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Article

CALL Teacher Training—Considerations for Low-Resource Environments: Overview of CALL Teacher Training

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Abstract

The pandemic in 2020 has profoundly impacted millions of people all around the world. We have experienced intense disruption in our daily lives. We have lost loved ones, jobs, motivation, and precious time that could have been used more productively. The pandemic did not distinguish between borders, race, or gender. It affected everyone but not equally, unveiling socioeconomic differences within and across countries in access to robust health care, tolerable working environments, and other basic needs. Inevitably, the pandemic has also disrupted the normal course of the way we teach and learn, especially in English for Foreign Languages (EFL) contexts. Administrators and teachers needed to suddenly reconfigure their in-person classes for online teaching while students had to adjust to this new way of language learning. As Godwin-Jones (2020) envisaged, this widespread switch to distance learning seems likely to be the new normal rather than a one-time occurrence.

Considering Hubbard and Levy's (2006) concern that "both language teachers in training and practicing teachers will find themselves at a disadvantage if they are not adequately proficient in computer-assisted language learning," it is now even more crucial for language teachers to develop skills, knowledge, and understanding of technology use in language teaching. As Oskoz and Smith (2020) pointed out, this new era in language teaching and learning provides a unique opportunity to investigate the affordances of technology and harmonize these affordances with learner, teacher, and curricular objectives. Thus, taking a fresh look at teacher training for computer-assisted language learning (CALL)

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in order to see how these affordances can be better implemented, especially in low-resource contexts, seems like a perfect place to start.

In this article, we first discuss some critical issues in CALL teacher education. Then we introduce an online CALL teacher education (CTE) course by explaining how these issues have been implemented in designing the course. We conclude by providing practical guidelines on how to design online professional development courses in the language teaching field.

Keywords: CALL teacher training; teacher education

1. Introduction

The pandemic in 2020 has profoundly impacted millions of people all around the world. We have experienced intense disruption to our daily lives. We have lost loved ones, jobs, motivation, and precious time that could have been used more productively. The pandemic did not distinguish between borders, race, or gender. It affected everyone, but not equally, unveiling socioeconomic differences within and across countries with respect to access to robust healthcare, tolerable working environments, and other basic needs. Inevitably, the pandemic has also disrupted the normal course of the way we teach and learn, including in English as a foreign language (EFL) contexts. Administrators and teachers needed to suddenly reconfigure their in-person classes for online teaching, while students had to adjust to this new way of language learning. As Godwin-Jones (2020) envisaged, this widespread switch to distance learning seems likely to be the new normal rather than a one-time occurrence.

Considering Hubbard and Levy's (2006) concern that "both language teachers in training and practicing teachers will find themselves at a disadvantage if they are not adequately proficient in computer-assisted language learning," it is now even more crucial for language teachers to develop skills, knowledge, and understanding of technology use in language teaching. As Oskoz and Smith (2020) pointed out, this new era in language teaching and learning provides a unique opportunity to investigate the affordances of technology, and to harmonize these affordances with learner, teacher, and curricular objectives. Thus, taking a fresh look at teacher training for computer-assisted language learning (CALL) in order to see how these affordances can be better implemented, especially in low-resource contexts, seems like a perfect place to start. The next section provides details about different resource settings.

Table 1:
Characteristics of Settings

Setting	Characteristics
Low-resource, low-access setting	With a computer but no projector or internet in the classroom
	With internet access outside the classroom
Mid-resource, mid-access setting	With computer lab and internet but low bandwidth and unreliable access
	With one computer and a projector in the classroom
High-resource, high-access setting	With lab available and computers in each classroom, high-speed internet
	With the L2 students in a networked computer lab

2. Low-, Mid- and High-Resource Settings

The TESOL (2008) technology standards (TTS) constitute a set of guidelines on how to integrate technology successfully into language learning and teaching activities. Intended for teachers, students, administrators, teacher educators, and researchers, these guidelines include several practical examples of using the standards to integrate technology into the teaching of a variety of L2 learner groups. The TTS also account for differences in technology infrastructure in different parts of the world by clearly providing various examples for low-, mid-, and high-resource and access settings (see Table 1).

In this article, we first discuss some crucial aspects of CALL teacher education. We then introduce an online CALL teacher education (CTE) course by explaining how these aspects have been implemented in designing the course. We conclude by providing practical guidelines on how to design online professional development courses in the language teaching field.

3. Language Teacher Preparation in CALL

Scholars and researchers in second language teacher education have long advocated for better preparing pre- and in-service language teachers to develop CALL skills in the 21st century (e.g., Hong, 2010; Hubbard, 2008). In CTE contexts, one crucial aspect of professional development is to train teachers to design language teaching materials using technology (Li, 2014; Sert & Aşik, 2018). Research shows a strong correlation between teachers' perceived self-efficacy and their effort and commitment to integrating technology into their instruction (Liu & Kleinsasser, 2015). For example,

Lee and Tsai (2010) found that teachers who can easily access the internet for instructional purposes have a higher level of self-efficacy. But this accessibility is not the sole factor that affects technology-enhanced instruction in language classrooms. Research suggests that lack of adequate teacher preparation limits the extent of teachers' technology integration into language instruction (Kessler, 2006).

In the same vein, Kessler and Hubbard (2017) argued that although in the last decade we have witnessed a rapid increase in options for using technology in language learning and teaching preparation, it can be challenging for both pre- and in-service language teachers (even for those who tend to experiment with emerging technologies) to select the best resource, tool, or application for a specific language-teaching goal. He also underlined that compared to the previous eras of technology in language teaching and learning, it has become easier for teachers to learn how to use these contemporary CALL tools for teaching with strong support and encouragement. Therefore, there is a tendency toward introducing both in-service and future teachers to CALL in CTE programs, so that they are better equipped with adequate CALL skills for use with their prospective students.

Recent studies on the use of CALL tools in language teacher education have tried to elucidate the issue of technology-enhanced language instruction. Some of these studies have investigated online discussions that were part of an online course in teacher training programs (e.g., Satar & Akcan, 2018; Sert & Aşik, 2018; Son, 2006). Others have explored the issue of *transfer* (i.e., bridging training and practice; e.g., Chao, 2015; Hlas et al., 2017), ethics in CTE programs (e.g., Shin, 2015), and open educational resources (OERs) in such programs (Borthwick & Gallagher-Brett, 2014; Pirkkalainen et al., 2017). We will now describe in greater detail these different perspectives in CTE research.

3.1 Online Discussions in CTE Programs

Several CTE programs have incorporated online community platforms for teachers to create an online community and learn from each other (Sert & Aşik, 2018). These platforms have significantly increased the number of studies that explore teachers' online engagement. The research into teachers' interactional patterns and their overall attitudes toward online discussions in teacher training programs provides invaluable insights for teacher trainers in developing CTE programs. Several studies show teachers' overall positive attitudes toward online learning communities in the CTE literature (e.g., Remesal & Colomina, 2013; Zhao et al., 2014). For example, Son (2006) examined the interaction patterns of in-service teachers of English as a second language/foreign language (ESL/EFL) in an online discussion

group created for a CALL course. The teachers in the study found the online discussion group to be a valuable way of learning CALL, sharing ideas and resources, and collaborating with their fellow teachers. But successful integration of online discussions into CTE programs is challenging for teacher trainers because their design should facilitate continuous participant engagement in meaningful learning thanks to carefully designed scaffolded activities that require multiple interactions for learners.

Recently, some researchers have been interested in understanding what affects participants' interaction in online discussions. For example, Satar and Akcan (2018) employed social presence and social network analysis to examine pre-service teachers' participation and interaction patterns in an online CALL course over two semesters. They found that there is an increased pattern in interaction in online courses over time, suggesting that variation and level of participation and interaction over semesters depend on the nature of the assigned tasks. Baek and Kim (2015) also reported a similar finding, suggesting that the nature of discussion tasks affected participants' interaction patterns in two Korean discussion communities with 100,000 participants. Thus, research indicates that when designing online discussions in CTE programs, course developers should consider such issues as the instructors' role in the discussions and the nature of the tasks. In both studies, more interaction was observed when the participants dealt with topics related to classroom teaching issues and tasks that required design, production, and sharing.

3.2 Transfer: Bridging Training and Practice

With the rapid development in technology, it has been apparent that the connection between language teacher education and the future of CALL depends on teachers themselves as gatekeepers, deciding which technologies enter their classroom and how (Hubbard, 2008). Therefore, to achieve transfer, teachers are expected to benefit from the technological knowledge and skills taught in the CTE courses, and to use the tools in their classroom (Egbert et al., 2002; Hegelheimer et al., 2004; Hong, 2010; Kessler, 2007). As technology has increasingly become an indispensable part of any regular classroom, teachers should go beyond simply transferring what was previously learned in a CTE program, because newer technologies are emerging at a dazzling speed.

In one example of studies that investigated the issue of transfer, Chao (2015) focused on the idea of consequential transition (Beach, 2003), exploring 19 in-service language teachers' transfer of knowledge they had learned in a previous CTE course into their own teaching. He identified four issues: thoughtful action planning, past experience refinement, limited use of technology, and reluctant use of technology. While challenging the view that transfer in CTE

must be about using technology, Chao suggested that the focus of teacher training courses should be on critical reflection regarding technology use. In other words, knowledge about a specific tool that was once learned might not be enough or even needed anymore, because the tool may be inaccessible now or may have been recently upgraded. Therefore, teachers should be encouraged to think more critically about their attitudes and positions toward technology (Chao, 2015), and teacher training programs should focus on the appropriateness and creative implementation of technologies, rather than just teach technical skills (Hegelheimer et al., 2004; Kessler & Hubbard, 2017).

3.3 Ethics in CTE Programs

CALL is a unique discipline that affords new modes of information presentation and knowledge creation in language learning and teaching, especially in today's world. The fast-growing body of new forms of creating and presenting content has eventually created a new era Maker Movement. In this movement, learners are encouraged to build their own projects individually or collaboratively (as researchers, writers, composers, developers, videographers, sound engineers, editors, producers, etc.), and share their content with others (Dubreil & Lord, 2020). However, herein lies a conundrum. As the pandemic revealed, there is a wide range of technical skills among our students, ranging from the highly proficient, truly Maker-type student to those who lack the basic technical skills to carry out simple tasks. In addition to being digitally literate enough to thrive in this Maker culture, learners should also be made aware of issues beyond technical competencies, such as ethical concerns when reusing or borrowing content created by others (Godwin-Jones, 2016). However, it is an irrefutable fact that determining the accuracy and appropriacy of content available online can be challenging, mostly because it can be difficult to identify the authors or publishers of online content. And the fact that there has been a staggering increase in the amount of data in recent years adds to this challenge.

While the data available to both students and teachers in this Maker environment in education are expanding every day, students, including pre-service teachers, are rarely taught about copyright issues and how to avoid plagiarism (Peters & Frankoff, 2014). As Godwin-Jones (2015) pointed out, many students are not aware of topics such as appropriate attribution, crediting of online content, and the use of Creative Commons licenses. But it is apparent that, like students, few language teachers have robust knowledge about these issues in the classroom setting (Shin, 2015), mainly because most teachers tend to think that copyrighted materials can be used for educational purposes (Averill, 2003). For example, teachers responsible for creating assessment materials

for a classroom-based test might download copyrighted audio files, images, or texts without permission due to a lack of awareness about the copyright of these materials.

One of the standards presented in TESOL's (2008) technology standards encourages language teachers to use technology in socially and culturally appropriate legal and ethical ways. This standard seems to be missing from many CTE programs (Shin, 2015). Since there is a risk of presenting inaccurate, inappropriate, and unethical materials to students if materials retrieved online are not critically evaluated by teachers, CTE programs should emphasize what is and is not allowed, how to avoid copyright concerns, and how to teach students about these issues. As Shin suggested, this emphasis should go beyond just a simple warning about violations to provide specific guidance on each topic. One possible caveat about the danger of copyright issues that could impact teacher trainees is that they might select inauthentic materials or abandon technology use in their instruction. Open educational resources might avoid this obstacle. But it is crucial to train teachers about ethical issues when using online content for pedagogical purposes. In the next section, we discuss OERs in more detail.

4. Open Educational Resources (OERs)

In parallel with the advancements in online learning, the idea of open content or knowledge has flourished, facilitating easy access to educational resources for learners and thus providing an equal education opportunity for learners around the world. One way of utilizing online learning for this purpose is through OERs, which allow learners and teachers to use, adapt, or reuse them. In 2002, as part of a UNESCO initiative, a group of academics met to discuss the OpenCourseWare initiative of the Massachusetts Institute of Technology, where the term "open educational resources" was coined (D'Antoni, 2009). As the primary contributor to the OER movement, the Hewlett Foundation (2008) defined it as

> teaching, learning and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use or re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials or techniques used to support access to knowledge. (Hewlett Foundation, 2008)

In other words, OERs could be viewed as resources created for educational purposes that are available either in the public domain or at no cost through their license.

As to whether OERs can realistically play a crucial role in improving the current situation of education throughout the world, Richter and McPherson (2012) identified several issues that OER developers should first overcome, such as lack of consideration of foreign context (i.e., failure to take the targeted learners' culture into consideration), insufficient information about the content (i.e., lack of description of the learning materials), and unadaptable content (i.e., materials that are impossible to alter). Similarly, in an attempt to explain the term "openness" with respect to OERs, Hilton and co-workers (2010) proposed an improved framework for these issues by identifying four features (four Rs) that OER contents should have: *reuse* (using all of the content at no cost), *redistribute* (sharing copies of the content), *revise* (adapting or changing the content), and *remix* (combining two or more pieces of content to create new content). They pointed out that if a resource does not provide all these features, it could be considered problematic.

So far, several researchers have investigated OERs in CTE programs. For example, Pirkkalainen and colleagues (2017), investigating instructors' online behaviors and their attitudes toward active participation in developing a collaborative OER, revealed that emotional ownership of knowledge (i.e., the degree to which individuals perceive that knowledge or resources belong to them) prevents teachers from sharing knowledge, which is similar to what Richter and McPherson (2012) highlighted regarding openness in OERs. In the same vein, Kursun and associates (2014), in their large-scale study, also pointed out that the majority of teachers in Turkey had concerns about legal issues that led to their ineffective application of OERs.

While in-service teachers shy away from using OERs in their instruction, pre-service teachers seem more enthusiastic about them. For example, Borthwick and Gallagher-Brett (2014) revealed that teacher candidates are relatively confident with open content, and that working with OERs can offer them fresh opportunities to acquire new technical skills for language teaching. Similarly, Thakrar and co-workers (2009) reported on a consortium, Teacher Education in Sub-Saharan Africa (TESSA), whose primary objective is to support instructors' professional development. They underline how the idea of harnessing OERs in teacher education potentially offers an innovative platform for teacher candidates, especially in regional areas where educational resources are limited.

4.1 The Future of Technology Integration in Language Teaching

The omnipresence of technology in our daily lives has shaped the new millennium. Inevitably, this dynamic technological world, where innovative ideas and algorithms evolve almost daily, has also impacted on the

instructional environment for language teaching. To keep up with their "digital native" generation students (Prensky, 2001), L2 teachers have experienced a new challenge in leveraging computer-mediated, internet-based technologies. Recently, Kessler (2018) has anticipated several areas in which technology will likely evolve and diversify in language teaching, such as collaborative approaches (e.g., collaborative writing projects and telecollaboration) and automation in language teaching (e.g., automated speech recognition systems such as Amazon Echo and Google Home, and automated writing evaluation). Also, Kessler thought that by immersing digital content in real-world environments or creating simulated and artificial environments, augmented and virtual reality technologies will allow L2 learners to experience target language culture when travel is not possible. Finally, while suggesting that few teachers have an awareness about what artificial intelligence (AI) and big data mean, and how they can be used in digital activities, Kessler conjectured that they will have a dramatic impact on the field of CALL. One example he provides for big data is the use of *corpora*, large collections of authentic texts, in language-learning and teaching activities. He suggested that although researchers have used corpora for decades to obtain authentic samples, the use of this application for pedagogical purposes is showing great promise.

These anticipations by scholars such as Kessler illuminate a path to follow for CALL researchers and practitioners. In the same vein, language teachers are expected to build an awareness of these innovations and find ways of integrating them into their classrooms (Kessler, 2018). But as Lomicka and Lord (2019) suggested, although CALL "has indeed made great strides in the past several decades" (p. 11), we are still at a stage in which technology is being used superficially in our classes. Therefore, we need to transition from talking about technology in general to focusing on the specific tools that truly maximize L2 learning and teaching. To achieve this transition, CALL researchers and practitioners should pursue their curiosity about the available tools and reveal the preferences of L2 learners and teachers, and the most appropriate delivery methods for different contexts (Lomicka & Lord, 2019, p. 12). These findings are especially crucial for teachers and learners in low-resource environments with limited access to the technology that is available in other parts of the world.

One approach is to provide language educators, especially those in low-resource teaching contexts, with professional development opportunities to learn effective methods for teaching with easy-access and free-use technology through a dedicated course. In partnership with FHI360 and the US Department of State, Iowa State University developed a global online course (GOC) titled "Using Educational Technology in the English Language Classroom." Next, we will describe different types of resources and access settings in terms

of technology infrastructure. Then we will outline the GOC: what it is, how and why it was developed, what course content and OERs are available, and how it addresses different resource settings, especially low-resource ones.

5. Global Online Course

The global online course (GOC) is an eight-week, CALL-based online course, titled "Using Educational Technology in the English Language Classroom," developed in 2020 by a team of faculty members and graduate students at Iowa State University (ISU) through a partnership with the US Department of State and Online Professional English Network (OPEN; see https://exchanges.state.gov/non-us/program/OPEN-Program). The GOC is designed to provide trainees with the opportunity to explore current methods and issues in the field of English as a foreign language (EFL) through the latest technology, and to build a professional network of colleagues around the world. Trainees are English language teachers from many different countries with varying backgrounds and contexts. For example, from January 2020 to March 2021, the course delivered 33 sections with 828 participants from 110 countries (see Table 2).

As Table 2 illustrates, the course participants come from a variety of resource settings. One of the notable differences between these settings is internet accessibility. Based on our pre-course survey results, an average of 98% of the trainees reported that they could access the internet from home or

Table 2:
An Overview of the Countries of the GOC Participants

Africa (e.g., Addis Ababa, Benin, Burundi, Cameroon, Cape Verde, Côte d'Ivoire, Dakar, Eritrea, Ethiopia)	60
East Asia and Pacific (e.g., Cambodia, China, Hong Kong, Indonesia, Japan, Korea, Malaysia, Mongolia, Myanmar)	179
Europe (e.g., Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Cyprus, Estonia)	214
Near Eastern Affairs (e.g., Algeria, Bahrain, Egypt, Iran, Iraq, Jordan, Lebanon, Libya, Morocco, West Bank/Gaza)	160
South and Central Asian Affairs (e.g., Afghanistan, Bangladesh, Bhutan, India, Kazakhstan, Kyrgyzstan, Nepal, Pakistan)	107
Western Hemisphere Affairs (e.g., Argentina, Belize, Bolivia, Caracas, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala)	108
Total	828

school, but only 15% of them stated that their internet is very reliable. The rest reported that their internet is reliable (54%), somewhat reliable (18%), not very reliable (12%), or not reliable at all (1%). This accessibility issue was also apparent in trainees' weekly discussions throughout the course. For example, Jin and colleagues (submitted) investigated the trainees' patterns of engagement in their discussion posts, in order to elicit the effectiveness of the professional development opportunities that the GOC course provides. They identified technology constraints as the fourth most frequent category out of 11. For example, one trainee commented that "a challenge or obstacle when using technology with my students is the possibility of my students to have access on the internet. It's really difficult to share your work/knowledge when your students cannot access internet."

The participants in the GOC also come from a variety of teaching contexts. Table 3 illustrates the teaching contexts that they represent.

While interacting with peers from various teaching backgrounds around the globe in an asynchronous computer-mediated communication (CMC) course, trainees acquire and maintain basic knowledge and skills in technology for professional purposes through hands-on learning via course readings, lectures, discussions, and major assignments that target each of the six skills of English language learning (i.e., vocabulary, grammar, reading, speaking, listening, and writing). In addition to their peer trainees, course participants also engage in professional communication with educational and technology experts (i.e., faculty members), teaching assistants (TAs), and program mentors

Table 3:
An Overview of Participants' Teaching Contexts

Teaching context	Number of participants
University	294
Secondary school	255
Supplementary English programs	133
Other	114
Primary school	113
Teacher training institution	74
Adult vocational school	35
Total	1,018*

* *Note*: The discrepancy between the number of participants in Table 2 and the number in Table 3 is due to some of them selecting multiple teaching contexts.

(i.e., graduate assistants). Faculty members in the applied linguistics program, as well as technology experts with extensive CALL experience, provide lectures in each of the six applied linguistics fields, while TAs grade and provide feedback for assignments and discussions, and program mentors help to mediate between TAs and trainees by acting as the first contact person to receive and redirect questions about the course.

The benefits of this kind of network are manifold. First, trainees engage in a series of professional development activities by viewing educational and technology experts' videos on the six skills of English language learning covered in the course (i.e., vocabulary, grammar, reading, speaking, listening, and writing). After viewing these lecture videos, they complete an assignment (e.g., creating a lesson plan) and interact with their peer participants from all around the world, which is another layer of their professional development engagement that allows them to see how a specific issue is handled in different EFL contexts. Second, trainees also engage in professional interaction with their section TAs and mentors. This type of engagement teaches trainees how to use a specific technology from their students' perspective, and how to provide constructive feedback, offer solutions when technology fails, and effectively organize their students in a collaborative assignment from a teacher's perspective.

5.1 Modules

Figure 1 represents a sample module (i.e., "Module 4: Reading"; see Appendix for an overview of the eight modules in the GOC). Each module starts with an overview page that includes the module objectives and a module packet. A module packet is the downloadable version of the online course, including all the necessary information (e.g., lecture and tutorial transcripts, assignment instructions, links to resources). This packet is especially aimed at trainees who have internet access problems. The overview page is followed by three lecture pages, each including segments from expert lectures on the associated topic with a brief description. The trainees can access the lecture videos via YouTube, or download them via Amazon AWS if they want to save them for further reference, or if YouTube is inaccessible in their countries. Then a reflection activity is presented that allows trainees to think critically and reflect on the topic of the module. Next, trainees' understanding of the module lectures is assessed through a short quiz called "Checking Your Understanding." This quiz is followed by a discussion assignment in which trainees interact with their peers by responding to a given prompt and posting a reply to at least one of their peers' posts. In addition to serving as a platform that triggers peer learning, the discussion assignment establishes a background for the major assignment of the module, which

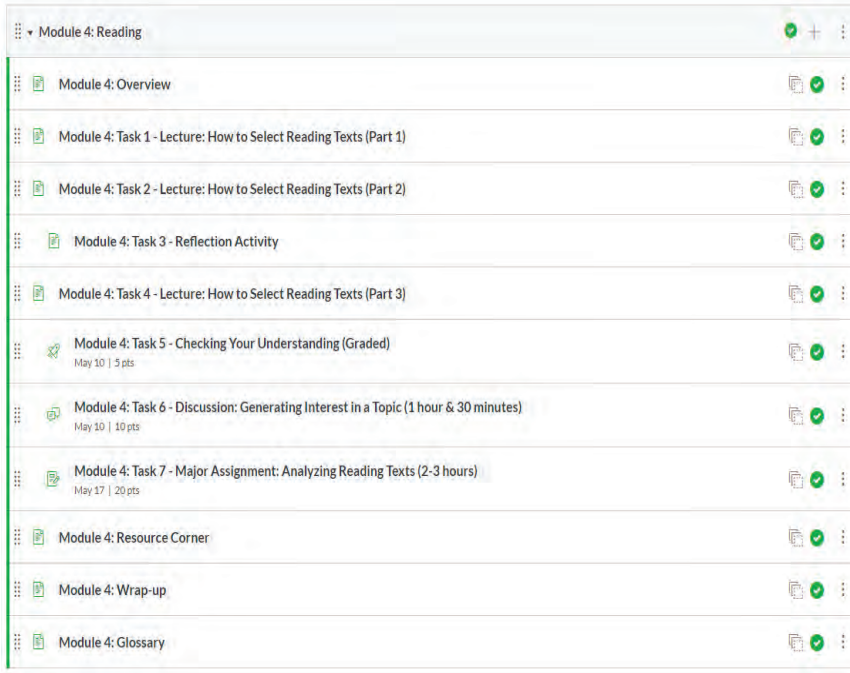


Figure 1. An overview of a module in the GOC.

follows this discussion assignment. Most of the major assignments allow trainees to create a fleshed-out lesson plan for a specific skill by integrating the technology tools presented in the module.

Since it is impossible to include all the technology tools in the lectures, the next page in the module is a resource corner, which serves as a dynamic platform that is occasionally revised to include up-to-date tools for each skill. The penultimate page in each module is a wrap-up page that summarizes the module and presents a checklist to ensure that trainees have not missed anything in that module. Finally, each module ends with a glossary page that includes all the essential terms of that week with a short description. For further information on the course and course content, see Kochem and associates (2020).

Next, we outline how the issues that we have discussed regarding CTE programs are addressed in the GOC.

5.2 Online Discussions

The discussions in the GOC are designed to elicit a high level of interaction. Based on the participant reflections in "Module 8: Portfolio Assignment,"

an average of 97% of the trainees in the GOC reported that they were satisfied with the opportunities to interact with other course participants. As we discussed, research suggests there are two specific issues to consider when designing online discussions in a CTE course: the instructors' role in discussions and the nature of the tasks (e.g., Baek & Kim, 2015; Satar & Akcan, 2018). Regarding the instructors' role, in the GOC, we use program mentors (i.e., volunteer PhD students) to ensure that there are no questions left unanswered, or comments that are vague or misleading. The mentors post comments that they believe will add value to the conversation. They provide thoughtful and engaging feedback, so that trainees will be inspired to contribute their own ideas.

Regarding the nature of the tasks, Jin and co-workers (submitted) identified a discrepancy between the frequency of questions asked by trainees in their posts and the responses they received in the GOC. They suggested that such a discrepancy could occur, because the discussion instruction specifically requires trainees to reply to peer participants' posts at least once. Thus, they proposed that higher levels of participant interaction could be achieved by providing instructions such as this: "Comment on at least three different participants' posts. Additional replies will be awarded extra credit."

5.3 Transfer

As we discussed, there are two different approaches for achieving transfer knowledge of the skills learned in a CTE course: effectively integrating into the classroom the tools learned in the course (e.g., Egbert et al., 2002; Hong, 2010) and critically reflecting on the knowledge and skills gained in the course regarding technology use (e.g., Chao, 2015). The GOC has taken both approaches in a balanced way by including (1) specific tasks that require trainees to reflect on either the previous content or the upcoming topic, and (2) several tutorials about the tools they need to use to complete an assignment. To see whether such transfer is likely to occur, we analyzed trainees' reflections at the end of the course about their willingness to share their new knowledge with others and designed ways to measure their learning gains. Our analysis indicated that an average of 81% of the trainees thought that the course helped them to develop a plan for sharing new knowledge with colleagues, and that it improved their knowledge of how to train other teachers. Also, all the trainees reported that they planned to share the knowledge they had learned about teaching with other teachers, mostly through presentations, workshops, and informal conversations. The GOC is designed to elicit trainees' learning gains in three ways: self-reported learning gains

Table 4
A Summary of Learning Gains

Self-reported learning gains in the final assignment	**Diagnostic and summative assessments**	**Overall course success rate**	
Top three learning gains	**Total gain %**	**Pass %**	**Fail %**
Google Docs (*n* = 535) COCA (*n* = 403) Readability tools (*n* = 262)	13	82 (*n* = 598)	18 (*n* = 128)

Note: 102 participants did not complete the course for reasons such as heavy workload (e.g., crowded classrooms, too many teaching and administrative duties), family issues, or unknown reasons.

through course participants' reflections in the final assignment, diagnostic and summative assessments, and overall course success rates.

Table 4 shows a summary of the learning gains of the 828 trainees in the GOC. As part of their final assignment, the trainees were asked to identify three major learning gains by referring to a specific component of the course. The top three tools they mentioned in their reflections were Google Docs in the collaborative writing module (*n* = 535), COCA in the grammar module (*n* = 403), and the readability analyzer tools in the reading assignment (*n* = 262). To provide empirical evidence of the trainees' learning gains, we asked them to complete a diagnostic assessment, consisting of 20 questions at the beginning of the course, and a summative assessment, consisting of the same questions at the end of the course, as suggested in TESOL (2008, p. 13). Both tests provided a general idea of our trainees' understanding of educational technologies and English teaching. The average difference between these two scores (i.e., the total gain) for the 828 trainees was 13%. We consider this gain as a contribution of the course to the trainees' professional development. As the final indicator of the learning gains, of the 726 participants who completed the GOC, a relatively high percentage (82%) successfully passed the course. Overall, then, the trainees who managed to complete the course and engage actively with the course content, including the lectures, major assignments, and discussions, could pass the course successfully.

5.4 Ethics

To help teachers and their students survive in the Maker culture (Dubreil & Lord, 2020), trainees need to be aware of issues such as appropriate attribution, crediting of online content, and the use of Creative Commons licenses

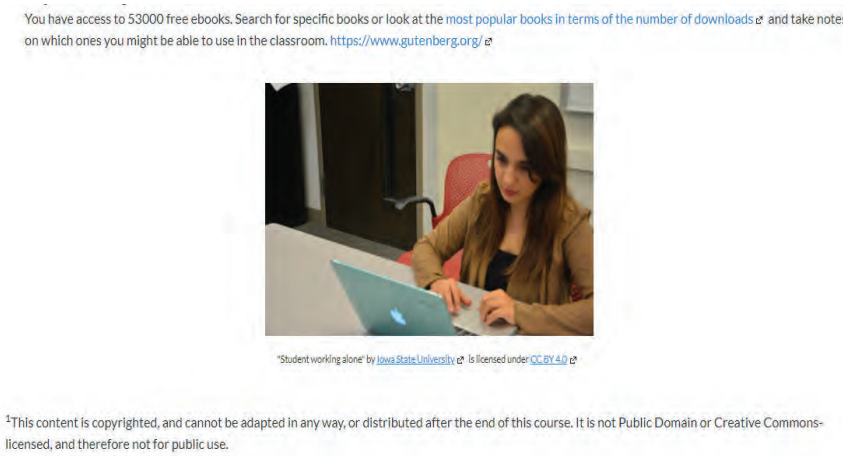


Figure 2. Different language for copyrighted content and CC BY 4.0.

when reusing or borrowing content created by others (Godwin-Jones, 2016). In the GOC, this issue is given utmost importance across modules throughout the eight-week course. For example, on the welcome page, trainees are informed about what plagiarism is, how it is handled in the course, and its possible consequences for the trainees. Teaching assistants and mentors also remind trainees of this issue regularly via the Canvas messaging system. Similar language is also placed under each assignment description page, which includes a sample assignment document that shows trainees what they are expected to submit.

In the GOC, trainees are provided with an extensive number of resources through external links, images, and files. Each resource is identified as either copyrighted, public domain, or Creative Commons–Attribution 4.0 International (CC BY 4.0) content with appropriate licensing language, as illustrated in Figure 2. Even though there is no specific lecture content dedicated to ethical issues in the GOC, trainees are exposed to frequent reminders of accepted and appropriate academic conduct and samples of the appropriate licensing language across the course when they reuse, redistribute, revise, and remix (Hilton et al., 2010) online content or their own work.

5.5 Open Educational Resources (OERs)

The "openness" of OERs can potentially address the issue of the appropriateness of online teaching materials (Kochem et al., 2020). Especially in low-resource regions without a strong internet connection, a teacher might be the only person who needs access to technology for many OERs, thanks

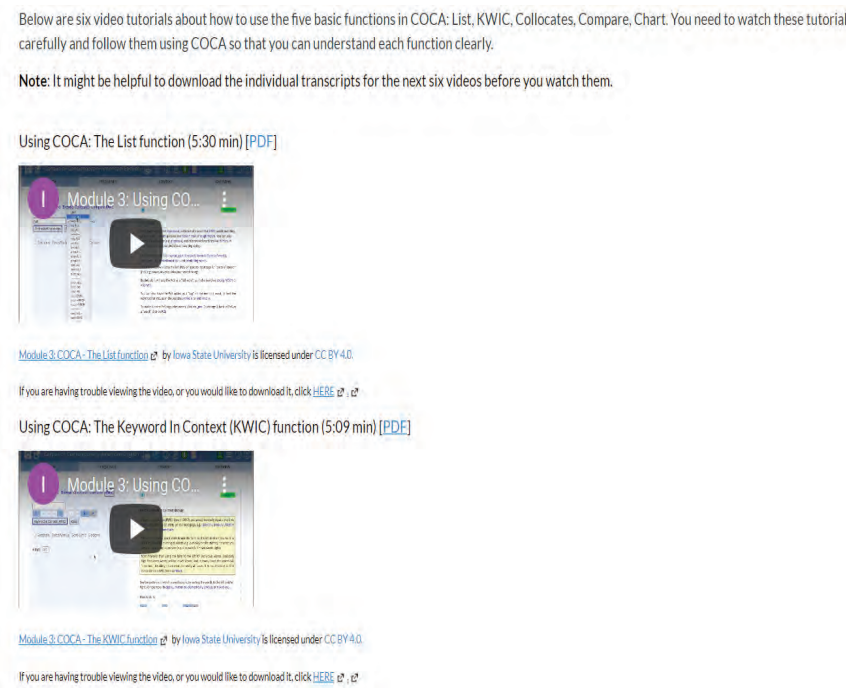
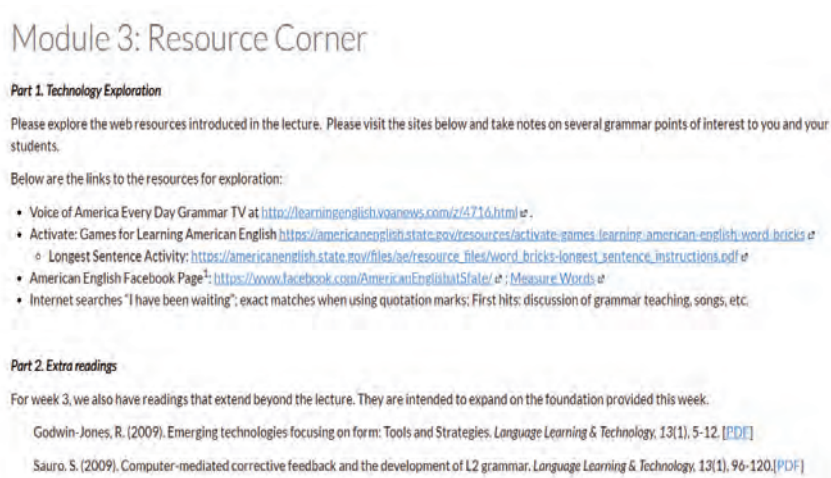


Figure 3. A screenshot of COCA tutorial videos in "Module 3: Technology and Grammar."

to the affordances that the offline use of OERs offers, such as downloadable, ready-to-use materials, (p. 257). In the GOC, lecture videos, course module packets, tutorial videos, and all other files that are needed to finish an assignment were designed to be OERs. For example, in "Module 3: Technology and Grammar," all the tutorials about COCA functions are licensed under CC BY 4.0 (see Figure 3). Under each video there is an external link to download the video for further use without worrying about a stable internet connection. This function is especially crucial in low- and mid-resource teaching contexts, in which students do not have access to a computer lab or own a laptop.

Another set of examples of OERs available in the GOC are the resource corner pages in each module. As Figure 4 shows, these pages serve as places where trainees can find extra resources, mostly OERs, in the form of URLs or downloadable PDF files (e.g., CC BY licensed reading materials).

GOC trainees are also encouraged to create OERs by providing a shareable link for all their assignments at the end of the course (see Figure 5). This task



Module 3: Resource Corner

Part 1. Technology Exploration

Please explore the web resources introduced in the lecture. Please visit the sites below and take notes on several grammar points of interest to you and your students.

Below are the links to the resources for exploration:

- Voice of America Every Day Grammar TV at http://learningenglish.voanews.com/z/4716.html .
- Activate: Games for Learning American English https://americanenglish.state.gov/resources/activate-games-learning-american-english-word-bricks
  - Longest Sentence Activity: https://americanenglish.state.gov/files/ae/resource_files/Word_bricks-longest_sentence_instructions.pdf
- American English Facebook Page[1]: https://www.facebook.com/AmericanEnglishatSfale/ ; Measure Words
- Internet searches "I have been waiting"; exact matches when using quotation marks; First hits: discussion of grammar teaching, songs, etc.

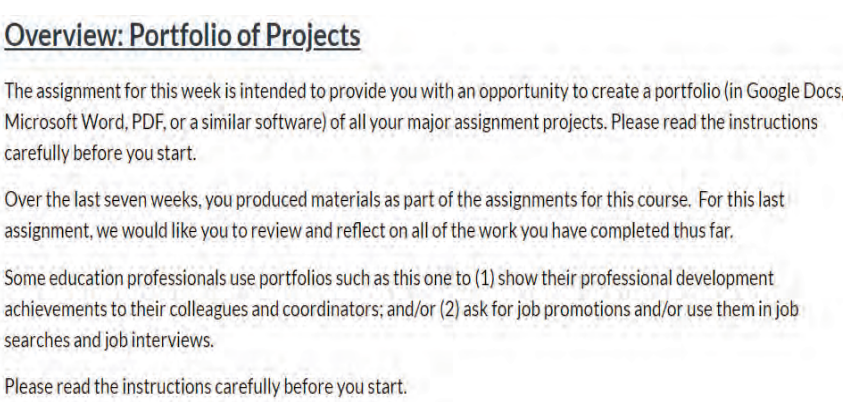
Part 2. Extra readings

For week 3, we also have readings that extend beyond the lecture. They are intended to expand on the foundation provided this week.

Godwin-Jones, R. (2009). Emerging technologies focusing on form: Tools and Strategies. *Language Learning & Technology, 13*(1), 5-12. [PDF]

Sauro, S. (2009). Computer-mediated corrective feedback and the development of L2 grammar. *Language Learning & Technology, 13*(1), 96-120.[PDF]

Figure 4. Resource corner page.



Overview: Portfolio of Projects

The assignment for this week is intended to provide you with an opportunity to create a portfolio (in Google Docs, Microsoft Word, PDF, or a similar software) of all your major assignment projects. Please read the instructions carefully before you start.

Over the last seven weeks, you produced materials as part of the assignments for this course. For this last assignment, we would like you to review and reflect on all of the work you have completed thus far.

Some education professionals use portfolios such as this one to (1) show their professional development achievements to their colleagues and coordinators; and/or (2) ask for job promotions and/or use them in job searches and job interviews.

Please read the instructions carefully before you start.

Figure 5. A screenshot of the directions for "Module 8: Portfolio of Projects."

allows them to apply what they have learned about the concept of "openness" throughout the eight-week period.

6. Guidelines for CTE Programs

In this section, we propose a set of practical guidelines for online language teacher training programs, especially CTE programs that target teachers from various resource settings. We built these guidelines from a synthesis of the literature in CALL and teacher education, TTS, and our own experience with the GOC.

Table 5:
Guidelines for Online Language Teacher Training Programs

Type	Guideline	Especially for
Convenience	Multiple submission options	Low- and mid-resource settings
	Flexible submission deadlines	Low- and mid-resource settings
Learning opportunities	Opportunities for collaborative assignments	All settings
	Community of practice (CoP) to continue interacting with peers from other parts of the world	All settings
	A dynamic page (e.g., the resource corner page in the GOC) that can be updated as new tools emerge	All settings
	Clear, guided prompts to initiate more interaction in discussions	All settings
Feedback	Pre-course assessment to identify: which tools are inaccessible; course expectations to see what areas/ tools students/participants want to learn about	Low- and mid-resource settings
	Built-in feedback loop through reflection activities, specific instructions in discussions, and major assignments	Low- and mid-resource settings
	End-of-course survey to identify weaknesses and strengths of the course	All settings
	Diagnostic and summative assessments to measure learning gains	All settings
	Follow-up research	Low- and mid-resource settings

Table 5 shows three types of guidelines for course developers of teacher training programs. In the convenience guidelines, we suggest providing trainees with various assignment submission options, such as different word processors (e.g., MS Word, Google Docs, PDF), presentation tools (e.g., PowerPoint slides, Google Slides, Prezi), and online file-sharing platforms (e.g., Google Drive, Microsoft Online). Trainees, especially in low-resource settings, should be allowed to submit their assignments in plain text (if using, e.g., learning

management systems such as Canvas), or to upload their narration of a slide presentation as a text or a separate audio file rather than be required to submit an embedded audio narration. Also, course developers should be as flexible as possible with regard to submission deadlines. Accommodating trainees, especially in low-resource settings, is crucial, because the way that they are impacted by a problem might be different from the way that their peers are impacted in a high-resource setting. For example, in the GOC, one of the trainees in Tunisia had to drive for 20 minutes just to go to a place with limited internet connection, in order to submit assignments because of a conflict in the region. We also had several extension requests from trainees in Myanmar, where there was a civil war at the time. Some participants also had to request late submission because of the physical, psychological, and financial impact of COVID-19 on their families.

In the learning opportunities guidelines, we suggest giving trainees opportunities for peer learning, especially through collaborative assignments and community of practice (CoP), in order to continue interacting with their peers from other parts of the world. To initiate a high level of interaction, discussion prompts should be clear and guided. For example, Jin and colleagues (submitted) found the discussion prompt that requires "commenting on at least one post" to be problematic. Instead, trainees can be required to comment on at least three other posts for an extra reward. The learning process in collaborative assignments, discussions, and CoP is mutual, in that trainees can learn about how a learning situation is handled in various teaching contexts. We also suggest that an online professional development course should have a dynamic page that is updated on a regular basis, in order to keep up with new technologies. In our pre-course assessment, keeping up with current trends in educational technology is one of the top course expectations we identify in each iteration.

Finally, in the feedback guidelines, we propose that a variety of methods should be incorporated into the course to collect as much feedback as possible. For example, a pre-course assessment could be used to identify available resources, so that the best affordances can be mapped onto learning contexts, especially in low-resource settings. It could also be used to reveal trainees' expectations from the course, and if there is any pattern across sections, which could inform the course developers about potential course revisions. Rather than collecting trainees' opinions solely at the end of the course, we suggest setting up the course in a way that elicits different types of feedback throughout the course, for example, through reflection activities and specific instructions in discussions and major assignments that ask for trainees' reflections on the target technology. Likewise, an end-of-course survey can be used to reveal trainees' opinions about topics such as accessibility issues; learning gains;

trainer–trainee relationships; overall quality of teaching assistant feedback; missing or redundant course components, topics, or tools; and willingness to share knowledge. In addition to trainees' self-reports, a pre- and post-assessment can be used to measure the learning gains of the trainees. Finally, follow-up research can be administered to see how much transfer has been achieved, especially in low-resource settings. Such check-ins potentially provide invaluable data about the success of the professional development course.

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Appendix

Course module	Primary course objectives of each module
Module 1	Define computer-assisted language learning (CALL); discuss how technology affects language learning and teaching today
Module 2	Use strategies to teach vocabulary growth through social media
Module 3	Identify appropriate grammar activities that include opportunities for learners to discover, analyze, and produce English grammar during language interactions
Module 4	Select and adapt appropriate reading texts for specific learner groups and language learning goals
Module 5	Demonstrate how to teach writing through CALL by selecting appropriate model texts, showcasing technology supported; help options, considering the audience for writing activities, and developing writing strategies
Module 6	Select and adapt existing listening resources on the internet to address language learning goals and learner needs
Module 7	Select CALL materials that teach speaking skills and focus on the sounds and accents that are relevant for their learners
Module 8	Develop lesson plans and teaching units with one or more of the technologies learned throughout the course