6 Evaluating Teacher Tech Literacies Using an Argument-Based Approach

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Introduction

Across the United States, the need for language teachers with technology-specific literacies is climbing, yet many teachers may be underprepared for such positions due to inadequate experience with or training in computer-assisted language learning (CALL) (Godsey, 2015; Lynch, 2016). What is more, language teacher education programs may struggle to equip teacher candidates with the tools they need to approach an ever-changing multimodal landscape (Borthwick & Gallagher-Brett, 2014; Nami, Marandi & Sotoudehnama, 2016; Sehlaoui & Albrecht, 2009). In the Northeastern US, in a region with critical need for language teacher training, faculty in an MS Bilingual Education & TESOL program took up the challenge to train PK-12 teachers using state-of-the-art videoconferencing technology. The present study showcases data taken from one course in this program, and uses an argument-based approach to validity (Chapelle, Enright & Jamieson, 2008; Kane, 2006) to make the claims that teachers in this course (a) were able to transform their traditional face-to-face teaching practices to sophisticated technology-mediated teaching practices within a synchronous online environment and (b) had equivalent content learning opportunities to those in the on-ground courses.

Language Teacher Education and Technology

The language teaching profession has been a leader in the pedagogical application of technology since the emergence of the Audiolingual method

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in the 1950s (Brooks, 1964; Richards & Rodgers, 2014). This leadership continues today as evidenced by the multitude of professional associations (CALICO, IALLT, AAAL-TEC, etc.) and academic journals (e.g., *CALICO*, *Language Learning & Technology*, *System*, etc.) dedicated to the topic, as well by the growth of graduate programs that focus on language learning with technology. At present, the exploration of technology for language teacher education has sought to bring language instructors closer together by means of telecollaborative virtual exchange programs, videoconferencing (VC), and synchronous chats, among many other innovative curricular uses. As a result, teacher education programs must ensure that their candidates receive adequate opportunities to gain practice incorporating the emerging technological infrastructure into their overall curricular blueprints (Sehlaoui & Albrecht, 2009).

Language teacher preparation programs have a responsibility to develop technologically literate professionals. The International Technology Education Association (ITEA) defines *technological literacy* as "the ability to use, manage, assess, and understand technology" (ITEA, 2003: 9). Following Cope and Kalantzis (2015) and New London Group (1996), we would argue that the term "new literacies" or "multi-literacies" is more relevant as it highlights the multitude of multi-modal, technology-mediated spaces and environments in which we live and learn today. Under the premise that they must be apprenticed into the communities of practice of their disciplines (Walqui & van Lier, 2010), teachers must – at least in part – have the opportunity to develop their technological *literacies* (knowledge and skills) within specialized communities of practice. How do we ensure that teacher education programs accomplish this? As Darling-Hammond et al. (2005: 200) argue: "For teacher preparation institutions to ensure that teachers know how to use the technologies that are part of the professional communities of practice, these, too, need to be infused into the content pedagogical courses that teachers take, so that they are using the tools within the disciplines themselves, not just learning about them in the abstract."

Teachers must have the opportunity to use the tools in the discipline of language teaching within their graduate programs in TESOL and Bilingual Education. As Darling-Hammond et al. (2005) suggest, the first and necessary step to building teacher tech literacies involves apprenticing teachers into the specialized communities of practice that will allow them to experience the types of learning that they can carry on into their own classrooms at a later date. Therefore, teacher education programs must provide the appropriate spaces, assignments, assessments, and learning goals that not only allow them to try out emerging technologies for pedagogical purposes but also involve mentorship into communities of practice that utilize these technologies.

This chapter showcases how viewing the development of teacher tech literacies through an argument-based approach to validity can help ensure that graduate teacher education programs offer teacher candidates opportunities to take part in specialized communities of practice that prepare them to use technology in practical and innovative ways. This preparation will help them transform their teaching, which may consist primarily of traditional face-to-face (f2f) pedagogies, into instruction that involves sophisticated uses of technology in synchronous and asynchronous computer-mediated communication (CMC) environments.

An Argument-Based Approach to Validity

Evaluation of teacher tech literacies is inherently complex (Borthwick & Gallagher-Brett, 2014; Nami et al., 2016). With the goalpost of educational technology in constant motion, measurement of teacher tech literacies in terms of specific technological tools is liable to be quickly outdated. Therefore, we must assess teacher tech literacies beyond their use or facility with individual technological tools. In order to incorporate the multitude of ways and contexts in which language teachers may use technology with their own current or future students, we propose an argument-based approach to validity (hereafter "an argument-based approach").

An argument-based approach (Bachman & Palmer, 2010; Kane, 2006; Messick, 1989) provides a framework for evaluating teacher tech literacies that does not depend on any tool or program per se, but one which can use evidence from specific contexts as backing to support claims about teachers' readiness to engage with technology for teaching in multimodal environments. An argument-based approach entails the development of two types of argument: (a) an *interpretive argument*, which provides a conceptual roadmap for justifying the use and interpretation of some measure, and later (b) a *validity argument*, which entails a critical analysis of evidence to support the inferences of the interpretive argument. This approach is based on practical argument structure (Toulmin, 2003), which has been commonly applied in non-mathematical fields such as law, sociology, and literary analysis (Chapelle, et al., 2008). An argument-based approach entails linking chains of reasoning (claims) together on the basis of data or observations (grounds). Figure 6.1 shows an example of this for the *domain definition* inference, the first step in an interpretive chain of reasoning, which, within this study, relates the skills of using technology in general to using technology for specific pedagogical tasks.

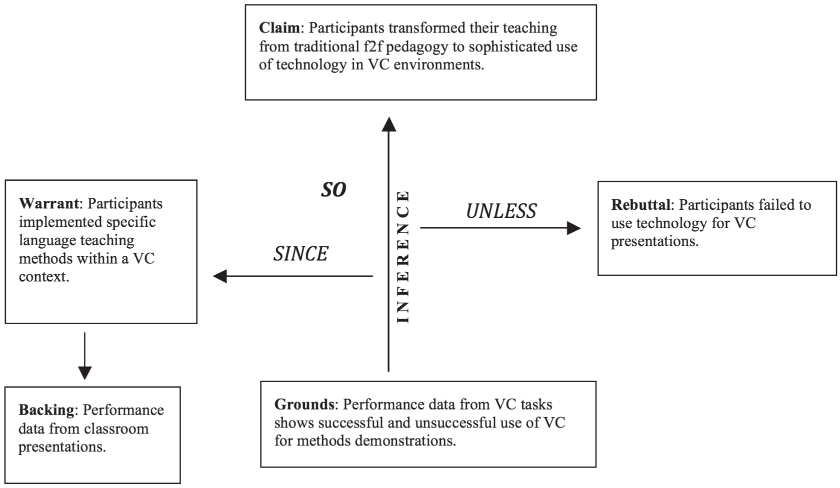

Figure 6.1. An example structure of the domain definition inference of an interpretive argument for teacher tech literacies

According to Jamieson et al. (2008), the assumptions underlying the domain definition inference include ensuring that the types of assessment tasks that take place in the classroom (pedagogical domain) are representative of the academic domains in which teachers will eventually work with their own students (target language use domain). In other words, in order to ascertain how teacher candidates might be expected to perform in the real-world domain (i.e., their classrooms), we first need to ensure that teachers are successfully executing learning tasks that assess their technology-specific literacies over the course of their professional development or graduate study.

Once a clear domain has been defined, the second inference called *evaluation* makes the claim that our observations of student performance on assessment tasks are evaluated in a way that allows us to provide observed scores that are reflective of the targeted abilities (Chapelle et al., 2008). Backing is provided in the form of equivalent scoring on the rubric used to evaluate teachers' effectiveness in delivering instruction using different language teaching methods across VC and on-ground courses. Observed teacher candidate performance is examined as a measure of tech-mediated teaching, which is highly relevant for determining the meaning of in-class practice for future authentic teaching performance. Figure 6.2 showcases five inferences of a possible interpretive/validity argument, specifically those of: *domain definition*, *evaluation*, *generalization*, *extrapolation*, and *utilization*. To support the first two inferences of an interpretive argument

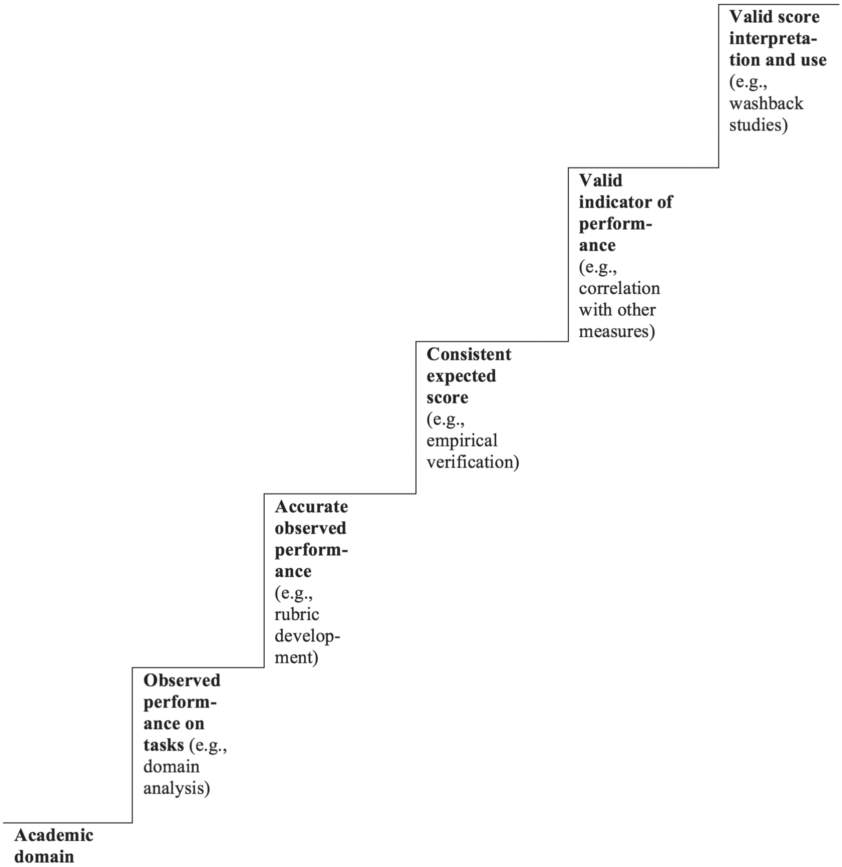

Figure 6.2. Steps of a validity argument, adapted from Chapelle (2008: 349)

(domain definition and evaluation), backing for this study is provided in the form of direct evidence of teachers using and being evaluated on their use of synchronous CMC for the demonstration of specific language teaching methodologies during a TESOL methods course taught entirely using VC.

As shown above, an argument-based approach allows us to construct a chain of reasoning that will determine our participants' facility with technologically infused pedagogies. It begins with the domain definition inference, which clearly lays out the context and the technologies used within this context as a prerequisite to further evaluation. Although domains for language teacher education may change as can the technologies within these contexts, clearly describing the domain in our context allows us to subsequently evaluate teachers' tech literacies for language instruction in our domain-specific environment. The second inference of the interpretive argument, evaluation, allows us then to assess context-specific teacher tech literacies to ensure comparability across on-ground and VC course modalities. Although a full interpretive and subsequent validity argument, as shown in Figure 6.2, is beyond the scope of the present chapter, we will show how the first and second inferences of an interpretive argument play a role in evaluating teacher candidates' tech literacies in a VC course environment.

Methods

Context and Participants

The data for our study were collected during the third semester of a required TESOL methods course in an MS in Bilingual, Multicultural Education and TESOL program at a medium-sized university in the Northeastern US. Courses in this program were taught in both on-ground formats as well as in a newly instated VC format, which includes students who are on campus as well as those who connect to campus from a distant location, two hours from the university's main campus. Without the distant course option, English-to-speakers-of-other-languages (ESOL) teacher candidates, many of whom were practicing PK-12 teachers working full-time at schools across the state, could not have enrolled in the graduate program at this institution.

A total of 12 teacher candidates participated in this course: six were located at a distant location and six participated from the university's on-campus technology-equipped classroom. All the ESOL teacher candidates were matriculated graduate students. The off-campus group was located within two hours' drive from the university and gathered in the same classroom for a total of 2.5 hours of class weekly. Self-reported data indicate that only one of the ESOL teacher candidates had significant experience with technology prior to entering the MS TESOL program, and it was he who served as the tech liaison for his school district. The other ESOL teacher candidate participants reported a basic technological understanding and experience that included work-related use of computers, overhead projectors, video and audio equipment. All ESOL teacher candidates from the distant cohort had taken two prior courses in the graduate program using the same VC technology in the two semesters leading up to this study. Only half of the on-campus cohort had participated in a VC-technology-mediated synchronous online course prior to taking this class. Thus, the majority of students (75%) had experience using the particular state-of-the-art technology available in the videoconferencing classroom before the start of the semester.

The videoconferencing classroom on-campus was equipped with a Cisco Sx80 Telepresence system, two Precision 60 cameras, several Clear One Pendant microphones, three 70” HD monitors, a Touch Panel room controller, and a wireless Lavelier microphone for the instructor. The classroom used an SIP gateway to receive telepresence phone calls and also had the ability to use the BlueJeans telecollaboration service to which the university was subscribed. The distant videoconferencing classroom was also equipped with two monitors, but had none of the other state-of-the-art features, such as a touch screen or pendant microphones. Instead, the distant cohort had to rely on a more basic technological setup than the on-campus students.

Data Collection and Analysis

The data in our study were captured by videorecording 10 out of 15 total class meetings over the course of one semester. The videorecorded sessions focused on capturing the ESOL teacher candidates’ teaching demonstrations using a variety of traditional and contemporary language teaching methodologies. These methodologies create a broad theoretical foundation upon which further development of more specialized techniques for teaching English learners (ELs) would be built during a second TESOL methods course the following semester. The rest of the time in the course, ESOL teacher candidates engaged in discussions about the connections between second language acquisition theory and language teaching methodologies. The researchers, faculty members in the MS TESOL graduate program, viewed the videorecordings of these class meetings and carefully selected three teaching demonstrations for qualitative multimodal analysis by two experienced and one inexperienced users. This selection was guided by our goals to shed light on how ESOL teacher candidates’ implementation of different pedagogical methodologies could be adapted to the VC environment as well as to determine whether ESOL teacher candidates were capable of successfully engaging with technology to implement their teaching demonstrations. Each of the three selected demonstrations included a different approach to language teaching: (a) a student-centered experiential methodology using Total Physical Response (c.f. Asher, 1982), (b) a teacher-directed methodology like the Audiolingual method (c.f. Brooks, 1964), and (c) a task-based methodology (c.f. Nunan, 2004; Willis & Willis, 2007).

In order to determine teacher candidates’ success delivering language tasks using VC, an assessment rubric was used (Appendix A). This rubric was developed and implemented for a number of years prior to this study to evaluate teachers’ demonstrations of various teaching methodologies in the on-ground graduate classes. To illustrate that teacher candidates' delivery of teaching methods using VC was equivalent to that of on-ground courses, we used the same rubric as in the past to compare their scores. We also transcribed the oral discourse of the selected demonstrations and then conducted a multimodal analysis, which included checking for the presence of the unique features of each method as well as coding multimodal (e.g., movements, body language, gestures) and linguistic data across on-campus and distant classrooms.

Our analysis focused on providing evidence for the Warrant for the domain definition inference (shown in Figure 6.1) that ESOL teacher candidates implemented specific language teaching methods within VC contexts across campuses, in order to provide backing in the form of performance data from classroom assignments. The results of this analysis, including teacher candidates' ability to accommodate their teaching demonstrations to the VC context and thus showcase their growing reliance on technology in language teaching, form the topic of the following sections.

Results

The results from our analysis of the teaching demonstrations showed that all the teacher candidates were able to adjust to a technology-rich environment. Table 6.1 reports the teacher candidates' scores on the teaching demonstrations across on-ground and distant pedagogical applications based on the assessment rubric in Appendix A. Through these scores as well as our observation of teacher candidates' performance, it became evident that ESOL teacher candidates were able to effectively integrate the new VC context into their teaching.

The equivalency of scores across teacher candidates' demonstrations from both on-ground and VC sections indicates that all teacher candidates were able to modify their teaching for the VC. However, a detailed qualitative analysis of the performance data during the VC teaching demonstrations shows that not all language teaching methodologies tended to lend themselves to the VC modality. We will now turn to the results of three

Table 6.1. Descriptive statistics of teacher candidate scores in on-ground and distant sections of the TESOL methods course

	Mean scores on teaching method demonstrations	Median	Standard deviation
f2f section (n = 12)	19.41	19.5	0.59
VC section (n = 12)	19.42	19.6	0.58

different types of videorecorded telecollaborative language teaching demonstrations carried out by teacher candidates in the VC section.

A Student-Centered VC Experience Using TBLT

In task-based language teaching (TBLT), the focus is on purposeful use of the target language (Nunan, 2004; Willis & Willis, 2007). In the demonstration of TBLT using VC technology, the teacher candidate (a student in the VC course) leading the demonstration provided his peers, who acted as middle school students for the purposes of the demonstration, with the task of developing a plan for a road trip. Sub-tasks included individual and group brainstorming, activation of vocabulary needed to complete the task, pair-share information gap activities, final development of the trip plan by small groups of students, and sharing of their itineraries from which the teacher candidate would choose the best in order to complete his own family's travel plans. Each of the sub-tasks was designed with supporting illustrations and handouts. Importantly, to accommodate the VC environment the "teacher" uploaded these documents to the course management system ahead of time for easy access by both local and distant cohorts.

During the task, "students" worked in small groups located on either side of the video bridge, as shown in the photograph in Figure 6.3. To complete the task, all students had opportunities to produce language as well as receive input in the form of language produced by others, both on and across campuses. The teacher played a minimal overt role in the development of classroom discourse with the exception of managing turn-taking

Figure 6.3. Students working in small groups on either side of the video bridge, on campus (left) and off campus (upper right)

during students' sharing of different sub-tasks. On-campus ESOL teacher candidates produced 10 utterances each while working in groups on their sub-tasks. Teacher candidates from the distant location produced seven utterances each as they engaged in extensive group conversations.

As shown in Text 1 below, in the final portion of the sub-task, the teacher candidate nominated his fellow students on each campus in turn to share their travel itineraries with the entire group. Neither group was unfairly advantaged or disadvantaged by the activity due to distance, as indicated by the equivalent opportunities for language output provided by the teacher.

Text 1. An excerpt of the final sub-task sharing of travel itineraries

Student 1 (on campus):	...We were saying on your first day you were going to do a bit of driving, and you're going to go to Ohio, and you're going to visit the Football Hall of Fame encampment, and then you're going to go to a Cavs game that night. Then, we thought you'd want to go to Nashville, which will take a little bit from Ohio, and listen to some country music and maybe go to a rodeo, and then you're going to work your way towards Colorado and go skiing in Durango.

Despite the apparently successful TBLT demonstration evidenced by a high score on the assessment rubric, the teacher candidate himself noted several inconveniences of using videoconferencing as a modality for this type of language instruction. For example, he was unable to record the results of student brainstorming due to the lack of a whiteboard in the classroom. He comments: "All right. If I had a whiteboard or anything, I'd put all your words up here."

A Teacher-Centered VC Experience Using ALM

The focus of this analysis is the demonstration of the Audiolingual Method (ALM). The ALM is known for its teacher-led, dialogue-centered, repetition-driven, and drill-focused, explicit teaching of language (Brooks, 1964; Richards & Rodgers, 2014). The teacher candidate who demonstrated ALM in this study relied on VC to exemplify most elements of this method for the participants on both ends of the video bridge. The teacher candidates who were acting as elementary students on both campuses were equally engaged in the repetition of the dialogue, drilling of the grammatical forms, including past tense verbs and contractions, and communicative drills – where

Figure 6.4. A teacher candidate (left, with sitcom image in the background) on campus leading students on both sides of the video bridge both on and off campus (right) using the ALM

students had to use specific expressions and phrases from the original dialogue to create their own conversation.

In the first phase of the lesson, the "teacher" orally introduced the dialogue to the "students" in class, illustrating it with an image from a popular sitcom as shown in Figure 6.4. Meanwhile, her peers acting as elementary students took turns repeating the lines from the dialogue. The "teacher" took seven turns and all "students" took the same seven turns in choral repetition. An excerpt of this task is shown in Text 2.

Text 2. An excerpt of the first phase of the lesson using the ALM showcasing dialogue repetition and drilling of grammatical forms

Teacher:	What did you do last night?
Students:	What did you do last night?
Teacher:	What did you do last night?
Students:	What did you do last night?
Teacher:	I watched TV, and I went online to talk to friends.
Students:	I watched TV, and I went online to talk to friends.
Teacher:	I went online to talk to friends.
Students:	I went online to talk to friends.
Teacher:	I went online to talk to friends.
Students:	I went online to talk to friends.

In the second phase of the lesson, the "teacher" assigned one role to an interlocutor in the distant cohort and another role to a second interlocutor in the on-campus cohort. "Students" on both campuses had an equal number of turns while practicing the dialogue.

In the third phase of the lesson, the "teacher" reversed this practice, asking one "student" from the distant end and another from the on-campus classroom to recreate the dialogue. Finally, the "teacher" drilled "students" across campuses on past tense forms and contractions via a substitution drill where she provided a verb form in the present tense and students chorally repeated that verb in the past tense. The same type of drill was used with contractions; however, at the end of the contractions drill, the teacher candidate asked individual "students" specific questions about what they did or did not do. When the "teacher" did not hear clear responses from either the local or distant cohorts, she called on "students" individually or campus-wide to respond. This is shown in Text 3.

Text 3. An excerpt of the final phase of the lesson using the ALM showcasing the "teacher" leading "students" across campuses in the contractions drill

Teacher:	Okay, [students on campus] now. I watched TV, and I went online to talk to friends.
Students on campus:	I watched TV, and I went online to talk to friends.

Based on this analysis, it was evident that VC did not impede the teaching demonstration using ALM for local and distant language learning. We observed equivalent participation from students on both ends and we found that the VC technology afforded the teacher opportunities to directly address any issues that occurred during the lesson. Moreover, the equivalent results on the aforementioned assessment rubric (Appendix A) across on-ground and VC sections indicate that the teacher candidate met all the requirements of the teaching demonstration.

A VC Experiential Content Lesson Using TPR

The final teaching demonstration chosen for analysis followed the Total Physical Response (TPR) method via VC in a simulated experiential science lesson. The TPR method is known for its integration of physical and linguistic processing of language (Asher, 1982). Traditional TPR involves students by engaging them in physical demonstrations of actions, repetitions of words associated with those actions, and pantomiming of propositions under study. The teacher candidate who demonstrated delivery of a lesson using TPR in this study had to rely on telecollaboration in order to get his peers, who played the role of middle school students, on both sides of the video bridge, physically and linguistically engaged. Figure 6.5 shows this setup.

Figure 6.5. A teacher candidate (left) on the distant campus leading students on both sides of the video bridge both on and off (right) campus using TPR in an experiential lesson

Right at the beginning of the presentation, it became evident that performing physical actions within a telecollaborative modality was not easily accomplished, particularly given the context of an experiential science lab.

The TPR experiential lesson consisted of three parts. First, participants were asked to point to images of laboratory-related objects that the distance-campus "teacher" named and projected for "students" on both campuses using a web-based presentation tool to control the slides. The projected images included artifacts from a science lesson, such as a beaker, a roll of paper towels, a microscope, an eye-washing station, a ruler, etc. In the second part of the lesson, participants had to take a virtual tour of the lab by physically moving their fingers clockwise and counterclockwise and "selecting" color-coded objects on the common screen. In the final part of the lesson, "student" participants verbally eliminated some of the objects from the screen while the teacher candidate predicted which objects they would keep. Text 4 below shows discourse from the first part of this lesson.

Text 4. An excerpt of the first phase of the experiential science lesson using TPR

Off-campus teacher candidate:	All right, boys and girls, uh, today we're going to be reviewing some of our laboratory equipment that we talked about last time. So, the first thing we're going to do is review some of the words that we looked at. So, we're gonna use our pointer fingers, and we're gonna point at the objects on our screens. Ready? So, we're gonna point to the beaker. [students on both campuses point to the beaker on their individual computer screens] Point at the beaker. Excellent.

While the overall lesson was carried out successfully as evidenced by the scores on the evaluation rubric, there were clear issues with "student" participants' physical involvement in the demonstrated experiential content lesson using TPR. Instead of touching, pouring, filling up, and trying on various pieces of lab equipment, participants were limited to pointing at and touching images on their screens or pretending to complete the required actions. This limited physical activity appeared to undermine the premise of TPR, which involves the creation of physical memory traces through word association and achieves this through relating students' physical actions to word meanings. In order to overcome inability to physically touch, pour, try on, etc.; participants had to attempt to remember the names of lab artifacts by linking words to their images. It became apparent that the VC modality during this lesson presented limitations due to the absence of tangible objects that could be manipulated by participants. These limitations were two-fold: first, it was difficult if not impossible to ensure that the classrooms on both ends of the video bridge had the same equipment; and second, as the equipment was not available, this resulted in "students'" physical manipulations being reduced to virtual pointing, which deprived them of the typical experiential involvement of TPR and other types of instruction involving embodied participation. Moreover, the virtual pointing by the distant cohort "students" was difficult for the "teacher" to evaluate.

Discussion

In order to guide our discussion of the above findings, we would like to reiterate that this study has shown how teacher educators implemented specific language teaching methods within VC contexts in ways that aimed to be equivalent across VC and on-ground sections of a graduate TESOL methods course. Our study thus provides backing for the domain definition and evaluation inferences of an argument-based approach (Bachman & Palmer, 2010; Chapelle et al., 2008). Performance-based data from classroom assignments involving VC teaching demonstrations of different language teaching methodologies were used to support the warrant that teacher-educators in an MS TESOL program altered their traditional face-to-face teaching to sophisticated use of technology in synchronous online environments in ways that were equivalent to those of their on-ground peers (Gleason, 2013). This change was evidenced by equivalent scores on the assessment rubric (Appendix A) across sections and a detailed qualitative analysis of three video-recorded teaching demonstrations in the VC section as previously discussed.

As argued by Chapelle (2011), an argument-based approach to validity is simple and requires two basic phases. The first phase involves an interpretive argument that lays out the conceptual tools needed to express the multifaceted meanings of pedagogical task scores (Kane, 2006). In the present context, we chose to focus on the first two steps of the first phase, providing backing for the domain definition and evaluation inferences, as shown in Figure 6.1. Evaluating teacher candidates' performance by first describing the domain and then comparing the teacher candidates' scores across distant and on-ground sections not only allows us to avoid "the need to define the construct, which has proven to be so difficult" (Chapelle, 2011: 20), but also allows us to evaluate teachers' tech literacies in our specific context without an overt focus on the tools themselves. As tools change, we need flexible and adaptable ways of assessing teachers' tech literacies without depending on the ever-evolving technology and without having to rely on a static construct definition for teacher tech literacy.

As it is important to ensure that VC classes offer equivalent opportunities for teachers to develop their tech literacies, we took an approach similar to that of Gleason, who applied an interpretive argument to formative language tasks in technology-embedded contexts, arguing that the interpretive argument can provide guidance for design and implementation of blended instruction to ensure that students have "equivalent access to content and experiences in both online and face-to-face settings" (Gleason 2013: 607). By utilizing the same assessment rubric across VC and on-ground sections of the TESOL methods courses, and by comparing teacher candidates' scores on this rubric, we ensure equivalent learning opportunities to build teacher candidates' knowledge and skills.

At the start of the project, we hypothesized that student-centered methods would be more difficult to adapt to the VC modality than teacher-directed methods due to their implicit need for f2f negotiation of meaning, collaboration across campuses, and a more flexible nature of learning. Although all methods were effectively demonstrated in the VC environment as evidenced by equivalent scores on the rubric used to evaluate teacher candidate demonstrations, appropriate adaptations for VC classes were needed. For example, through our observation and analysis, it became evident that certain activities (including collaboration and meaning negotiation) experienced through VC learning closely mirrored f2f tasks of the same nature. For instance, as shown in Schmitt, Gleason, & Verplaetse (2016), a popular discussion-focused activity of a Progressive Brainstorm (Gibbons, 2015), where students walk in groups around the room to orally discuss and then write down their responses to a variety of posted questions, can be successfully simulated in a VC-class by using Padlet™, a virtual whiteboard that can be organized for different groups to engage in discussion and writing in a synchronous mode.

On the other hand, a lack of experience and practice with technological applications can result in teaching challenges ranging from a lack of preparation with tech tools for specific classroom tasks to diminished learning experiences by students in the distant settings. Recall that in the recorded teaching demonstration using task-based instruction, the teacher candidate failed to record a list of vocabulary proposed by the "students" in his lesson, lamenting the lack of a whiteboard and later acknowledging that he had not thought of using the virtual whiteboard or the interactive screen for writing down his "students'" contributions. Apprenticeship into online pedagogical practices – actual experience simulating this task in a VC mode – helped this teacher candidate rethink the available tools and develop his teacher tech literacies (Walqui & van Lier, 2010).

Other traditional f2f classroom activities may be more difficult to substitute in online contexts. In sheltered content instruction (Echevarria & Graves, 2015), for example, student and teacher experiential involvement (e.g., body movements, gestures, physical artifacts to mediate learning) in the lesson is essential. However, the teacher candidate who demonstrated an experiential science lesson using TPR discovered that providing equivalent objects/artifacts used in the on-ground classroom to the participants in the distant classroom was problematic. In a traditional experiential science lesson using TPR, the actual lab equipment would be available to demonstrate the actions of touching, pouring, filling, and mixing. The lack of availability of these tangible artifacts across VC campuses presented a limitation to experiential science instruction using TPR within a VC modality. Indeed, anything that involves the manipulation of physical objects and experiences may be challenging to approximate with comparable virtual experiences. Nonetheless, as Gleason (2013) argued, it is essential that learners in distance and blended environments have equivalent learning opportunities as their traditional classroom counterparts, insofar as such equivalent learning opportunities ensure that online/blended courses will have a positive washback, positively impacting factors such as student retention.

From this discussion, it is evident that certain methods illustrated in the teaching demonstrations did tend to yield themselves more naturally to VC whereas others proved more challenging. For example, the results of the experiential TPR science lesson were comparable to other teaching methods demonstrated over the semester, such as Community Language Learning (CLL) and Suggestopedia (Richards & Rodgers, 2014), all of which require special adaptations to a typical classroom environment. In the case of TPR, students often have to manipulate realia in order to achieve a total physical response, whereas in the case of CLL and Suggestopedia, comfortable and cozy environments that are conducive to relaxed conversation are needed (Richards & Rodgers, 2014). This also has implications for teaching younger learners in a VC environment which is limited by the potential to touch, experience, and manipulate physical realia.

Overall, our study has revealed that it is not the nature of the teaching method (i.e., teacher-centered, learner-centered, or learning-centered) (Kumaravadivelu, 2006) that determines the quality of online teacher preparation in a VC context. In fact, all 13 demonstrated language teaching methods were successfully presented and experienced by the participants as evidenced by the equivalent scores on the teaching demonstration rubric. This lends credence to the fact that students in both traditional and VC sections of this TESOL methods class had access to equivalent learning experiences.

The comparison of the results provided by the assessment rubric and the detailed analysis of the teaching demonstrations indicate that the rubric on its own may not provide a complete picture of teaching success. The rubric as it currently stands was unable to capture the deficit of the advanced preparation for physical presence of realia and availability of the virtual whiteboard in a VC classroom. Therefore, we propose an enhanced rubric, shown in Appendix B, which specifies the importance of making provisions for VC contextualization of teaching. Such an enhanced rubric could better help teacher candidates consider the demands of online teaching a priori, resulting in the development of their tech literacies for teaching in VC modalities.

Conclusion

Our study has relied on an argument-based approach to validity to make the claim that teacher-educators in an MS TESOL program were able to transform their teaching using traditional f2f pedagogies to sophisticated uses of technologies in VC environments. Furthermore, by comparing teacher candidates' scores across VC and on-ground courses, we were able to show how these teacher candidates gained equivalent access to content, knowledge, and skills. Although our study draws on limited data, we believe that it has broader implications for assessing the development of teacher tech literacies as well as for VC language education more generally. Moreover, the inclusion of an enhanced rubric, such as that suggested in Appendix B, which encompasses the affordances and limitations of teaching and learning in a VC mode, would help teachers develop their tech literacies in this situated context.

To provide further backing for our claim that the teacher candidates in our graduate TESOL program were able to transform their teaching from traditional face-to-face pedagogical practices into sophisticated technology-based pedagogical practices, the remaining steps of an interpretive argument would need to be taken (e.g., generalization, extrapolation, and utilization). A complete interpretive argument would help construct an eventual comprehensive validity argument for teacher tech literacies. Such an argument would necessarily show that teacher candidates can successfully employ their developed tech literacies in a VC environment with their own students.

The affordances and limitations of technology for language learning must always be carefully weighed. In our context, there is a desperate need for language teacher preparation in CALL. Furthermore, already teaching full-time, many teachers would not be able to take advantage of such opportunities without access to distance educational programs which apprentice them into hands-on pedagogical uses of technology, such as those showcased in this study. Having a fully online language educator preparation degree is not an excuse to sacrifice superior educational preparation; on the contrary, teacher candidates must be well prepared in their content areas as well as have valuable, hands-on tech literacies that can be readily applied for real life teaching domains (Darling-Hammond et al., 2005). As we know, these real-life educational domains are swiftly changing and thus, teachers must have access to graduate teaching experiences that afford them authentic uses of technology for teaching and not just training with technological tools in the abstract.

Future research in this area will further explore additional inferences of the interpretive argument in order to ensure not only that language teachers are afforded opportunities to develop their tech literacies while in their graduate programs, but also that they are able to effectively implement such knowledge and skills in their own classrooms and with their own students. Further investigation will shed light on how the development of teacher tech literacies presents opportunities for students in distant locations to simultaneously learn language, learn content through language, and learn teaching methodologies that focus on domain-specific uses of technology.

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Appendix A

Original Assessment Rubric / Checklist for ESOL Teacher Candidates' Teaching Demonstrations Involving Various Language Teaching Methodologies

Checklist	**Yes**	**Some**	**No**
1. Did the lesson illustrate some of the key principles discussed in the readings?	2	1	0
2. Were the objectives measurable or observable?	2	1	0
3. Did the objectives describe skills appropriate for ELLs?	2	1	0
4. Were the activities congruent with the objectives?	2	1	0
5. Were the language and presentation of materials adapted for the specific needs of ELLs?	2	1	0
6. Were socio-cultural considerations included if appropriate?	2	1	0
7. Was the focus on meaning, with form attended to in function of the meaning?	2	1	0
8. Were content (topic) and form (language) integrated?	2	1	0
9. Was the reflection thoughtful and reference theoretical underpinnings to the pedagogical choices made?	2	1	0
10. Did the teacher explain any changes made in the plan?	2	1	0
Total /20			

Appendix B

Revised Assessment Rubric / Checklist for ESOL Teacher Candidates' Teaching Demonstrations Involving Various Language Teaching Methodologies

Checklist	Yes	Some	No
1. Did the lesson illustrate some of the key principles discussed in the readings?	2	1	0
2. Were the objectives measurable or observable?	2	1	0
3. Did the objectives describe skills appropriate for ELLs?	2	1	0
4. Were the activities congruent with the objectives?	2	1	0
5. Were the language and presentation of materials adapted for the specific needs of ELLs?	2	1	0
6. Were socio-cultural considerations included if appropriate?	2	1	0
7. Was the focus on meaning, with form attended to in function of the meaning?	2	1	0
8. Were content (topic) and form (language) integrated?	2	1	0
9. Was the reflection thoughtful and reference theoretical underpinnings to the pedagogical choices made?	2	1	0
10. Did the teacher explain any changes made in the plan?	2	1	0
Total /20			
For VC teaching			
1. Were all the materials equally available to the participants in on-ground and distant settings?	2	1	0
2. Did the teacher make provisions for providing equivalent feedback to the participants in on-ground and distant settings?	2	1	0
3. Were all the online tools uploaded and ready for use in both settings?	2	1	0
Total /26			