



## OPEN ACCESS

## EDITED BY

José Gijón Puerta,  
University of Granada, Spain

## REVIEWED BY

Benilde García-Cabrero,  
National Autonomous University of Mexico,  
Mexico

Pablo García Sempere,  
University of Granada, Spain

## \*CORRESPONDENCE

Elizabeth Dickson  
✉ edickson@salud.unm.edu

RECEIVED 30 March 2024

ACCEPTED 31 July 2024

PUBLISHED 16 August 2024

## CITATION

Dickson E, Lardier DT, Verdezoto CS and  
Hackett JM (2024) Reducing isolation for  
educators through ECHO virtual communities  
of practice.

*Front. Educ.* 9:1409721.

doi: 10.3389/feduc.2024.1409721

## COPYRIGHT

© 2024 Dickson, Lardier, Verdezoto and  
Hackett. This is an open-access article  
distributed under the terms of the [Creative  
Commons Attribution License \(CC BY\)](#). The  
use, distribution or reproduction in other  
forums is permitted, provided the original  
author(s) and the copyright owner(s) are  
credited and that the original publication in  
this journal is cited, in accordance with  
accepted academic practice. No use,  
distribution or reproduction is permitted  
which does not comply with these terms.

# Reducing isolation for educators through ECHO virtual communities of practice

Elizabeth Dickson<sup>1\*</sup>, David T. Lardier<sup>2</sup>, Carolina S. Verdezoto<sup>3</sup>  
and Janna M. Hackett<sup>4</sup>

<sup>1</sup>College of Population Health, University of New Mexico Health Sciences Center, Albuquerque, NM, United States, <sup>2</sup>Department of Psychiatry and Behavioral Science, Division of Community Behavioral Health, University of New Mexico Health Sciences Center, Albuquerque, NM, United States, <sup>3</sup>College of Education and Human Services, Department of Individual, Family, and Community Education, University of New Mexico, Albuquerque, NM, United States, <sup>4</sup>College of Nursing, University of New Mexico Health Sciences Center, Albuquerque, NM, United States

**Introduction:** Students in U.S. rural schools experience lower educational outcomes than their urban peers related to social determinants of health such as under resourced schools, shortages of qualified teachers and staff, and high poverty levels. Geographic, social, or professional isolation in rural communities can compound these disparities by contributing to high turnover of educators and staff. Virtual communities of practice (VCoPs) can address the needs of individuals in remote and rural communities. However, it is critical to understand if VCoPs meet rural school staff needs to support their students. Wenger's Community of Practice (CoP) framework and the Project ECHO model for VCoPs guided this descriptive, qualitative arm of our study to explore experiences of school staff participating in VCoPs through Project ECHO.

**Methods:** Thirteen ECHO for Education participants joined virtual focus groups to discuss their experiences and perspectives of VCoPs. Interview transcripts were inductively coded using the CoP framework with enhanced rigor through audit trails and member checking.

**Results:** Four predominant themes emerged from the interviews: 1) belonging/connected with others; 2) reduced sense of isolation; 3) exchange of new ideas/knowledge; and 4) sense of collaboration. Participants described how the VCoP they participated in resulted in positive professional and personal experiences including the support offered in context of working in rural schools during the COVID 19 pandemic.

**Discussion:** VCoPs can establish supportive professional networks for rural school staff working with students in under-resourced settings. Our theoretically-grounded results substantiate VCoP development as a systems-level approach to facilitate professional collaboration, mitigate staff turnover, diminish professional isolation, and support students in rural communities.

## KEYWORDS

project ECHO, rural education, virtual communities of practice (VCoP), qualitative research, community of practice

## Introduction

Inequities in education are pervasive and can disproportionately affect communities that experience high levels of poverty, are geographically rural, or are historically marginalized (United Nations, 2020). Rural education inequities are often related to limited resources, such as a lack of access to technology in communities without broadband internet infrastructure

and a shortage of qualified teachers available to teach and be willing to live in isolated communities (Logan and Burdick-Will, 2017; Showalter et al., 2019). Additionally, many teachers receive inequitable pay in geographically isolated environments with limited professional development opportunities (Glover et al., 2016; Showalter et al., 2019). These challenges can lead to dissatisfaction and frustration in working environments: If an individual does not have a socially supportive community, educators may ultimately choose to leave the teaching profession (Seelig and McCabe, 2021). Evidence suggests that teacher retention is related to professional relationships and a sense of community (Gallo, 2020). Therefore, supporting professional development and socialization opportunities among rural teachers is essential.

One mechanism used to support connection-building among educators is professional development opportunities offered within a supportive *community of practice* (CoP). CoPs are groups of individuals who share a concern, a set of problems, a passion about a topic, or want to learn more by regularly interacting with others (Wenger et al., 2002), or professionals who desire regular interaction with peers to share knowledge and increase skills (Wenger, 1998). Learning does not rest with the individual but rather is a social process situated in a unique, group context. CoPs can develop spontaneously or have a planned space with clear boundaries, with individuals meeting in-person or online in virtual spaces, often referred to as professional learning communities (Antinluoma et al., 2021).

Virtual communities of practice (VCoPs) have the potential to meet the social and professional needs of individuals when geographic separation impedes professional connection. In particular, VCoPs use technology to connect like-minded professionals across rural and urban settings (Curran et al., 2009). While VCoPs can develop spontaneously over social meeting platforms, VCoPs are also intentionally formed, facilitated online where participants enter into a “learning partnership” to explore and discuss common issues and ideas, share their aspirations and needs, and perhaps create something related to their common connection and value (e.g., tools, designs, events) (Jocius et al., 2022). The collective *community* they build can promote a supportive learning environment (Montali et al., 2022), cultivate personal relationships and trust, while allowing participants to develop a shared sense of identity. VCoPs have demonstrated this type of positive support and learning in various professional groups, particularly since the COVID pandemic, including education (Davis and Goodman, 2014; Tseng and Kuo, 2014) and healthcare (Sood et al., 2020; Delgado et al., 2021; Montali et al., 2022).

VCoPs have been shown to increase skills and knowledge through shared professional experiences (Hajisoteriou et al., 2018; Göktürk et al., 2020) and, in a bidirectional benefit, sharing knowledge in virtual spaces can also contribute to an increased sense of community (Ergün and Avci, 2018). How well a VCoP achieves these qualities can vary based on factors like session frequency, the facilitator, and the level of participation from attendees. Lardier et al. (2024) published a review of quantitative indicators to measure the impact of VCoPs, including changes in participant knowledge outcomes and sense of connectedness, both of which influence the sense of community among participants and desire to continue attending sessions.

VCoPs have also been shown to provide opportunities for educator engagement, promote the development of professional relationships, and support knowledge-sharing among participants (Bolliger and Inan, 2012). By working in a cooperative environment

to enhance feelings of belonging and connection, VCoPs can create opportunities to meaningfully engage in knowledge-sharing and peer learning. This collaboration can support the professional development needs of educators from rural communities by providing opportunities to network with others working in similar rural school environments, learn new skills from other VCoP members, approach problems from different perspectives, and enhance interpersonal connections between educators in urban and rural groups. These connections can help enhance communication and collaborative learning for educators while diminishing the isolation associated with teaching in a rural location.

## Theoretical framework

Social learning theory has helped to inform the development and structure of VCoPs. Wenger's (1998) CoP theoretical framework is based in evidence of social learning, learning that is a social process that takes place with cultural and historical contexts. Just as crucial to CoP development is the importance of learning in communities that can offer connection and meaning making, a socially-constituted experience, among participants of the CoP (Wenger-Trayner, 2013). The CoP framework asserts that persistent exchanges in knowledge can be one of the most beneficial ways for us to gain applied understanding, and involves individuals, through interaction with others, aligning and realigning their own expertise and experience with the expertise and experience of others (Wenger et al., 2015).

Project ECHO (Extension for Community Healthcare Outcomes) is a virtual professional development model that incorporates the foundations of the CoP framework, incorporating adult learning preferences and methodologies such as social learning theory and supports adult learners to quickly implement new skills (Project ECHO, 2024). Building on VCoP principles, ECHO engages participants of all experience-levels in critical discussion, continuous learning, and knowledge-sharing by using four principles: (1) using technology to help, “amplify” or leverage scarce resources; (2) didactic training to share knowledge and best practices; (3) case-based learning by participants; (4) continuous program evaluation to monitor outcomes. Project ECHO uses a “hub and spoke” model in which experts, consultants, and core professionals disseminate knowledge through regional hubs and individual participants or “spokes.” During ECHO sessions, in addition to having didactic presentations, participants present and discuss challenging professional situations to their peers, seeking to gain understanding, knowledge, and new skills from each other. ECHO sessions are non-hierarchical, allowing learners of all experience levels to engage and learn, centering the ECHO motto: “All teach/all learn.” The VCoP created by ECHO supports engagement from all participants as valuable experts in their personal and professional experiences.

While originally designed for health care providers (Project ECHO, 2024), the ECHO model has been adapted for educators across educational settings, called ECHO for Education, providing opportunities to apply these learning theories within the CoP framework for those working in the education space, more specifically rural education environments (Hardesty et al., 2020; Dahl et al., 2023). ECHO for Education has been particularly beneficial throughout New Mexico, where Project ECHO originated at the University of New Mexico (Project ECHO, 2023), a state that is enriched by deep cultural

and language diversity, but experiences the lowest-ranking in education achievement in the U.S. and one of the most rural states (United States Census Bureau, 2016).

The creation and sustainability of VCoPs for staff and educators in rural communities offers a tremendous solution to stem the loss of rural educators due to professional isolation, the need for collaboration, and knowledge sharing. However, few studies have examined VCoPs in the general education or health education domains. To address that gap, we conducted an explanatory mixed-methods study to better understand VCoPs within the healthcare and education disciplines for rural educators. The larger aims of the mixed methods study were to (1) perform a scoping review of the published literature for various VCoP measurement tools in health, education, and health education disciplines and (2) use the results from the scoping review to qualitatively explore experience/perceptions of participants in a virtual COP from ECHO for Education. These aims sought to answer the questions: what VCoP measurement tools have been published for health, education, and health education disciplines? and what are the VCoP experiences of participants in ECHO for Education? The scoping review from the larger study (Lardier et al., 2024) identified 13 studies that used existing measurement tools and different theoretical frameworks to evaluate the impact of VCoPs, pointing to the need for a well-validated set of measures and framework to examine the impact and effectiveness of VCoPs. This article will describe the qualitative findings that were guided by the constructs from Wenger's (1998) CoP framework and the Project ECHO model.

## Methods

A descriptive qualitative approach was used to explore the experience and perceptions of participants within the VCoPs created by ECHO for Education. Most individuals participated in ECHO for Education sessions during the COVID-19 pandemic when many of their school environments had closed due to government shut-downs and teaching had moved online. Subsequently, when we conducted the focus groups, we wanted to understand any perceived changes in knowledge, skills, confidence and/or additional support experienced by participants as they navigated the changes in their work during COVID-related school closures and re-entry to in-person teaching in schools. Our research team consisted of two co-principal investigators (ED and DL) experienced working with the Project ECHO model and facilitating ECHO sessions, and two PhD graduate students (JH, Nursing PhD student and CV, Family Science and Human Development PhD student). This study was approved by the University of New Mexico Office of Research Integrity and Compliance (Study #1598127-1).

## Sampling

We used purposive sampling of previous participants in ECHO for Education programs from across New Mexico school settings. Project ECHO staff sent out recruitment emails to 278 individuals who had participated in at least 4 or more ECHO for Education sessions in the 2 previous years. Two rounds of recruitment emails were sent out over 3 months. In the body of the recruitment email,

participants were provided a link to a REDCap (Harris et al., 2009) survey page that explained the study and screened for eligibility (previously participated in ECHO for Education sessions, English speaking), discussed risks and benefits for participation, and identified that they would receive an incentive for participation. Participants who selected "yes" to confirm their consent and eligibility were then directed to enter their name, email address, a preferred date for the focus group interview, and were informed that a research team member would contact them to schedule a focus group interview. If participants selected "no" affirming they were ineligible, they were thanked for their consideration. The PI monitored REDCap responses and emailed individuals to re-confirm eligibility and schedule focus group interview dates. All focus group interviewees were emailed two reminders before their focus group interview. Recruitment continued until we reached data saturation (both code and meaning saturation) (Patton, 2015; Hennink et al., 2019).

## Data collection

A total of five, 60-min virtual focus groups were conducted over Zoom over a 6-week period. Number of focus groups was determined by adequacy of sample based on data analysis and the size of each focus group (ranging from 2 to 6 participants) was based on the availability of participants for the scheduled focus group (Hennink et al., 2019). The research team member facilitating the interview read a standardized consent script aloud and participants gave verbal consent. Up to three research team members (ED, JH, CV) were in attendance who alternated between asking interview questions and taking notes. The in-depth, open-ended interview questions were developed by the research team based on the scoping review findings (Lardier et al., 2024), the reflections and feedback from three VCoP and ECHO for Education content experts, and additional relevant literature. Participants were asked what led them to join ECHO for Education and encouraged to describe their experience while attending ECHO sessions. Specific questions related to their experience in the ECHO for Education VCoPs included: what a sense of community meant to them in a virtual space; what factors increased their sense of connectedness and engagement; if the information exchanged in the ECHO session improved their teaching skills, deepened their knowledge as an educator, or impacted their students or colleagues; if they planned on continuing to participate in the ECHO for Education; and what factors would make them feel like continuing their participation. Each focus group discussion was audio recorded, transcribed by a third party, professional transcription service, reviewed for accuracy, and de-identified. All participants received a \$25 electronic gift card in gratitude for their participation and time they contributed to the study.

## Data analysis

Data analysis began and continued through the period of data collection to assess information participants were sharing until saturation of thematic content was reached (Charmaz, 2006). Interview transcripts were uploaded to NVivo (Lumivero, 2024) for analysis and we analyzed the transcripts using a team-based, interactive process, involving one PI (ED) and two graduate students (JH and CV). After

each member of the research team separately reviewed the transcripts, we used constructs from Wenger's CoP framework and results from the quantitative arm of the study to guide the development of an initial apriori coding scheme for data analysis. The PI entered this coding structure into NVivo software, and each research team member coded one transcript to assure accuracy. We then coded each transcript using the apriori coding scheme, meeting frequently to review and discuss the analysis process, refer to field memos, adding additional codes if necessary, and reflect on the coding analysis results until consensus was reached for each transcript. The research team members maintained an audit trail of discussion, reflections, and analysis decisions. Two study participants were randomly selected to review preliminary findings (Saldana, 2021); their reflections regarding the preliminary findings resulted in a deeper understanding and analysis of the data.

## Results

We conducted 5 virtual focus group interviews with 13 total participants between Fall 2021 and Winter of 2022. Twelve (92%) of participants identified as female, one as male, and 8 participants worked in rural/non-metro communities (63%) with 5 (37%) in urban/metro communities. The data analysis revealed that the participants' experience in VCoPs created by ECHO for Education was overwhelmingly positive, professionally and personally. Four core themes emerged from the analysis regarding their experience with the ECHO VCoP: 1) a sense of *feeling connected* with other attendees of the VCoP; 2) a *reduced sense of isolation*, especially during COVID pandemic related school closures with connection often more being the motivation to attend the ECHO than the topic of discussion; 3) appreciation and eagerness to *exchange new ideas* and develop new knowledge, especially specific to their context in rural New Mexico; and 4) an *increased sense of collaboration* with other participants. The findings and subthemes, are presented in detail in the following section.

### Theme 1: Sense of belonging and feeling connected

Participants shared the sense of connection they experienced through their VCoP, and the sense of professional community that was created. One participant described the experience as being connected and supported with shared interests:

I feel like that a good professional community is much less about, "Here's why I'm better than you," and more like, "Oh, that's cool. How did you do it? Can you show me and I'll show you this" regardless of whether it's for my science teaching or my special ed. or working with my GSA program, when there's literally only three teachers in the building and only two of them talk about it. You have to find a professional community somewhere else. (female 13, rural participant)

Participants defined the sense of community in different ways, such as a desire to collaborate, a sense of shared experience, and openness to hear others and offer support. One participant articulated how the VCoP provided a *safe place to share* with others of like-mind even when they held different opinions: "The sense of community is

just the ability to be around like minds, also around people that may have different opinions, but in a way that it's safe that we can kind of share ideas, grab ideas from others" (female 10, rural participant).

This sense of connection was often expressed in the support they felt from other VCoP members. One participant shared a sense of support even if she needed to withdraw from the CoP temporarily:

Definitely there was a lot of support and I mean, the fact that I was comfortable telling them, "I have to back out because I got my work dumped in my lap a whole year earlier than it was supposed to." And they were like, "Oh my God, we understand. Good luck and go forth and come back when you can." (Other) professional organizations where if I had needed to back out, I would have been shamed for it and (the participants) in ECHO did not do that. (female 12, rural participant)

Other participants described the connection in the VCoP as *knowing* the other participants through their VCoP and supporting each other through life events like the loss of a loved one:

The community is—I recognize the faces. I recognize the names (another participant) and I work for the same district. We've never been in a meeting together, but it felt really warm that here I was every week in this meeting with someone who I knew was just down the street. And so, I recognized names. I recognized faces. And when one of the leaders, when his wife died, we all mourned. We all felt something. And so, with a community you are not anonymous and you feel something when things happen to people. (female 6, rural participant)

The sense of belonging and feeling connected in a virtual environment is challenging: a key element to creating that dynamic is *building trust among participants* so that they feel supported and understood. Participants shared how this sense of safety was created through shared, common experiences:

I've never had an experience where I felt threatened or apprehensive about sharing information, but that could be because we were all trying to problem-solve or look for solutions to real problems that we had, and the ability to talk to people from different size districts, was also very helpful...I will have always felt like that was a very safe environment to share information—not personal information, as noted, but just about the common issues that come up in education. (female 11, rural participant)

Another participant related the support they felt from other members of the VCoP, and being able to ask for help from other participants:

So just being able to relate with people in different situations, and an understanding that I could share information with people who are empathic, people who are understanding. There was a time when I had to present. I was one of the presenters, and things were just falling apart that day, being in a small school. I was able to quick call (the coordinator) and just say, "This is what's going on. Can somebody please help me out?" I really felt like it was a place where I could be very open and say, "I need help." Even though we were online and still get that support. (female 9, rural participant)

## Rural reality

Most of the participants reported working in rural schools. VCoPs can connect individuals working within a specific discipline who are geographically isolated in rural communities. When connecting with other participants who worked and lived in rural communities, one participant described a shared sense of reality teaching in rural schools:

It's more of an understanding, better able to relate to people. And when I speak about some of the challenges our kids face with having to go home, and take care of animals and cattle and then quick run back because they have a volleyball game. A lot of the rural communities understand that much better than some of the bigger cities. So, it's more about, I guess, the norms of our little culture as a rural community. (female 9, rural participant)

Educators and school staff in rural school districts face considerable challenges working with fewer resources in their school setting and having less access to individuals with expertise to support them compared to what might exist in a more metro, urban community. One participant described how ECHO is able to bridge that distance and open the challenges to resources and connection: "ECHO does provide the resources, it's a great way to connect with people from all over the world, all over the country, all over the state" (female 10, rural participant).

The professional isolation experienced by individuals in rural communities can mean a literal physical isolation, manifested as large geographic distance from others resulting in an absence of working with colleagues and individuals with shared professional interests. Participants of the VCoP created by ECHO as eliminating the isolation, as described by one participant:

It was like, "Oh, I do not have to drive 200 miles..." we actually talked about the mileage between where I would have to drive from, and how many hours that was going to take, and how much gas that was going to take. And instead, I was able to access this wealth of knowledge and networking sitting in my chair at my desk. How can you beat that? That was a very attractive incentive for a small school like ours because no way is my (superintendent) going to say, "Oh yeah, sure. Take a day off a month, and let me pay for a sub for you. Oh yeah. That sub that we cannot get." So as far as the entire opportunity to be able to use technology in this fashion to truly get valuable resources shared, to develop networking, to me, that is fantastic. (female 11, rural participant)

Participants discussed how individuals in different geographic locations had access to different resources, comparing those in rural versus urban communities. One participant pointed out: "Sadly, I think if I had been in (the city) and known about ECHO, I probably would not have paid as much attention or been so reliant upon the information that other people had shared because I just had a greater access to information" (female 9, rural participant).

## Theme 2: Reduced sense of isolation

Working in rural school districts where the number of co-workers and diversity of teaching experiences and expertise can be limited, the VCoP offered the opportunity for participants to connect outside of their immediate school community. One participant described one of

the reasons she continued participating in the VCoP was to increase her connection to others of similar age and experience:

What got me coming back to it was the opportunity to interact with other teachers, especially other teachers in my age range because again, I'm teaching with teachers who are 30 years older than me on average, which makes it kind of hard to connect with some of my co-workers. (female 12, rural participant)

Participants from rural school districts who were isolated and alone in terms of their background training and content expertise described the importance of connecting with others who share a similar teaching background and content focus. One participant shared, "I would definitely say that for tiny schools it made a huge difference, because you just cannot collaborate with other people who teach your own topic when you *are* the department" (female 4, rural participant).

## Pandemic impact

The COVID-19 pandemic's impact on school settings was traumatic for teachers and school staff. Navigating school closures and subsequent re-openings was demanding and difficult for school staff, students, and the broader school community. Participants described the critical support they experienced by participating in VCoPs during the pandemic, which provided opportunities to reduce that sense of isolation and connect with teachers and school staff within the same state who were experiencing the same, state-level COVID policy changes, yet were isolated because of their geographic rurality. One participant shared these sentiments of connecting with other colleagues:

It's good just to connect with people and kind of know that we are all kind of going through some— and during the pandemic, we are all going through similar type things, whether it's a small district charter or large district, we all are having similar growing pains. So, it's kind of nice to know that there's others having the same misery as you sometimes. (female 10, rural participant)

Another participant identified that joining the VCoP was due in fact to the isolation they experienced during the pandemic and that their needs for connection and professional support were met: "(During COVID) I was desperate for two things. One was some kind of contact with human beings and secondly, ideas of how to teach in the great unknown" (female 7, urban participant).

## Theme 3: Exchange of new ideas

Participants identified value in the VCoP as a place to exchange ideas and learn about new approaches they can apply in their teaching practice. One participant communicated that the lack of new ideas in their current teaching environment was partly due to limited interaction with others, something the VCoP was able to counter: "We do not have a lot of in and out and not as broad a spectrum of culture in general and I got to interact with a lot of people [in ECHO...who are open to more pedagogical practices because there's a lot of stuff that does not change (here)]. So that was what got me into it" (female 3, rural participant).

The exchange of new ideas among participants was encouraged by Project ECHO, who created and maintained the VCoP. While the ECHO sessions scheduled presentations from experts in focused content areas to discuss with participants, it was the sense of building trust and community that was a priority, as exemplified by one participant:

I've done professional development where their idea of engagement is you are not allowed to look at anything except us. You're not allowed to take notes on anything except what we are doing. God forbid you engage with the person sitting next to you, and ECHO encouraged (it) as long as you were not being super distracting. Yeah, you could totally have a whispered conversation in the corner with someone in your group. Be like, "So this is what I did last week, and this is what we talked about the week before and I think it really worked." And they were encouraging for that, which allowed us to develop trust with each other, but also develop relationships. Then we could do some of the bigger group work and presentations that you kind of finish off the year with and that made a huge difference. (female 12, rural participant)

The potential to share ideas and learn from individuals outside of your immediate work place was helpful to think "outside of the box" and build confidence to try something new and consider what was possible. One participant provided the analysis of building their tool box:

"Sometimes you are kind of in your little fishbowl in your area, but when you get to meet people from other areas of the state, rural, urban, whatever, sometimes it helps generate ideas that maybe you did not think about, grab more tools for your toolbox so that you can kind of really do what you need to do at your site." (female 9, urban participant)

Participants were also clear that participating in the VCoPs were valuable in the increase in knowledge and skills: "I think it does add to the toolbox, and improve practice" (female 10, rural participant). In particular, engaging with more experienced participants who are working in a similar environment was a helpful, mentoring experience as explained by one participant:

To be able to sit and have somebody that's been a mini expert in an area and say, 'Look at this. This is what I've experienced. This is what a great resource is.' This is what we are doing in (my town). Even though you guys are down the road from us, we have similar situations. I may not have the exact tools that you guys have already been utilizing. (male 12, urban participant)

One participant was new to the teaching profession described how the exchange of ideas and strategies were important at that stage: "I was a newer teacher. And at that time, I was looking for strategies that worked in the classroom. And I was in the (ECHO) program, so that really supported that learning as well. And then through the pandemic, it kind of gave me some stabilization for myself, and that flowed over into my teaching for my students" (female 7, urban participant).

The format of the ECHO VCoP (didactic presentation by an expert followed by participant discussion and case presentation) provides the opportunity for VCoP participants to learn from an

expert while learning from each other. This format was not ubiquitously helpful for all participants all the time. One participant explained how the exchange of ideas with their peers was more helpful and what they learned most from:

When we were able to turn on our microphones and share after the presentation and talk about the presentation, that was when we were able to actually share the strategies and discuss the tools that we could use in our classrooms to help support the students and engage the students and provide the accommodations and modifications that were needed. And I think that's where I gained the most learning. I do not want to say that the programs that I've been through and the teaching classes I've taken were not any good, but I learned the most from sitting with my peers and hearing it. And then practicing it. (female 6, rural participant).

## Theme 4: Sense of collaboration

Participants found opportunities for collaboration among their VCoPs. The challenges of teaching in rural communities often equates to needing instructional resources and materials to address student needs, but individuals may not know what is available or where to access free resources online. The VCoP provided connection and collaboration among participants from both all types of communities to exchange ideas, as illustrated in the following quotes from two participants:

We have very limited resources and sometimes just being aware of what larger districts have been able to accomplish gives us a potential direction where we know we cannot always adopt the same things they do because of cost or staffing. But being aware of what is out there, sometimes you can find things that are similar, but you have to have some base knowledge of what's available. (female 11, rural participant).

The second participant described the importance of sharing resources that were free among VCoP colleagues:

Once COVID hit, we were all able to share like, "Hey, I found this new website. This is for free." We have no money. I do not have a single cent to my name for a counseling budget like a giant school. Any kind of resources that were available, I jumped on because if I can use it, I was able to share it with teachers in case there was something that they could find. (female 9, rural participant)

Participants also described the sense of collaboration as having access to their fellow VCoP participants whose experiences they valued as expertise, and from whom they can gain valuable knowledge and resources from each other. One participant explained:

"I think having access to (this) knowledge is very powerful so that you know that this has come from somebody who is, maybe they cannot coin themselves as an expert, but as a user of the information. Being able to access that information and say, "Oh, let me go look at this, and we can compare our notes to see what are we doing here that matches up with what they're suggesting or

their procedure or processes” is extremely valuable. (female 11, rural participant)

Some participants had other colleagues that they worked with who attended the same VCoP. These participants shared that their individual experience within the VCoP provided an opportunity for them to increase collaboration for their shared work in their school setting:

We developed a better understanding of what we were trying to do. At first, they were—I mean, they were kind of like, “Well, what is this?” But then once they participated through the semester, then they walked away, I think, with a better understanding of what we are trying to do, and now as we continue to roll it out, it’s a lot smoother of a process. (female 3, rural participant)

Participants expressed gratitude and value in being invited to other VCoPs formed by the larger Project ECHO network. These ECHO communities were often external of participants’ professional discipline or their own professional area of interest (e.g., healthcare versus education). However, because of their positive experience in their ECHO for Education VCoP, a proxy trust developed and a value of the information being shared with other ECHO VCoPs, participants felt welcome to join other VCoPs, listen, learn, expand their understanding, and often were able to use information in their educational setting. One participant described this experience:

I sometimes get information about other ECHOs, like ECHO for Healthcare. And when they have had broad topic things (like updating on COVID) I’ve been able to listen in. I feel like I’m getting very reliable information that’s relative and timely to my time and space. And so that reach goes beyond just my immediate need as an educator, just as a citizen, having access to that information, to me is important. I know maybe it’s not to other people, but I like to know what’s going on, and I feel like that’s a very reliable source of information. I trust it. (female 11, rural participant)

## Discussion

This research expanded on previous knowledge about CoPs by focusing on these communities within virtual spaces. Findings showed that ECHO for Education VCoPs provided opportunities for professional networking and development and offered time and space to support social and peer learning among professionals in predominately rural geographic work environments. The findings support the CoP Framework in several practices. For example, Wenger (1998) stated that social contexts are not separate from knowledge development, and that interactions between individuals promote understanding. Wenger further noted that participants in CoPs must be mutually engaged with others to build relationships within a community space and that participants must feel accountable for their participation and contribute to the discussion. Our results showed that ECHO VCoPs provided spaces where mutual engagement and accountability were evident, without establishing a formalized hierarchy for participants. Of note, the ECHO for Education model

incorporates a presenter to start the session by introducing or describing a problem or a concept. However, the session presenter changes regularly. Importantly, the presenter is not necessarily an “expert” but a participant who offers guidance and seeks discussion to support learning about a particular topic.

Further, our findings support evidence that teachers in rural areas who felt isolated benefitted from a perceived belongingness and connectedness to other participants in the ECHO VCoP (Rolandson and Ross-Hekkel, 2022). This was particularly notable among those new to the teaching profession who had yet to establish a strong professional network of support outside of their school environment. A reduced sense of isolation ties Wegner’s CoP model by bringing people together to discuss problems and share concerns regarding educational barriers in rural communities. These rural-specific outcomes deepen our understanding of VCoPs for educators, particularly since rural educators may experience fewer opportunities to gain advice from those across other settings. Despite the rural reality of frequently having less access to technology and dependable online connection/infrastructure than urban areas, the VCoPs operated in these rural areas successfully. Additionally, our results showed that Project ECHO helped less experienced teachers gain knowledge from more experienced teachers while diminishing the sense of isolation that can occur in geographically distant communities.

These factors were significantly heightened during the COVID-19 pandemic, when educational communities experienced confusion, isolation, and fear (Audrain and Basile, 2024). VCoP participants described feeling secluded during the pandemic. They provided the context that further amplified the study results by sharing how the VCoP supported them by reducing isolation and providing opportunities for collaboration amidst numerous ongoing policy changes. Participants reported that the VCoP helped them find comfort and connection while learning best practices to support online learning after school closures and format changes related to the pandemic, all important context as the school settings across the country continue to juggle the pandemic impact on school staff and students.

As participants described experiences of reflecting together on their similar but individual experiences across various school settings, the VCoPs demonstrated the unique CoP capacity to provide non-hierarchical environments for participant support and transformative learning that can propel their ideas and capacity forward (MacPhail et al., 2014; Sarid and Levanon, 2022). This was reported by those newer to the teaching profession as well as more experienced educators who acknowledged the added benefit that their VCoP experience provided, arguably overcoming previous barriers to collaboration. Providing a unique environment for self-reflection offered VCoP participants across the spectrum of professional experience the opportunity to develop professionally, learning from successes as well as negative experiences (Williams et al., 2021).

These results of the ECHO for Education VCoPs are promising and show clear benefits to educational systems through teacher support and professional development, as demonstrated in other settings (Hardesty et al., 2020; Dahl et al., 2023) and the potential to impact student outcomes (Lay et al., 2020). However, further research is needed. In our scoping review, few quantitative studies examined CoPs (Lardier et al., 2024). Quantitative assessment of VCoP characteristics and, more importantly, the impact of those characteristics on educational outcomes could refine our

understanding of the complex social and professional relationships built and sustained in virtual communities. Since VCoPs have demonstrated evidence of reducing reported feelings of isolation and increased support connection, collaboration, and idea exchange, they will likely be useful for professionals in other domains and disciplines. VCoPs are already used in healthcare and healthcare education domains (Sood et al., 2020; Linkewich et al., 2022; Serhal et al., 2022). Just as VCoPs in education can reduce educational inequities by supporting rural teachers, healthcare-focused VCoPs can and are impacting health inequities across communities, in part by allowing providers in rural areas to consult with specialists in urban health centers (Arora et al., 2014; Arora, 2019). Considering the large number of reported healthcare inequities in the United States, VCoPs could make a tangible improvement in health for rural patients. Similarly, healthcare education VCoPs provide open forums for students to engage together socially and educationally. This collaboration may help eliminate barriers to progression in academic programs and affect student attrition.

Project ECHO's impact on educational spaces, especially interconnecting urban and rural spaces can further enhance a sense of community between professionals by creating a space that allows for understanding of unique challenges that different educational spaces experience. The theoretical foundations of the CoP model are visible within these participants' experiences of information exchange, even without having a sense that there was one expert in the room.

## Mixed methods study

While this manuscript describes the qualitative arm of our larger, explanatory sequential mixed methods design, the results from our scoping review (Lardier et al., 2024) informed the conceptual understanding of VCoPs and the development of interview questions before engaging in qualitative data collection and analysis. This study design helped to strengthen not only the qualitative data collection and analysis, and by integrating both the quantitative findings and qualitative findings together, assisted with the interpretation of the scoping review results and final thematic analysis of the focus group interviews. The themes of connection, reduced isolation, access, and collaboration across different communities speak to how important this intentional space is to support rural educators.

## Strengths/limitations

This study strengthened our understanding of the impact of VCoPs in educational spaces, in particular the VCoP developed and supported by ECHO for Education. The results of the associated scoping review helped us to identify and clarify constructs related to VCoP outcomes that aided the process of data analysis: for example, it assisted in deciphering the difference between *increased capacity* and *increased skills* reported by participants. The study team members represented different disciplines, training and orientation to education, offering a deeper bench of experience and context to the study's sample recruitment strategy, data collection, and data analysis and perspectives that challenged one another to think outside of their discipline, and strengthened data analysis. Similarly, VCoP participants appear to share different perspectives and be supportive of each other regardless

of their discipline, which facilitated professional growth and limited professional silos. As we believe our study contributes to the evidence supporting VCoPs, our study does not come without limitations. First, our study only represents the participant experiences in ECHO for Education VCoPs. While a smaller sample size is rigorous by qualitative methodological standards, it is not nor is the predominance of participants identifying as female (92%) representative of all VCoPs supported by ECHO for Education. Expanding studies beyond VCoPs in Project ECHO programs outside of education and recruiting a larger sample can provide further insights that may have been missed in this study. Nevertheless, the contribution to the literature on VCoP and the benefits provided by spaces such as Project ECHO appear to greatly benefit for educational spaces, especially rural areas that are often neglected professional development opportunities.

## Data availability statement

The datasets presented in this article are not readily available because the qualitative interview data collected and analyzed for this article are restricted. Requests to access the datasets should be directed to [edickson@salud.unm.edu](mailto:edickson@salud.unm.edu).

## Ethics statement

The studies involving humans were approved by University of New Mexico Office of Research Integrity and Compliance. The studies were conducted in accordance with the local legislation and institutional requirements. The ethics committee/institutional review board waived the requirement of written informed consent for participation from the participants or the participants' legal guardians/next of kin because a waiver of consent was approved due to meeting the minimal risk criteria, defined as the "probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves, than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests."

## Author contributions

ED: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. DL: Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. CV: Data curation, Formal analysis, Investigation, Methodology, Validation, Writing – original draft, Writing – review & editing. JH: Data curation, Formal analysis, Investigation, Methodology, Validation, Writing – original draft, Writing – review & editing.

## Funding

The author(s) declare that financial support was received for the research, authorship, and/or publication of this article. This research



was supported in part through funding from the University of New Mexico Research Allocation Committee.

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## References

- Antinluoma, M., Ilomäki, L., and Toom, A. (2021). Practices of professional learning communities. *Front. Educ.* 6:617613. doi: 10.3389/feduc.2021.617613
- Arora, S. (2019). Project ECHO: Democratising knowledge for the elimination of viral hepatitis. *Lancet Gastroenterol. Hepatol.* 4, 91–93. doi: 10.1016/S2468-1253(18)30390-X
- Arora, S., Thornton, K., Komaromy, M., Kalishman, S., Katzman, J., and Duhigg, D. (2014). Demonopolizing medical knowledge. *Acad. Med.* 89, 30–32. doi: 10.1097/ACM.0000000000000051
- Audrain, R. L., and Basile, C. G. (2024). “Leaning into the leapfrog moment: redesigning American schools in a post-pandemic world” in Schools and society during the COVID-19 pandemic. ed. F. M. Reimer (Berlin: Springer).
- Bolliger, D. U., and Inan, F. A. (2012). Development and validation of the online student connectedness survey (OSCS). *Int. Rev. Res. Open Distance Learn.* 13, 41–65. doi: 10.19173/irrodl.v13i3.1171
- Charmaz, K. (2006). Constructing grounded theory: A practical guide through qualitative analysis. New York, NY: Sage.
- Curran, J. A., Murphy, A. L., Abidi, S. S. R., Sinclair, D., and McGrath, P. J. (2009). Bridging the gap: knowledge seeking and sharing in a virtual community of emergency practice. *Eval. Health Prof.* 32, 314–327. doi: 10.1177/0163278709338570
- Dahl, E., Sturges, H. A., Smith, O. K. H., Hardesty, C., Root-Elledge, S., Zlatkovic, S., et al. (2023). The use of the ECHO model for education as an innovative approach to educator professional development. *Front. Educ.* 8. doi: 10.3389/feduc.2023.1151915
- Davis, C., and Goodman, H. (2014). Virtual communities of practice in social group work education. *Soc. Work Groups* 37, 85–95. doi: 10.1080/01609513.2013.821021
- Delgado, J., de Groot, J., McCaffrey, G., Dimitropoulos, G., Sitter, K. C., and Austin, W. (2021). Communities of practice: acknowledging vulnerability to improve resilience in healthcare teams. *J. Med. Ethics* 47, 488–493. doi: 10.1136/medethics-2019-105865
- Ergün, E., and Avcı, Ü. (2018). Knowledge sharing self-efficacy, motivation and sense of community as predictors of knowledge receiving and giving behaviors. *Educ. Technol. Soc.* 21, 60–73. Available at: <https://www.jstor.org/stable/26458507>
- Gallo, J. (2020). Against the grain: narratives of rural teachers’ professional lives. *Rural. Educ.* 41, 1–13. doi: 10.35608/ruraled.v41i2.862
- Glover, T. A., Nugent, G. C., Chumney, F. L., Ihlo, T., Shapiro, E. S., Guard, K., et al. (2016). Investigating rural teachers’ professional development, instructional knowledge, and classroom practice. *J. Res. Rural. Educ.* 31, 1–16. Available at: <https://eric.ed.gov/?id=EJ1101917>
- Göktürk, S., Lidice, A., and Dikilitas, K. (2020). Evaluating an online professional learning community as a context for professional development in classroom-based research. *TESL-EJ: Teach. English Second Foreign Lang.* 24, 1–17.
- Hajisoteriou, C., Karousiou, C., and Angelides, P. (2018). INTERACT: building a virtual community of practice to enhance teachers’ intercultural professional development. *Educ. Media Int.* 55, 15–33. doi: 10.1080/09523987.2018.1439709
- Hardesty, C., Moody, E. J., Kern, S., Warren, W., Cooley Hidecker, M. J., Wagner, S., et al. (2020). Enhancing professional development for educators: adapting project ECHO from health care to education. *Rural Spec. Edu. Q.* 40, 42–52. doi: 10.1177/8756870520960448
- Harris, P. A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., and Conde, J. G. (2009). Research electronic data capture (REDCap): a metadata-driven methodology and workflow process for providing translational research informatics support. *J. Biomed. Inform.* 42, 377–381. doi: 10.1016/j.jbi.2008.08.010
- Hennink, M. M., Kaiser, B. N., and Weber, M. B. (2019). What influences saturation? Estimating sample sizes in focus group research. *Qual. Health Res.* 29, 1483–1496. doi: 10.1177/1049732318821692
- Jocius, R., O’Byrne, W. I., Albert, J., Joshi, D., Blanton, M., Robinson, R., et al. (2022). Building a virtual community of practice: teacher learning for computational thinking infusion. *TechTrends* 66, 547–559. doi: 10.1007/s11528-022-00729-6
- Lardier, D. T., Dickson, E. L., Hackett, J. M., and Verdezoto, C. S. (2024). A scoping review of existing research between 1990 and 2023: measuring virtual communities of practice across disciplines. *J. Community Psychol.* 52, 198–225. doi: 10.1002/jcop.23092
- Lay, C. D., Allman, B., Cutri, R. M., and Kimmons, R. (2020). Examining a decade of research in online teacher professional development. *Front. Educ.* 5:573129. doi: 10.3389/feduc.2020.573129
- Linkewich, E., Quant, S., Bechard, L., and Donald, M. (2022). Using a virtual community of practice to support stroke best practice implementation: mixed methods evaluation. *JMIR Form. Res.* 6:e31827. doi: 10.2196/31827
- Logan, J. R., and Burdick-Will, J. (2017). School segregation and disparities in urban, suburban, and rural areas. *Ann. Am. Acad. Pol. Soc. Sci.* 674, 199–216. doi: 10.1177/0002716217733936
- Lumivero (2024). NVIVO. Available at: <https://lumivero.com/products/nvivo/>
- MacPhail, A., Patton, K., Parker, M., and Tannehill, D. (2014). Leading by example: teacher educators’ professional learning through communities of practice. *Quest* 66, 39–56. doi: 10.1080/00336297.2013.826139
- Montali, L., Zulato, E., Frigerio, A., Frangi, E., and Camussi, E. (2022). Mirroring, monitoring, modelling, belonging, and distancing: psychosocial processes in an online support group of breast cancer patients. *J. Community Psychol.* 50, 992–1007. doi: 10.1002/jcop.22696
- Patton, M. Q. (2015). Qualitative research & evaluation methods: Integrating theory and practice. Thousand Oaks, CA: Sage Publications.
- Project ECHO (2023). Project ECHO: Moving knowledge, not people. Available at: <https://projectecho.unm.edu/>
- Project ECHO (2024). The ECHO model. Available at: <https://projectecho.unm.edu/model/>
- Rolandson, D. M., and Ross-Hekkel, L. E. (2022). Virtual professional learning communities: a case study in rural music teacher professional development. *J. Music. Teach. Educ.* 31, 81–94. doi: 10.1177/10570837221077430
- Saldana, J. (2021). The coding manual for qualitative researchers. New York, NY: Sage.
- Sarid, A., and Levanon, M. (2022). Rethinking the theory of communities of practice in education: critical reflection and ethical imagination. *Educ. Philos. Theory* 54, 1693–1704. doi: 10.1080/00131857.2021.1935234
- Seelig, J. L., and McCabe, K. M. (2021). Why teachers stay: shaping a new narrative on rural teacher retention. *J. Res. Rural. Educ.* 37, 1–16. doi: 10.26209/jrre3708
- Serhal, E., Pereira, C., Armata, R., Hardy, J., Sockalingam, S., and Crawford, A. (2022). Describing implementation outcomes for a virtual community of practice: the ECHO Ontario mental health experience. *Health Res. Policy Syst.* 20, 1–15. doi: 10.1186/s12961-022-00818-1
- Showalter, D., Hartman, S., Johnson, J., and Klein, B. (2019). Why rural matters 2018-2019: the time is now. Washington, DC: Rural School and Community Trust.
- Sood, A., Assad, N., Jarrell, W., Kalishman, S., Le Suer, K., Murillo, S., et al. (2020). A virtual community-of-practice approach by rural stakeholders in managing pneumoconiosis in the USA: a cross-sectional analysis. *Rural Remote Health* 20:5784. doi: 10.22605/RRH5784
- Tseng, F. C., and Kuo, F. Y. (2014). A study of social participation and knowledge sharing in the teachers’ online professional community of practice. *Comput. Educ.* 72, 37–47. doi: 10.1016/j.compedu.2013.10.005
- United Nations (2020). Recognizing and overcoming inequity in education. Available at: <https://www.un.org/en/un-chronicle/recognizing-and-overcoming-inequity-education>
- United States Census Bureau (2016). New census data show differences between urban and rural populations. Suitland: United States Census Bureau.
- Wenger, E. (1998). Communities of practice: Learning, meaning, and identity. Cambridge: Cambridge University Press.
- Wenger, E., Arnold McDermott, R., and Snyder, W. (2002). Cultivating communities of practice: A guide to managing knowledge. Brighton, MA: Harvard Business Press.
- Wenger, E., Fenton-O’Creavy, M., Hutchinson, S., Kubiak, C., and Wenger-Trayner, B. (2015). Learning in landscapes of practice: Boundaries, identity, and knowledgeability in practice-based learning. London: Routledge.
- Wenger-Trayner, E. (2013). “The practice of theory: confessions of a social learning theorist” in Reframing educational research: Resisting the what works agenda. eds. V. Farnsworth and Y. Solomon (London: Routledge).
- Williams, V., Mathis, D., Lee, V., Gibbs, A., Gilbert, B., Henry, B., et al. (2021). Critical reflection and communities of practice as professional development strategies for educators. *Int. J. Cross Discip. Subj. Educ.* 12, 4339–4349. doi: 10.20533/ijcdse.2042.6364.2021.0532

## Publisher’s note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.