business at home, and teaching with integrity. I don't know where that balance is." Dawn recommended adding in components to the virtual participant agreement of "being there early and making sure you are doing your assignments." Tony shared that he was more, "laid back in the virtual world" and questioned whether he needed to be more "aggressive" on upholding existing policies as an

LT after listening to others in his focus group. Other LTs discussed requesting more evidence from participants to ensure they were actually completing the labs. Sarah shared, “We used breakout rooms, we used pictures, and we were able to get that evidence and hopefully have the confidence that they knew what they were doing.”

All LTs expressed that these issues could have been mitigated by being in-person. Natalie shared, “I feel like the participants didn’t get to know me. They didn’t get to know my personality just as much as I couldn’t learn about them, which made it difficult in some scenarios to help them out.” Because relationships were described by the LTs as an important component of the CASE philosophy and overarching framework, this lack of relationship building hindered their ability to effectively assist teachers with learning the content. Within the CASE LT Facebook group, numerous photos were posted of labs being set-up, in-progress, and final results. There were also videos walking participants through entire lab processes created by LTs. George highlighted the differences between in-person and virtual in his ability to help participants who might be struggling with specific labs. He shared, “She did the lab three times because she kept doing it wrong. She wasn’t in there, she wasn’t with us, and you know it was just different.” He went on to elaborate on issues with other participants in the institute. He said, “No matter how much you tried to tell them to read the directions they were trying to skip ahead. People do that when they’re in person too, but you have that interaction and time to assist in those things.”

Many LTs desired a greater commitment level from participants and commented on how participants were being pulled in multiple directions, adding to their overall preference for face-to-face delivery. Joan commented, “I think virtual has some good things as far as convenience, but again, in that setting, your participants aren’t always engaged.” George elaborated, “...because they were like the last ones to log-in in the morning and the first ones to log off at three o’clock and, and they wouldn’t sit around and ask questions or anything, they were just done.” Rebecca shared that she “needed additional virtual engagement strategies to use with adult learners” as an LT to combat engagement issues. Maria, who had never experienced an in-person institute as a LT commented:

Personally, I really want to try an in-person institute. I feel like I have a lot to offer as far as how to motivate people and it’s really hard to do that online. If asked if I would do an online institute in the future, I suppose I would, but it wasn’t ideal for me.

Logan spoke to the differences in participant engagement and participation in a virtual environment. He said, “In a large group, it was just silent. Even the chat was pretty silent in the large group.” However, when he moved to breakout groups, the engagement changed. He commented that “Participants actually told us that they liked being in small groups.” Isabel reflected on the organic conversations that were noticeably absent in a virtual setting. She said, “So it’s not the same enriching small group conversations that you can have when you’re all sitting around doing homework at 5:00pm at night.” Dennis echoed this statement, “I do think I’m going to miss out on not actually having that person-to-person connection when I do run into some of them [in-person].”

In addition to engagement, absenteeism was a major concern for LTs. Kelly expressed her frustration, “The main issue was absenteeism. Yes, they signed the agreement, and yes we told them, and yes we threatened them, but they didn’t listen.” Tony shared, “When you go to a break or at the end of the day, you’d have people that would never disconnect because they were just gone.” There was a perceived lack of accountability in the virtual space to know if participants were even absorbing the material on the other side of the screen. George commented, “I definitely think there were people that didn’t get to interact. If you didn’t call on them, they would not say a word, and it was a struggle.” Joan compared participants to her high school students, “In the beginning-I mean they got them done of course [APPs]-but in the beginning, staying on that timeline, they [participants] weren’t super good about.”

The setting participants were in and life happening around them also contributed to a lack of

participant engagement and buy-in to the virtual PD. Jose shared, “Some of our participants participated in the orientation on the road or from a location where they couldn’t really interact with what they need resulting in some participants realizing they didn’t have what they needed until too late.” Veronica said, “I think too life just got in the way. One lady messaged, ‘oh I’m a foster parent, I’m getting this child dropped off today and I won’t be available for the first session.’” Stories like Veronica’s were common across LTs and encompassed a variety of participant experiences balancing family, professional life, and the virtual institute.

Veronica shared a desire to receive more strategies from CASE on how to facilitate community in a virtual setting. She said, “I would have liked to had maybe a brainstorm session among the teachers about a way to form a virtual community because I saw some really cool things.” From the CASE LT Facebook ideas for building community shared amongst LTs included an ugly Christmas sweater contest, show and tell time, virtual graduation ceremonies, and polls for participants at the start and the end of each institute day. However, Walter commented that this virtual connection still wasn’t the same. He claimed, “I saw on Facebook somebody posted that they were doing a trivia night in their group, but it’s not the same as going to the hotel lobby and water coloring with Kaycie.” Isabel said she struggled because she “didn’t have the opportunity to walk around the room” and get to know the participants individually. Dawn’s struggles stemmed from how to facilitate breakout groups to enhance participant community because “it didn’t happen organically.” Logan shared, “So yeah, that that the interaction part was the heart hardest portion to compensate or replace or replicate, however you want to say, because it’s just really hard to do in a virtual setting.”

Sarah highlights the differences between LTs as building community wasn’t an expectation of CASE but instead something that some LTs took upon themselves. She shared:

I’ve tried my best to create as many relationships and bonds as I could. I was sending out thank you notes for participating to participants and sending out gift cards for the winner of the selfie contest with the ‘winging it’ lab. Just trying to get them involved and see if I could encourage them if they weren’t already motivated. I was trying to reel them in, but I mean that’s just an extra step that some of us do, and you have to have the means to be able to do that. It’s not expected of you, it’s just something that you do.

Overall, all LTs desired more support from CASE to facilitate community among participants as they felt it was an important component of quality CASE institutes and integral to what a “true” CASE institute should be.

Theme 3: Logistical Hurdles in the Virtual Environment

LTs surfaced many unique challenges inherent within the delivery of virtual PD. For many of the LTs, the learning curve with virtual delivery combined with the navigation of a quality PD experience for all participants was complicated. Again, many of the hurdles experienced seemed to be amplified by LT past experiences with in-person CASE delivery and connected to delivering CASE PD that aligned with the CASE philosophy without compromising the quality of the content. When asked to summarize her experience with CASE curriculum delivery in a virtual environment Veronica commented, “Did it work? Yes. Would I ever want to do it again? Oh, good Lord, no.”

To facilitate the transition to virtual learning, CASE developed institute schedules with combinations of synchronous and asynchronous time. Synchronous time meant the LTs and participants completed APPs together, often with cameras on. Asynchronous time was intended for participants to work on their own and LTs were often available for assistance. However, the lack of clarity in what should be occurring during both synchronous and asynchronous time created issues and uncertainty for many LTs. LTs at various institutes treated asynchronous and synchronous time differently. Logan shared, “The asynchronous time, I’m not sure how we were supposed to use that either. Some days you

know we were on a lot longer than that one hour afterwards, depending on the lab we were setting up.” Other LTs commented that they appreciated the asynchronous time to break up the monotony of online learning. Walter said, “I think my brain would melt out of my ears if we had to go like six hours straight talking all the time...I thought it was weird to give them time off, but in the end, it worked out.”

Technology was also perceived as a barrier within the virtual PD, causing LTs to prefer in-person. Veronica, who taught an agricultural power and technology focused course, commented, “Trouble shooting was very challenging. Not being able to walk up to someone and say, ‘oh no, your circuits are not correct, let me look at it through the screen backwards.” April, who taught animal science, shared, “I don’t personally have a document camera, so it was a little bit more difficult to guide them through the dissection versus the group that did [have a document camera].” These experiences highlight how some specific CASE courses were perceived as more challenging to teach in a virtual environment.

Other LTs shared that they were new to the technology platforms themselves, making it difficult to teach using the technology. Isabel said, “I was brand new to Google Classroom...so it was really difficult because I didn’t have a class to play with. I couldn’t practice a Google Meet and putting people into breakout sessions...That part for me was really frustrating.” Even for LTs with experience with the technology platforms, there were still systemic issues. Dennis highlighted the limiting nature of Google Meets, “The two lead teachers were kind of the co-hosts, but only one could send people to rooms and go visit the room, while the other one could not do that.” Tony suggested, “If there is a virtual component in the future, maybe, let it be whatever the leads [LTs] are more comfortable with, whether that be Teams, Zoom, or whatever.” Within the CASE LT Facebook group, various technology applications were highlighted included Google Jam Board and virtual interactive notebooks. Erin shared about the overwhelming amount of technology tools provided to LTs overall and her attempt to balance tools with content. She said, “So I think we were given some really cool things [technology tools] that if I had like a full time classroom I could use them. But not over two weeks, where I’m just worried about the content.”

It was not just the LTs who had issues with technology, it was also many of the participants. Dennis said, “Some of our teachers just didn’t have the computer skills. We had one guy...Walter and I spent a lot of time just talking computers with him. It’s almost like push that button there to turn it on.” Veronica reflected on previous institutes and the pervasive difficulties with technology, “I had a guy that was maybe five years from retirement and couldn’t get stuff downloaded at an in-person institute. I could not imagine, the level of frustration, a person like that would have [at a virtual institute].” Kelly commented on participant issues with turning things into Google classroom, “I had one [participant] that for the life of her could not figure out how to turn everything in and I had no idea what she was doing wrong.” This comment highlights the intersection between lack of technology skills for participants, and lack of technology skills for LTs in an attempt to mitigate difficulties experienced.

Beyond participant technology skills, some of the environments were not conducive to virtual PD. Isabel commented, “Some people, their bandwidth was limited. So, for them to leave their cameras on while they were doing things [labs] was a challenge.” Walter spoke about rural environments being particularly prohibitive due to “limited data rates” and “poor connections.” George expressed his concerns with technology itself being a barrier to participants and LT engagement with CASE in the future, which again connected to the concept of protecting the CASE brand. He said, “I just didn’t want anybody to be chased away because of that, you know, the technology aspect.”

There were also supply inconsistencies and broader issues with the virtual teaching environment. Out of all the LTs interviewed, every single one mentioned issues with the supplies sent to them and their participants by their host sites. Maria stated, “I wish we had the same box that the participants had.” For Joan, this was more than an inconvenience and severely impacted her teaching. She said, “I think if we go virtual that your Lead Teachers need to be given the materials that the participants get because I couldn’t

really, it was hard for me to answer their questions when they were having troubleshooting issues.” Across the majority of institutes, LTs did not receive the same supplies as participants because it was not required in the host manual. This also led to differences in direction sets for conducting labs based on the lab technology the LTs and participants had available. Dennis said, “I’m not sure if CASE anticipated that. I don’t remember which activity; it was something electrical. The instructors for the Go Direct sensors were completely different than the Vernier lab quest 2 sensors.” Erin shared, “Had I known ahead of time that I didn’t have the same sensors as my participants, I could have prepared myself a lot better for that.” Particularly if LTs taught their institute early in the summer, they were unaware of the supply discrepancies.

There were also issues with the participants themselves receiving the correct supplies to complete the labs. Numerous experiences were shared about lost supplies, broken supplies, or delayed supply delivery. Courtney said, “A lot of our participants didn’t receive a lot of the materials they were supposed to receive so that was a huge challenge. A lot of the DNA stuff for the DNA labs they just didn’t get.” Even if the participants received the materials, there was no guarantee they knew what they were or how to use them. April commented, “I would sit and literally hold up every single material they saw because some of them didn’t know the difference between a pipette and a dropper.” April suggested, “It might be helpful for CASE to have a PPT of what all the materials look like...we have like four boxes, full of materials from different vendors, but the participants struggled finding it.”

In addition to supply issues, there was also a burden on LTs to create a quality teaching environment in which to deliver the virtual PD. Isabel said, “I spent quite a bit of time setting up my space, practicing my camera angles, and the materials in my lab space.” Her attention to this was fueled by her desire to give a quality CASE experience to her participants. She shared, “Because if I were a participant and I couldn’t even see what was going on, that would be very frustrating.” Within the CASE LT Facebook group, LTs were also creative in their lab set up, utilizing ring lights, multiple laptops, standing desks, and classroom TV screens. Some LTs taught from their local high school classroom or laboratory and others taught from their homes. Erin was one of the LTs teaching from a unique space. She shared her challenges, “I was teaching from an RV, and I didn’t have the setup to do several of the labs, so I prerecorded them somewhere else.” In an in-person CASE institute the teaching environment is provided by the host site.

Within a typical CASE institute there are a variety of individuals who work together to make the PD a success. This includes the hosts, LTs, National CASE, and the participants themselves. With the first foray into virtual delivery, there were issues with who was responsible for what when planning for and delivering the CASE institute. LTs recognized a need for a clearer division of responsibilities for all parties to ensure that the institute is executed effectively. Specifically, the division of responsibility between hosts and LTs was blurred from the LT perspective, which then led to some confusion from participants. George shared, “I think, from a participant standpoint, they get confused. Who’s really in charge? Is it the host? Is it the lead teacher?” This uncertainty of who oversaw what aspects of the CASE institute permeated many of the focus group conversations.

Dawn shared that she found it “weird there wasn’t a host specific thing” to do during the institute itself after inviting her host to the Google meets. Isabel commented, “It’s hard from a hosting standpoint at a virtual institute because you’re not even there.” She said her hosts continually asked her, “What do you want us to do? We got everything organized, it’s all shipped out- what more can we do?” The lack of items for hosts to do was also expressed by George. He said, “I think that does make it a challenge for the hosts, especially hosts who are more accustomed to being involved.” Walter acknowledged that there was “A whole bunch dumped on hosts that they don’t normally do like mailing boxes and all that was, but they didn’t have to arrange housing and food.”

This shift in host responsibilities led to some hosts being very inactive in their institutes and others clamoring for a larger role. Erin shared her perspective, “I think CASE staff could have done a better job communicating to our hosts about that or maybe it is our host’s responsibility to get all that information.” Her comment showcases the uncertainty of what hosts should provide and what National CASE should provide in the process. Erin also shared that she “talked directly to CASE staff when we had problems,” something that would typically fall to the host. Various LTs also mentioned talking to CASE staff before hosts since it was a virtual institute.

Discussion/Implications/Recommendations

The theme of *Maintaining the Integrity of CASE* aligns with content focus aspect of the conceptual framework (Desimone et al., 2002; Garet et al., 2001). Within content focus, the rigor of the content was perceived as watered down by LTs within the virtual environment. The virtual modality also impacted active learning as the content had to be truncated to fit the new schedule and there were less opportunities for meaningful collaboration and engagement with the content. It is important for teachers to have the opportunity to consider how new information can be put into classroom practice (Putnam & Borko, 2000). The altered schedule also impacted the coherence of the PD, ultimately causing LTs to question if the current virtual PD truly reflected the CASE philosophy and model.

For many of the LTs, some who had been actively involved with CASE since its inception, the shift from in-person to virtual was met with resistance to change. Interestingly, quantitative data from the participant perspective on the same case were largely positive (Smalley et al., 2023), indicating a disconnect exists between facilitators and participants in this virtual PD model. CASE’s long history of conducting PD in a specific way was difficult for many LTs to reconcile in the new virtual environment. There was a sense of worry in each focus group that what made CASE special was lost in the new virtual environment, compromising the integrity of the CASE brand.

To better align with this theme, it is recommended to urge CASE to develop a clear plan to convey the philosophy and background of CASE within institutes. This plan should include explicit guidance on how to deliver and reinforce this content during LT instruction. Additionally, CASE should carefully consider its philosophy and model when making future decisions on programs to ensure that the quality of programming is maintained, as some decisions might compromise CASE’s fundamental values. This recommendation should be applied to other organizations delivering virtual PD. They must consider the guiding philosophy and program outcomes carefully when transitioning in-person PD to virtual settings.

The second theme of *Challenges with Collaboration and Community* aligns with active learning and collective participation aspects of the conceptual framework (Desimone et al., 2002; Garet et al., 2001). Within active learning, delivery of the content was perceived to be impeded by the virtual format for LTs, leading to a preference for face-to-face delivery. More specifically to facilitation, there were issues with assisting participants and the environment in which PD was delivered and received. The LTs were concerned with how active the participants were engaging with the material during both synchronous and asynchronous instruction. The perceived lack of active learning gave way to concerns about how the implementation would go when participants begin integrating CASE into their classrooms.

Within collective participation, there were concerns surfaced about participant engagement and buy-in due to the virtual modality. Collective participation is instrumental in developing a community of practice (Santamarie et al., 2010), which teachers can turn to for support when integrating new material into the classroom. Many LTs expressed that commitment level from participants was not the same as in-person institutes, and absenteeism was one way this concern manifested. The participants did not have as many meaningful experiences to develop those relationships vital for support. While breakout rooms and

other procedures did work for some LTs, it is recommended that future facilitator training focuses on how to collaborate virtually and develop relationships within the virtual platform space. This training must focus specifically on how to develop communities of practice in the virtual setting. These communities serve a vital support role as participants make changes to their classroom practice and work to integration information learned at PD (Greiman, 2010).

Moreover, this theme is consistent with both the process and suggestions aspects of Ekinici et al.'s (2019) model. The limited control over the physical conditions of the virtual space by the LTs, coupled with the hindrance of collaboration due to the absence of face-to-face interaction was a source of frustration for LTs. Additionally, Ekinici et al. (2019) calls for an active learning environment and collaboration between participants as needs for effective PD from the participant perspective. In Ekinici et al.'s model (2019), teachers suggest that PD should be responsive to participant needs. While this might be challenging for the LTs due to absenteeism and engagement issues, it reflects the overall flexibility that teachers are advocating for within PD.

Recommendations for practice aligning with this theme include a PD structure to mitigate some of the stress related to the shift from face-to-face to virtual from CASE. It cannot be assumed that what is done in-person will automatically translate to a virtual environment without careful and thoughtful adaptation. Direction from CASE should be provided on how to best motivate participants and encourage engagement, along with a clear absentee agreement for virtual institutes. Any organization interested in delivering virtual PD must consider the motivation of participants and purposeful engagement in virtual spaces, as community development is an important component to successful teacher PD (Santamaria et al., 2010).

The final theme of *Logistical Hurdles in the Virtual Environment* aligns with duration and coherence aspects of the conceptual framework (Desimone et al., 2002; Garet et al., 2001). Within duration, there was a lack of a clear structure surrounding the use of asynchronous time expressed by LTs. LTs also surfaced concerns for the total time allotted for the institute, APPs omitted, and the navigation of various time zones. LTs felt the limited focus would hinder what was implemented into the high school classroom. Within coherence, the issues with supply acquisition caused participants and LTs alike to be missing some of the needed materials important for learning to occur and an inability to see additional lab results in a collaborative atmosphere with colleagues. Participants must be able to see how the PD aligns with their education goals (Desimone et al., 2002; Ekinici et al., 2019; Garet et al., 2001). Without proper supplies and omitted APPs, it can be challenging for participants to fully grasp how the curriculum can fit into their classroom and limited the coherence of the training.

It is recommended that LTs (or any PD facilitators) and participants should receive the same supplies. It is also recommended that clear expectations for the use of asynchronous time and a singular time zone be employed. CASE should explore alternatives to full virtual PD such as hybrid opportunities and weekend opportunities to mitigate some of the issues faced in the virtual environment. It is also recommended that additional planning time be allocated for training LTs to empower them as online teachers (Baran, 2011). More purposeful assigning of LT partners, elimination of two new LTs for a single institute, and potentially adding a third LT for virtual institutes is encouraged. Finally, there is a need for a clear division of responsibilities between national CASE staff, hosts, and LTs and further clarification on the roles of each party for future virtual institutes.

Conclusions

Overall, the LTs preferred the traditional face-to-face model for CASE PD delivery. Focus groups lamented on the deviation from what CASE was “supposed to be” as a grassroots curriculum initiative, mourned the loss of collaboration with and between participants at their virtual institutes, and discussed at

length the various obstacles present in technology and supplies associated with online delivery. Despite the LTs hesitation, participants are continuing to call for virtual opportunities (Smalley et al., 2023).

Virtual PD will continue to gain permanence in educational spaces. CASE, and other organizations that deliver PD, must consider ways to take the process that was spurred by the 2020 global pandemic and improve upon it to create a sustainable program that can meet the quality and expectations of impactful PD. This can lead to teacher change and continued CASE curriculum permeation.

While this study yielded insight on the LT perspective, there is also much to be gleaned from research focusing on CASE participants. A quantitative questionnaire was dispensed at the end of the institute season to all participants with positive reception of the experience (Smalley et al., 2023), but this should be expanded upon to investigate implementation one and two years following the institute. Future research should explore which APPs past participants are teaching and if it corresponds to the ones they did within their virtual CASE institute. For the individuals who took the CASE institute virtually, did they sign up for another institute, and if so, did they choose virtual or in-person and why? Observations of teachers and qualitative focus group interviews of participants could also yield further insight into the effectiveness of virtual CASE institute PD, which can contribute to future programmatic decisions by CASE and other organizations wishing to implement virtual PD.

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