The use of the ECHO model™ for education as an innovative approach to educator professional development

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After entering the workforce, educators may face novel problems of practice that require additional training. Ongoing professional learning and development (PD) is meant to provide the additional training necessary to ensure educators are prepared to meet those challenges. PD offerings should meet the recommendations of Adult Learning Theory, the Model for Teacher Change, and recommended best practices for adult learning and PD. The ECHO Model for Education is an effective, high-quality model of educator PD that satisfies such recommendations. Practical issues are discussed, and recommendations are made for those interested in implementing this innovative model for PD.

KEYWORDS

The ECHO model™, ECHO for Education, professional learning and development, education, community of practice

1. Introduction

Schools and their students can only be as good as their teachers and administrators (Guskey, 2002). Effective teaching that leads to positive student outcomes requires educators to not only understand content-specific knowledge related to their specialty area(s), such as reading or math, but also pedagogical principles that support implementation [Knowles et al., 1998; National Joint Committee on Learning Disabilities (NJCLD), 2000]. Ongoing professional learning and development (PD) is an essential strategy for educators to receive training on both pedagogical and content-specific knowledge and practices [National Joint Committee on Learning Disabilities (NJCLD), 2000]. In addressing the need for active and engaging PD, the ECHO Model™ (Extension for Community Healthcare Outcomes, Arora et al., 2007a,b) is an innovative way to provide high-quality, effective PD to educators while also supporting the implementation of best practices in local communities where expertise is minimal. Specifically, ECHO for Education is an effective form of educator PD that meets the needs of educators in regard to their learning and their ability to impact student outcomes.

1.1. Best practices for educator professional development

To achieve the goal of improving educational outcomes for students, educators first need to improve their instructional skills by supplementing their teaching with novel methods or

approaches that are informed by best and promising practices [National Joint Committee on Learning Disabilities (NJCLD), 2000]. The improvement of educator instructional skills is often done through ongoing educator training, which is commonly referred to as PD (Corcoran, 1995). PD is primarily provided for educators at district, regional, or state-level conferences such as formal workshops (Corcoran, 1995). While PD can lead to a stronger sense of self-efficacy in educators, when poorly designed, PD can result in educators failing to generate substantial change in their teaching approaches and practices (Corcoran, 1995). In order for educators to successfully incorporate concepts learned through PD into their educational practice, three core requirements must be satisfied: (1) the PD should focus on content-specific knowledge; (2) the PD must incorporate active, rather than passive, learning principles; and (3) there must be coherence between PD activities to align with educators' experiences and goals (Garet et al., 2001). Similarly, Donovan et al. (1999) outline three elements that are necessary to acquire, and subsequently master, new skills and knowledge. First, new information should correspond to the learner's existing knowledge and should be pertinent to the learner. Second, acquired knowledge should be applied under the guidance of an operational, conceptual, or theoretical framework. Lastly, to sustain learner progress, self-assessments and evaluations should be utilized.

A key issue with traditional PD, delivered through passive activities such as conferences and webinars, is that the PD is not always effective at producing change that positively impacts teacher practice. To promote advantageous change in teaching practices, PD for educators should incorporate principles shown to be beneficial for adult learners, as well as practices that lead to positive outcomes for students [National Joint Committee on Learning Disabilities (NJCLD), 2000]. Guskey's (1986) Model of Teacher Change (MTC) and Knowles's (1968) Adult Learning Theory are two theories that highlight features of PD that are likely to increase effectiveness. MTC asserts that PD is effective when it supports changes in teachers' educational practices, which leads to improved student outcomes and subsequently results in a change in teachers' attitudes and beliefs (Guskey, 1986, 2002). As educators receive feedback through the success or failure of new practices, they can tailor the practices to suit their own needs and observe concrete changes in student outcomes. This subsequently changes their attitudes and beliefs about those practices, making them a long-term feature of their repertoire of skills (see Figure 1).

A similar theory, Adult Learning Theory emphasizes: (1) adult learners' need to know why they should learn about a topic before they actually engage in learning; (2) their concept of self-direction and personal responsibility to engage in learning; (3) their life experiences and how those contribute to the learning experience; (4) their readiness to learn based on their unique daily needs; (5) their task- or life-centered orientation rather than subject-centered orientation to learning; and (6) specific motivators (e.g., salary increases, career mobility) that entice adults to engage in learning (Knowles et al., 1998). Essentially, this theory suggests that adult learners must be able to link the learning topic to their day-to-day activities. Given the tenets of these two theories, it is not the mere attendance of PD that initiates teacher change, but rather the actual experience of practices and knowledge garnered from PD as well as educators' personal investment and proximity to the issues at hand.

Darling-Hammond et al. (2017) reviewed several different PD models and determined that there are seven shared features of successful PD models. Specifically, successful models are focused on content, utilize adult learning theory through active learning, promote collaboration, support participants with coaching, model effective practices, allow for reflection and feedback, and are sustained over a number of ongoing sessions. A meta-analysis examining methods of adult learning revealed analogous findings (Dunst et al., 2010). Methods that displayed the greatest influence on learner knowledge, self-efficacy, attitudes, and skills actively included learners in the acquisition, use, evaluation, and reflection of new practice and knowledge (Dunst et al., 2010). Additionally, adult learning methods appeared to be effective when at least five adult learning characteristics (introduction by instructor, thorough explanation of new practice or knowledge, application, evaluation, and learner self-assessment) were implemented in training with at least 30 learners over multiple sessions for a total of at least 10 h of training (Dunst et al., 2010).

As an alternative to traditional in-person PD, forms of online or web-based PD activities have gained popularity because of their ability to reach rural districts and educators (O'Dwyer et al., 2007) as well as events like COVID-19 necessitating a move to virtual forms of PD (Hartshorne et al., 2020). COVID-19 specifically highlighted the need for PD that builds a community among participants that allows for the sharing of resources (Safi et al., 2020). Teachers during COVID-19 sought PD that was learner-centered, social, and self-directed (Trust and Whalen, 2020), demonstrating that virtual training of teachers is useful in improving their development (Stringer Keefe, 2020). With steadily decreasing state and federal education budgets, online PD also appeals to those in rural areas as they are able to increase accessibility to PD opportunities while keeping costs low (Stone-MacDonald and Douglass, 2015). However, while online PD may be a viable and feasible option for rural or time-constrained educators, there are additional complications with the use of traditional forms of PD that include a lack of interaction and the use of "sit and get" sessions. A lack of face-to-face interaction can create feelings of isolation in participants which can lead to lower levels of engagement and satisfaction (Cook and Steinert, 2013; McConnell et al., 2013). Social participation in a community allows learners to increase their overall level of professional competence as well as display this competency in day-to-day situations with the opportunity for feedback from other community members (Buysse et al., 2003; Anfara and Angelle, 2008), but without interactions with other members in online PD, these communities cannot be appropriately established. Thus, online PD should build a community for its members to interact and learn together, provide resources that are easily available for educators on their own time, connect experts to educators to train them on the needed skills, and focus on the needs of the participants. Many of the recommended best practices for educator PD are addressed by the adaptation of the ECHO Model in ECHO for Education.

1.2. Project ECHO®

Given the shift to online forms of PD, it is critical to develop innovative forms of PD that will have a positive impact on teaching practice and student outcomes. One novel PD model, Project ECHO, holds tremendous promise. Project ECHO was originally created to address the health disparities and lack of access to healthcare and
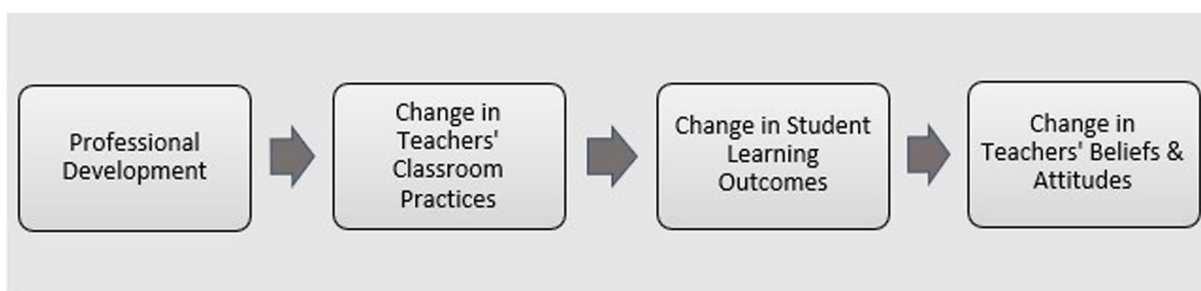
FIGURE 1
Guskey's (1986, 2002) model of teacher change.

TABLE 1 ECHO implementations.

Area	Source(s)
Asthma	Arora et al. (2010)
Behavioral health care	Hager et al. (2018)
Chronic pain	Scott et al. (2012); Anderson et al. (2017); Carlin et al. (2018)
Diabetes care	Arora et al. (2007a, 2010), Colleran et al. (2012)
Eating disorder treatment	Tantillo et al. (2020)
Education	Root-Elledge et al. (2018); Hardesty et al. (2020)
Geriatrics	Gordon et al. (2016); Bennett et al. (2018)
Medical education	Arora et al. (2010); Fowler et al. (2018)
Mental health care/psychiatry	Arora et al. (2007a, 2010); Scott et al. (2012); Mehrotra et al. (2018)
Obesity	Arora et al. (2010)
Opioid prescription management	Carlin et al. (2018)
Osteoporosis care	Lewiecki et al. (2016)
Pregnancy care	Arora et al. (2010)
Pulmonary disease	Arora et al. (2010)
Rheumatology	Arora et al. (2007a)
Rural regions	Arora et al. (2007b, 2010, 2011), Scott et al. (2012), Mitruka et al. (2014), Tahan et al. (2015), Carlin et al. (2018), Mehrotra et al. (2018)
Substance abuse/use disorders	Arora et al. (2007a, 2010), Scott et al. (2012); Komaromy et al. (2016); Mehrotra et al. (2018)
Veteran health care	Pfeifer (2012), Kauth et al. (2015)
Viral illnesses/infections	Arora et al. (2007b, 2010, 2011); Scott et al. (2012); Mitruka et al. (2014); Tahan et al. (2015)

specialists related to hepatitis C across New Mexico, particularly in rural and underserved areas (Arora et al., 2007a,b). The overarching goal of Project ECHO is to create a multi-directional knowledge exchange by providing content expertise and professional support to rural and high-risk locations that lack access to what is provided at university or large urban settings (Arora et al., 2007b). Project ECHO aims to create mentor-mentee relationships utilizing teleconferencing technology to allow for best practices to be shared and implemented in applied settings. Project ECHO has been generalized into the ECHO Model, which has been successfully utilized in a number of different contexts, including education (see Table 1). Given the increased accessibility and real-time delivery (e.g., case presentations, problem-solving, mentorship) afforded by the ECHO Model, this model represents an alternative to traditional PD for educators that conforms to adult learning theory and is especially beneficial for those in rural settings.

The ECHO Model is a formalized PD delivery model in which implementation is based on four core components: using technology to leverage scarce resources, training on core professional development topics, case presentations and ongoing mentorship, and outcome measurement. Implementing sites must be trained in the use of ECHO and agree to implement ECHO to fidelity. Like ECHO for medical settings, ECHO for Education adheres to all core components of the ECHO Model. ECHO for Education simply applies the model to the context of education and educators with adaptations to make this model relevant to the educational context. Implementation of ECHO is based on organizing a community of individuals in attending a series of meetings or sessions over a pre-determined period, however most networks are ongoing, taking place over multiple years and addressing evolving best-practices. Generally, this includes either bi-monthly or monthly sessions that are held virtually and include subject matter experts and individuals interested in connecting and learning about the topic. A set of sessions is often referred to as a network. While ECHO for Education fully adheres to the ECHO Model, there are a few small variations in comparison to the original, medical ECHO Model.

One of the most important adaptations of the ECHO Model for Education is the intentional focus of ECHO for Education on creating a community of practice (CoP; also referred to as professional communities, learning communities, and professional learning networks). CoPs are social structures that revolve around continuously updating and maintaining knowledge while also emphasizing member-to-member interaction as an essential feature that provides opportunities for professional development, outreach, and networking across geographical or organizational boundaries (Wenger et al., 2002; Brooks, 2010). The overarching goal of a CoP is to promote ongoing dialog and evolving relationships between colleagues that help to improve the knowledge and abilities of everyone involved (Golden,

2016). Further, learners capitalize on their learned knowledge through social participation once they are assimilated into a community of like individuals with similar goals (Palincsar et al., 1998; Barab and Duffy, 2000). Social participation in a community allows for learners to increase their overall level of professional competence as well as display this competency in day-to-day situations with the opportunity for feedback from other community members (Buysse et al., 2003; Anfara and Angelle, 2008).

ECHO for Education intentionally identifies each network as a CoP to reflect the importance of building a community of learners across disciplines and areas of experience, of building local expertise, and of emphasizing an alignment with the common practices and terminology of educators. While the traditional ECHO Model focuses on building mentorship relationships in order to transmit expert knowledge between the hub and spoke sites, ECHO for Education emphasizes the importance of network members working together to address the issues faced by rural educators. In following the principles of a CoP, ECHO for Education encourages network members—who display trust and respect for other members as well as commitment to the community itself—to exchange their thoughts, knowledge, and personal expertise with other members in order to enact change in practice (Wenger et al., 2002; Anfara and Angelle, 2008).

Ideal CoPs employ an equal balance of individual learning practices (i.e., learning through doing) and observing more experienced members of the community (i.e., learning from others; Wenger et al., 2002; Brooks, 2010). However, when there is a lack of access to colleagues in other schools or districts, increased rural isolation can decrease the likelihood of educators communicating their knowledge, successes, and failures with others (Johnston, 1994). While online PD can help professionals in all fields who are faced with rurality or underserved areas, the lack of face-to-face interaction in these programs fails to adequately address professional isolation (Arora et al., 2010). ECHO for Education utilizes traditional distance services such as e-mail, online presentations, telephone, fax, and video- or teleconferencing to provide members with links to colleagues. Participants in ECHO for Education report frequent communication with network members outside of network sessions to build relationships and continue to assist with issues discussed during network sessions (Root-Elledge et al., 2018). ECHO for Education is designed to create an ideal CoP by balancing the sharing of expertise with ongoing interactions from all network members.

Of equal importance in the adaptation of the ECHO Model for Education is the alteration of the medically-focused language that is used in the original ECHO Model. This includes altering terms such as "tele-clinics," "grand rounds," and "case presentations." Educators rarely think of their students as a case, or presentations regarding their students' behavior and outcomes as grand rounds. Therefore, within ECHO for Education, slight alterations of these terms are made. Reference to educators' places of work are labeled and discussed as the school/district within which the educator works. Cases discussed during network sessions are often referred to as problems of practice or student narratives. By subtly changing the terminology used within ECHO for Education educators are able to see the relevance of the model to their work, grasp the model quickly, and are not pushed away by unfamiliar medical jargon.

Another adaptation includes delivering the core learning content related to current problems and student needs identified by network participants. These topics are directly related to best and promising practice and include student outcomes in specific academic areas, strategies for addressing challenging behaviors, social skills, secondary transitions, early childhood, focusing on educator skills and strategies, or any number of other areas that are of relevance to current issues in education. ECHO for Education networks are also longer in duration, sometimes spanning years while covering the new and emerging topics in these areas. These extended networks bring back many of the same members who are looking to connect with their community. In addition to having a different focus on education topics, the evaluation of ECHO for Education looks slightly different when adapted from the original ECHO Model. Network evaluation must be centered on the specific outcomes that a network has selected, and therefore are unique to each. For example, a medically-focused ECHO network may want to measure the outcome of deaths associated with hepatitis C while an ECHO for Education network may want to evaluate the amount of time a student with Autism Spectrum Disorder (ASD) spends in a classroom.

1.3. Implementation and efficacy of ECHO in education

The first step in implementing ECHO is defining the focus of the ECHO network. Importantly, the focus of the network should address a community identified need. After understanding the need for the network, it is critical to establish an interdisciplinary expert hub team. Hub team members should be able to commit to designing and delivering the learning content for the duration of the network (e.g., 6–8 sessions) and should have sufficient content expertise to effectively deliver the materials to session attendees. For extended networks that are common among ECHO for Education, hub team members may remain on the hub team between network years or implementations, but new members may need to be identified prior to each new network implementation. Once the hub team is established, the network must recruit participant "spoke sites." These participants are typically individuals who are currently facing challenges addressed by the network, are interested in the network topic, or want to earn professional development credits. After a hub team has been established and spoke site participants have been identified, the hub team should ensure they are sufficiently prepared to organize and lead ECHO sessions.

Typical ECHO for Education sessions include brief introductions (~ 10 min), a short (~ 30 min) didactic session, a narrative presentation about a student with an associated discussion (30–45 min), and finally a wrap up that includes the sharing of additional resources (5–10 min). Sessions are organized by the hub team and run by session facilitators. In applying the ECHO Model to education, the importance of having strong session facilitators and ensuring that attendees are comfortable with all aspects of technology used for the sessions cannot be overstated. Overall, challenges can occur due to participants assuming ECHO for Education is a more traditional "sit and get" form of PD, so steps should be taken to explain the difference and build an active community of participants. Additional details on implementing ECHO for Education can be obtained from ECHO training sessions at ECHO Superhub sites.[1]

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1   http://www.uwyo.edu/wind/echo-replication/index.html

Prior work has demonstrated the successful application of the model for educators in the specific context of assistive technology (Root-Elledge et al., 2018), autism, secondary transitions, and behavioral supports (Hardesty et al., 2020), and family empowerment around educational goals (Moody et al., 2020). Root-Elledge et al. (2018) demonstrated that ECHO for Education was able to reach a wide range of individuals in rural areas and that both knowledge and reported skills of participants increased due to participation in ECHO for Education. This work laid the initial foundation for the efficacy of ECHO in Education. Hardesty et al. (2020) expanded on the work of Root-Elledge in demonstrating that ECHO for Education was also effective across additional contexts such as autism, secondary transitions, and behavior supports. Educator participants in these networks reported increased knowledge and skills and indicated high levels of satisfaction with this form of professional development. Moody et al. (2020) also demonstrated how ECHO was beneficial in supporting families with children with Autism. It was shown that the community created in ECHO helped parents and families take more ownership and support the educational goals for their children.

Data from the ECHO in Education Superhub at the University of Wyoming supports the efficacy of the ECHO Model for Education as a high-quality form of Educator PD. During the 2020–2021 ($n = 1,118$) and 2021–2022 ($n = 399$) academic years, evaluation data was collected from $N = 1,517$ respondents across five separate ECHO in Education networks (Act Early ECHO, UW ECHO in Assistive Technology, UW ECHO in Autism and Positive Behavior Supports, UW ECHO in Early Childhood, UW ECHO in Student Health). Respondents in these networks were asked to complete evaluation surveys after each session they attended. Professional development credits were offered for participation (if applicable to their profession) and attendance was not mandatory. Data were compiled across networks and respondents. Across both academic years, respondents reported very positive responses to items such as "Today's session has contributed to my understanding of (network topic)" (1–5 scale, 1 = Strongly Disagree, 5 = Strongly Agree) – $M = 4.35$; $SD = 0.77$, "Today's training topic was useful to me." (1–5 scale, 1 = Strongly Disagree, 5 = Strongly Agree) – $M = 4.53$; $SD = 0.64$, and "Attending today's session has helped me feel connected to other professionals or families." (1–5 scale, 1 = Strongly Disagree, 5 = Strongly Agree) – $M = 4.36$; $SD = 0.66$. Confidence was also high among participants in implementing what they learned from the sessions (1–5 scale, 1 = Not at all confident, 5 = Extremely confident) – $M = 3.79$; $SD = 0.88$.

Respondents also completed a retrospective assessment of their knowledge change. Across all networks, a paired samples t-test indicated a significant increase in knowledge, $t(1485) = -40.89$, $p < 0.001$, due to participation in the individual ECHO in Education sessions. A paired samples t-test was selected as responses were aggregated across all participations for the purposes of a single pre-post comparison as not every participant completed every evaluation survey. Responses were measured from 1—Not at all knowledgeable to 5—Extremely knowledgeable: "Knowledge BEFORE this ECHO session?"—$M = 2.98$; $SD = 0.89$, "Knowledge AFTER this ECHO session?"—$M = 3.76$; $SD = 0.72$. It should be noted that data was collected only from participants who elected to complete the evaluation surveys. These surveys were mandatory for receipt of professional development credits but did not capture all participants in the ECHO for Education sessions. Future research may learn more about the success of ECHO for Education by interviewing those

individuals who chose to discontinue participation in the ECHO networks. Overall, these findings indicate that the ECHO Model in Education is successful in providing skills, strategies, and a sense of community to educators in an effective way.

The adaptation of the ECHO Model to education is further supported by the alignment of ECHO for Education with the principles of MTC, Adult Learning Theory, and best practices for successful PD and adult learning. MTC suggests that PD causes teacher change due to the experience of practices and knowledge gained (Guskey, 1986) while Adult Learning Theory emphasizes the importance of the motivation to learn and outlines the way in which the content is delivered (Knowles et al., 1998). Overall, the use of case-based learning in ECHO for Education allows educators to bring real-world experiences into their learning through the mutual sharing of their interactions with students. The discussion of student narratives also allows educators to take skills, knowledge, and other participants' recommendations out of the PD environment and apply them in their classrooms or educational settings. Educators are also motivated to participate as the learning is applied and focused on topics that they have identified as areas of highest need. ECHO for Education also builds capacity for participants by connecting them to a virtual professional network that creates an ongoing learning community they can communicate with as they progress in their careers.

ECHO for Education additionally addresses all the key aspects of successful PD models (Darling-Hammond et al., 2017) and effective adult learning methods outlined in Dunst et al.' (2010) meta-analysis. ECHO for Education delivers core learning content about best-practices that have been identified and prioritized by educators. The content is delivered by experts and participants are asked to reflect on their learning and assess their progress via evaluation. The mechanisms of mixing best-practice, self-directed voluntary attendance, and real-time application and learning via discussion and student narrative presentations encourage discussion of day-to-day situations faced within their educational setting and encourage collaboration. The discussion of these experiences remain task-oriented as topics covered in the PD are specific to what is faced in the educational setting and offers educators specific motivators such as continuing education credits to allow for career and salary mobility. The engagement of the participants is also sustained across several sessions and a community of practice is built over several weeks or months for the educators. ECHO for Education as a form of PD follows the recommended best practices outlined in the literature and has been shown to be successful in past implementations.

2. Discussion

Ongoing PD is extremely important if educators wish to provide the best education they can for their students. Attending physical PD sessions may be very difficult for some educators, particularly those in rural locations, and many of the common approaches to PD (e.g., conferences, online webinars) do not follow best practices prescribed by Adult Learning Theory (Knowles et al., 1998; Garet et al., 2001; Tour, 2017), the MTC (Guskey, 1986), adult learning (Dunst et al., 2010), and successful PD models (Darling-Hammond et al., 2017). The adaptation of the ECHO Model for education addresses these issues associated with traditional forms of PD. Additionally, ECHO for Education offers aspects of PD which are not available through

traditional outlets and has been shown to be successful in past applications.

The ECHO Model (Arora et al., 2007a,b) was originally designed as a service and training network to transfer knowledge and expertise to rural healthcare providers. Since its inception, this model has been adapted to fit the needs of educators in a similar fashion (Root-Elledge et al., 2018; Hardesty et al., 2020), as small alterations to the model allow it to fit into an educational PD context. These changes include an emphasis on building a CoP, focusing on education-relevant topics, a departure from medically-focused language to more educationally-based language, and an evaluation strategy focused on the educational outcomes of interest. ECHO for Education networks successfully meet educators where they are and deliver high-quality PD that meets the needs they have identified.

In addition to highlighting the value of ECHO for Education for educator PD, this paper seeks to assist those interested in starting their own ECHO for Education networks. Maintaining fidelity to the original ECHO Model while responding to the real-time needs of the target educator community guides the process. A network must meet a need, bring expertise to all participants, encourage the engagement of members, and offer applied skills and techniques that can be applied in authentic educational settings. The core focus of the ECHO network is important to consider during the planning, recruitment, implementation, and evaluation processes. ECHO for Education networks also rely heavily on the quality of hub team members and session facilitators who oversee the day-to-day and long-term success of the network. The ability of the network to offer varying forms of continuing education credits is also important in building network participation among educators. The use of the components outlined here, along with immersive training in the ECHO for Education protocol, will ensure the successful creation of an ECHO for Education network. It should be noted that while the ECHO Model and ECHO for Education have been utilized in settings across the globe, ECHO for Education may not fit within all legal and regulatory frameworks and those interested in implementation should review local standards prior to implementation.

In conclusion, ECHO for Education is an innovative and effective form of educator PD. In comparison to traditional forms of PD, ECHO for Education saves time for educators by allowing participation from anywhere with an internet connection, responds to educator needs by allowing interaction and encouraging community, and offers specific and applied recommendations to educators via student narrative presentations and network feedback sessions. ECHO for Education has the potential to reach more educators and bring high-quality PD into a wide array of educational settings. PD is a vital component of improving educator self-efficacy and student outcomes, and ECHO for Education can provide educators with a collaborative learning community that is an accessible option for bettering future practice and improving student outcomes.

Author contributions

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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.

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