

ARTICLE



## Multiple online environments as complex systems: Toward an orchestration of environments

*Marco Cappellini, LPL, CNRS, Aix-Marseille University*

*Christelle Combe, LPL, CNRS, Aix-Marseille University*

### Abstract

*Distance learning, telecollaboration, and virtual exchange rely more and more on multiple online environments. Research on how teachers and learners deal with this is rare. The present study considers future teachers designing online tasks for actual learners in a telecollaborative project deployed across three online platforms. Framed by dynamic and complex systems theory, our study draws on computer-mediated discourse analysis, multimodal conversation analysis, and content analysis to understand through which affordances pedagogical actions such as instruction giving and providing feedback are accomplished throughout the three environments. Analysis highlights different strategies for each pedagogical regulation. Our main finding is that the presence of different environments emerges as an affordance for teachers to distribute pedagogical actions across the system of environments, which we call orchestration of environments. We discuss the implications of this finding for models of teacher competence and for teacher education.*

**Keywords:** *Telecollaboration, Teacher Training, Multiple Online Environments, Orchestration of Environments*

**Language(s) Learned in This Study:** *French*

**APA Citation:** Cappellini, M., & Combe, C. (2022). Multiple online environments as complex systems: Toward an orchestration of environments. *Language Learning & Technology*, 26(1), 1–20.  
<https://hdl.handle.net/10125/73497>

### Introduction

From the mid-90s to the early 2000s, distance language learning took advantage of emerging Internet technologies such as learning management systems. Researchers began to observe language teaching and learning in these new environments, which resulted in studies stating the specificity of distance language learning. For instance, Hampel (2006) showed how task design in online language learning has its specific features, while Hampel and Stickler (2005) proposed a model for language teacher competences with Information and Communication Technologies (ICTs). With the advent of the so-called Web 2.0 in the late 2000s, a multitude of online environments became easily available for language teachers and learners, which led researchers to studying language learning processes in specific environments, such as Multiplayer Online Games (Reinhardt & Sykes, 2014). New theoretical constructs appeared to capture these new phenomena, such as Online Informal Learning of English (Sockett, 2014) and learning in the digital wilds (Sauro & Zourou, 2019).

Parallel to research on online language teaching and learning, CALL researchers reflected on the models and practices that teacher education can help develop to prepare future teachers to be able to integrate ICTs into their practice (Hubbard & Levy, 2006; Son & Windeatt, 2017). Among teacher education programs, telecollaboration (Belz, 2003), also called multilateral online exchanges for language and culture learning (Lewis et al., 2011) or more recently virtual exchange (O'Dowd & O'Rourke, 2019),

played an important role in developing models of teacher competence (Dooly, 2010; O’Dowd, 2015), and of teacher training (Baroni et al., 2019). O’Dowd (2018) showed that virtual exchange is currently developing in two directions: on the one hand, the integration of large-scale international projects based on small sets of online environments such as the Solyia Connect Program and its platform; on the other hand, the implementation of small-scale, often bilateral telecollaboration projects that draw on a variety of online environments. We consider the latter.

Literature exploring how the variety of environments available is conceived of by teachers and learners is almost non-existent or has suggested that, when multiple environments are used, each environment is linked to a single pedagogical objective (Benoit & Lomicka, 2020). A remarkable early exception comes from Thorne (2003), who developed the concept of cultures-of-use to describe and understand how learners perceive specific Computer-Mediated Communication tools in relation to specific social relationships. This paper is based on a qualitative study observing trainee teachers involved in a telecollaboration project with language learners via three online environments. We put forward an extension of existing frameworks of online language teacher competences taking account of how teachers deal with the simultaneity of multiple online environments. Given the proliferation of online environments used by language teachers, we would like to propose the concept of “orchestration of environments” to better conceive how multiple environments can be drawn on, both in terms of design of pedagogical practice and in terms of research. This concept is aimed at complementing current frameworks and models of teacher competence in CALL.

## **Theoretical Background**

Our study lies at the intersection of sociocultural theory (Lantolf & Thorne, 2006), ecological approaches (Van Lier, 2004; Blin, 2016), and dynamic complex systems theory (DCST; Larsen-Freeman & Cameron, 2008). We situate our study in sociocultural theory because we consider cognition and learning to be social phenomena emergent from the interaction between the learner and their social environments. More precisely, (online) environments are considered as a source of mediation for both communication and learning. Following Van Lier (2004), we link sociocultural theory to semiotics and the theory of affordances. The environment is considered as a reservoir of semiotic resources that teachers and learners can draw upon to co-construct meaning and, more widely, to perform or constrain actions. Specifically, we adopt a post-cognitive conception in which affordances are not considered as pre-existing, but are conceived as emergent during the action (Blin, 2016). Finally, we link these wide theoretical approaches with DCST in that we conceive our context as a complex system (Hampel, 2019) whose components are considered not as static entities but as changing elements, with a focus on their relationships and how they evolve (i.e. with a focus on dynamics).

Applied to our context, this means that we consider pre-service language teachers’ (inter)actions with learners through the three online environments (presented below) as acts of mediation accomplished through affordances. These affordances emerge during interaction between the interlocutors through the online environments and are used to co-construct interactional routines that influence one another through the three environments conceived as a whole.

## **Literature Review**

### **Models and Frameworks of Teacher Competence in CALL and Approaches for Teacher Education**

Many models and frameworks of teacher competence for language teaching with ICTs are available in the literature, sometimes linked to the production of standards (Kessler, 2016). These models/frameworks are not necessarily specific to online distance language learning though, and include references to face-to-face and blended learning and teaching contexts as well.

One of the most cited examples is Hampel and Stickler's pyramid framework (2005, 2015). Hampel and Stickler (2015) distinguish between teachers' awareness of the properties of online materials and spaces, and teachers' ability to exploit them. They add to these two ensembles a third transversal dimension: teachers' skills in encouraging learners to take responsibility for their learning and negotiate suitable online spaces. While the original framework published in 2005 distinguished competences at seven different levels, a later version in 2015 presents competences at four different levels. The form of the pyramid indicates that skills build upon each other. The most basic skills – level 0 – are ICT competence, which is the ability to deal with specific technology. Level 1 relates to “specific technical competence and dealing with constraints and possibilities of the medium,” level 2 deals with “facilitating communicative competence and online socialization,” and finally level 3 involves “creativity, choice and own style” (Hampel & Stickler, 2015, p. 66).

O'Dowd (2015) developed a model focusing on competences required by teachers setting up and running telecollaborative projects. This model, which is based on the classical distinction between skills, knowledge, and attitudes, lists 40 descriptors in the form of can-do statements grouped into four sections: (a) organisational, (b) pedagogical, (c) digital competence, and (d) attitudes and beliefs. O'Dowd underlines that the model aims to capture the four specific features of teacher competence for telecollaboration: telecollaboration is an intercultural activity, teachers work with other teachers or trainers to design an telecollaboration exchange, telecollaboration is a long-term activity, and the teachers need to integrate the online activities into their class activities.

As for the teacher education approaches in CALL which aim to favour pre- and in-service teachers' development of the skills described above, several authors affirm that rather than having a specific course on CALL, it would be advisable to infuse the use of ICTs into the other teacher training courses (Hauck & Kurek, 2017). Moreover, Hampel and Stickler (2015) observe the limits of pre-service training and call for lifelong training, possibly based on communities of practice, given the rapid change of digital technologies. Literature on CALL teacher education shows a predominance of socio-constructivist conceptions underlying such training (Gruba, 2017; Hampel & Stickler, 2015; O'Dowd, 2015). Researchers also largely agree on the necessary link between pedagogical concepts and technical aspects (Hubbard, 2017) in two ways. The first is to equip trainee teachers with concepts that enable them to analyse the pedagogic potential of any technology (Dooly & Smith, 2020), concepts such as affordance (Blin, 2016). The second avenue is experiential learning (e.g., Cappellini & Hsu, 2020; Grau & Turula, 2019), where the link between pedagogy and technology is established within action on the one hand, and through subsequent reflection thereupon on the other.

### **Research on Multiple Online Environments and Their Complexity**

As noted by Hampel and Stickler (2015) “[T]oday a multitude of online spaces are available that have a potential for learning. These spaces are multimodal, multicultural and multilingual” (p. 63). As stated in the introduction, this can lead to complex pedagogical environments. However, research usually considers multiple environments where each of them is linked to a specific pedagogical objective. For instance, Benoit and Lomicka (2020) designed a telecollaboration project between American and French students drawing on four complementary environments: Skype sessions to practice oral interaction, email exchange for communication within tandem pairs, and Facebook and Instagram to facilitate community building. Linking each environment to a pedagogical objective leads to a juxtaposition of environments, which makes it difficult to consider the complex links between them.

First attempts to consider the characteristics of environments as a whole rather than as discrete parts come from two directions<sup>1</sup>. The first is the analysis of semiotic dynamics. For instance, Develotte and Kern (2018) close their collection of studies on online intercultural encounters by stating that:

We believe that exposing learners to a broad mediational palette, combined with reflection, analysis and discussion of learners' experiences in the various mediums, can have beneficial transversal learning effects – not only in terms of ‘training’ for communicating in particular kinds of situations

but also, and most importantly, in developing an attentional disposition that will allow learners to learn from all their communicative encounters, regardless of the medium. (p. 292)

The second direction is the link between task complexity and environments. Nissen (2019) argues that complex tasks and scenarios (i.e., a sequence of tasks; Dooly, 2017) are more likely to lead learners to use different online environments. This is true for telecollaboration environments as well, with complex tasks and scenarios leading learners to distribute their learning across different online environments.

Recently, some studies have focused on the complex relationships between online environments in blended learning with telecollaboration. Dooly and Sadler (2020) analysed how two trainee teachers involved in telecollaboration developed their teacher competence in interaction across different online and offline environments. In their study, they considered data from all the environments and how an interaction in one of them resulted in changes in interactions in the others. In a study on a telecollaboration project between trainee teachers of French and American learners, Kern and Linares (2018) analysed how addressivity (which can be roughly defined the ways people address to each other) is co-constructed between pairs of participants. They found not only that each medium (i.e., online environment) lent itself to particular kinds of discourse and role taking, but also that the sequence of mediums (in our terms, of environments) played a key role in how communication was enacted. Ware et al. (2018) considered a telecollaboration project between 13 language mentors of English as a second language and 11 high school mentees from six linguistic and cultural backgrounds. In the 10-week telecollaboration project, mentors developed tasks drawing on different online environments: a central platform (Edmodo) that each mentor combined with audio-visual and/or text-based environments. The authors identified two ways mentors drew upon the environments for task design and implementation: *fluidity spaces* and *task silos*. In fluidity spaces, mentors enacted the same pedagogical actions across environments, which allowed them to build links between tasks, better appreciate their mentees' linguistic skills, and picture them as individuals; in task silos, each task was set in a specific environment in isolation from other environments and tasks. Fluidity spaces were constructed by more technologically proficient mentors, whereas tasks silos were the result of work by mentors less at ease with technology.

In these three studies, (online) environments are not conceived as juxtaposed, but as combined and offering learners different sets of modalities and affordances to enact pedagogical actions locally. In other words, these studies offer first steps toward a holistic perspective where the interpersonal mediation between teachers and learners or amongst learners is ecologically linked to the technological mediation and results in what we call dynamic complex systems.

## Research Questions

We are interested in conceptualising how teachers perform pedagogical actions when they are in contact with their learners through different online environments. More precisely, we consider three pedagogical actions: (a) instruction giving, (b) positive feedback, and (c) negative feedback. Moreover, since our study is anchored in DCST, we consider the set of online environments in a telecollaboration project as a whole, where interactions in one environment are influenced by and have consequences on interactions in other environments. Within this framework, we aim to answer the following questions:

1. How, and through which affordances, do teachers engage in pedagogical actions in different online environments?
2. What are the relationships constructed between interactions in different online environments?

## Methods

We situate our study in the tradition of qualitative research in CALL (Levy & Moore, 2018). Our aim is not to obtain representative results in statistical terms, but to try to shed light on a particular phenomenon through in-depth observation of data by taking into account the participants' perspectives. Although some

of the results are bound to the specific context under examination (Levy & Moore, 2018), we believe that qualitative studies can inform design in CALL, in our case especially in relation to telecollaboration and teacher education.

## **Context**

Our data come from a telecollaboration project based on the model of *Le Français en (Première) Ligne* (hereafter FIL; Develotte et al., 2007) between pre-service teachers (hereafter called tutors) of French as a foreign language in a French university and learners of French in a British university during the spring semester of 2016. In this model, objectives are different for the two populations. For tutors, it is a form of experiential learning to develop online teaching competence (Guichon, 2009; Cappellini & Hsu, 2020). For learners, it is an opportunity to develop competence in oral and written interaction, in intercultural communication, and in digital literacy (Kern & Develotte, 2018).

Interactions took place in three online environments: a Learning Management System (hereafter LMS) (Moodle), an audio-visual platform (Adobe Connect) and, on the initiative of one of the tutors, a private group on the Social Networking Site (SNS) Facebook. The project involved 23 students in their 1<sup>st</sup> year of a master's program in Foreign Language Education and 36 learners enrolled in a B2-level course of French as a foreign language. The scenario of the telecollaboration project was integrated into the learners' pedagogical sequence.

At the beginning of the semester, before the online interactions, the tutors received information about their learners' proficiency level, about the topic of the pedagogical sequence, and were asked to form pairs and to design a scenario composed of an asynchronous task preparing for a synchronous task. For the synchronous session, each pair of tutors proposed two time slots. Once the scenarios were posted online, learners chose to take part in one or more of them depending on their interests and availabilities. The scenarios and telecollaborative interactions lasted for about a month and were run by pairs of tutors with the number of learners per pair ranging between one and five. During and after the telecollaborative activities, tutors were guided by their teachers (the authors) in reflecting upon their actions during in-class interactions. Each tutor wrote a reflective report as part of their assessment. More details about the pedagogic setting are provided in Cappellini and Combe (2017).

## **Data Collection and Analysis**

### **Data Collection**

As noted by O'Dowd (2017), when dealing with a multitude of environments, researchers need to cope with the complexity and variety of data sources. In our case, data came from the LMS, the audio-visual platform, the SNS, and tutors' reflective reports. Written permission was collected individually on the French side, following a procedure designed at the authors' research laboratory. On the British side, an application was submitted to the institution's research ethics committee and permission was granted. Learners gave informed consent to record their interactions.

LMS data were captured by exporting the Moodle scenarios for permanent storage and through screen captures. Interactions in Adobe Connect were recorded using the inbuilt recording option, which captures audio and video streams of what happens within the platform's interface. Synchronous interactions were also recorded following Guichon's procedure (2009), adding an external camera to record tutors' physical environment. Both videos were then imported and aligned in the Eudycos Linguistic Annotator (Sloetjes & Wittenburg, 2008). Facebook exchanges were collected through screen captures. Finally, the written reflections were collected as text files.

### **Data Analysis**

In our analysis, we focused on three pedagogic actions. First, instruction giving was chosen because it is a

key mediation in the learning process, and because this pedagogical action gained renewed interest in recent literature (Satar & Wigham, 2020). The other two actions are tutors' positive and negative feedback on learners' productions as they are theorised in sociocultural theory, that is as "contextualized as a collaborative process where the dynamics of the interaction itself shape the nature of the feedback" (Lantolf & Thorne, 2006, p. 276). Positive and negative feedback were chosen because they proved to be a key element of the pedagogy, especially in the sociocultural approach we adopt. In this study, we focused on four dyads of tutors. These were selected because their strategies in performing pedagogical actions are representative of the other tutors. In other words, the strategies identified in these four pairs include all the strategies of the tutors as a whole.

The analysis took place in three stages. In the first stage, we deployed the method of analysis which proved effective in a previous case study (Cappellini & Combe, 2017). We considered the above-mentioned pedagogical actions for each data source separately. For the LMS and SNS data sets, we used Computer-Mediated Discourse Analysis (CMDA; Herring, 2015). For the audio-visual data, we drew on multimodal conversation analysis (Dooly & Helm, 2017). For the reflective writings, we used content analysis (Stemler, 2001). In each data set, we first identified the relevant parts of the data as including one of the above-mentioned pedagogical actions. We provide a short example of analysis for each method.

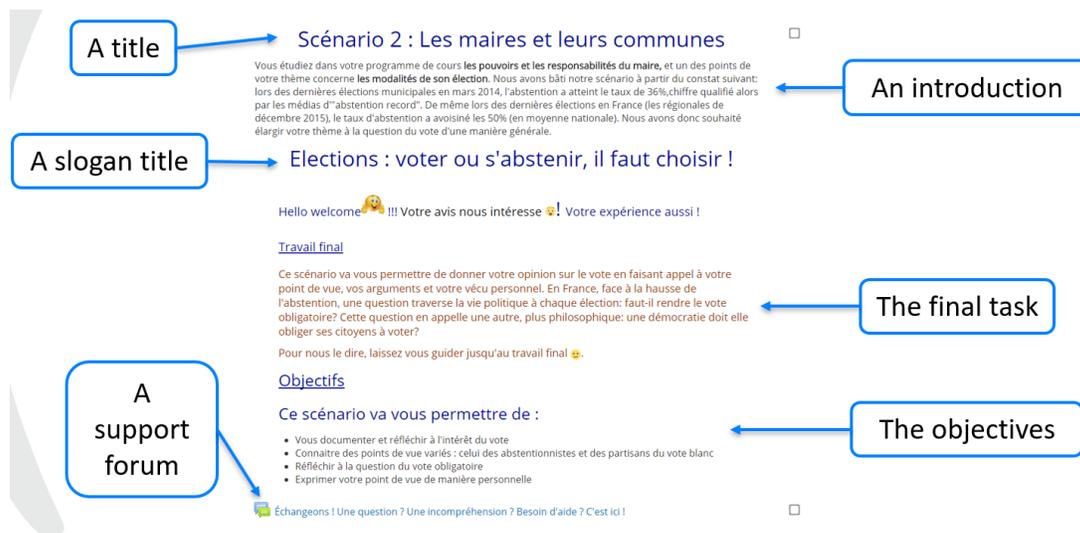
### First Stage

#### Computer-Mediated Discourse Analysis

The first example, presented in Figure 1, comes from the first pair of tutors we consider: Valentin and Cécile (all names are pseudonyms). It shows instruction giving in the LMS platform.

Figure 1

#### Example of a Scenario Structure in the LMS Platform



First, the tutors structured their scenario using different fonts, distinguishing between the title and the introduction (upper section)—which links the scenario to the learners' sequence on Public Affairs—and the instruction giving, including the final production of the task (*Travail final*) and the pedagogical objectives (*Objectifs*) in terms of can-do skills. Between the two sections, there is a phatic line which starts in English and continues in French, with three sentences punctuated by emoticons and exclamation marks.

Enrolment<sup>2</sup> in the scenario is designed in the first part of instruction giving section (*Travail final*) with a double strategy. On the one hand, tutors build an interpersonal relationship using ‘we’ and the plural ‘you’ (*vous*) rather than formulating impersonal instructions. On the other hand, learners are situated as experienced people with ideas about the topic that are worth sharing and, for the tutors, worth listening to. The communicative and learning contract<sup>3</sup> is made explicit in the final line, detached from the rest of the section: “*Pour nous le dire, laissez vous guider jusqu’au travail final 😊*” (to let us know [your opinion about voting], let us guide you to the final work [production]). In the last part, learning objectives are made explicit through a list of four bullet points. In the section about instruction giving, no support about technical issues is present. Technical support is implicit and embedded in the forum that closes the scenario, titled “*Echangeons ! Une question ? Une incomprehension ? Besoin d’aide ? C’est ici !*” (Let’s exchange! A question? A misunderstanding? Need help? That’s here!)

### *Multimodal Conversation Analysis*

The following excerpt is an example of negative feedback during the synchronous session in Adobe Connect. Valentin is the tutor and Jack is the learner. For transcription conventions, see [Appendix A](#).

#### **Extract 1**

1 Valentin : XX (change of posture away from screen)

2 Jack : presque partout quand quand on voyage + [Valentin changes posture and looks at the screen] on va toujours trouver euh: (facial expression ‘doing thinking’ + hand holds still) évidence d’un homme + de quelqu’un

*Almost everywhere when you travel + you’ll always find ehm: \*evidence of a man + of someone*

3 Valentin : ah

4 Jack : a déj- a y déjà visité y a déjà visité

*Has al- has already there visited has already visited there*

5 Valentin : oui oui là partout où on part on: on a toujours la trace de l’homme/

*Yes yes anywhere you go there’s/there’s always evidence of mankind*

6 Jack : oui il y a toujours la trace de l’homme exactement

*Yes there is always evidence of mankind, exactly*

At the beginning of the excerpt, Valentin and Jack overlap, and the tutor leaves the floor to the learner while also changing posture and moving his gaze away from the screen. While Jack is talking, he hesitates, manifested paraverbally (*euh*), gesturally (he holds his hand still, whereas he was producing beats while talking) and with a facial expression, producing a ‘doing thinking’ expression, that is looking somewhere upright while searching for the lexical item he needs. At this point, Valentin moves his gaze back to the screen and changes his posture, understanding that Jack is holding the floor while trying to construct his utterance and remains in a waiting position. After the hesitation, Jack uses the transfer of the word *évidence*,” which does exist in French but roughly means “what is manifest” rather than “evidence.” While Jack continues his turn, Valentin produces in overlap the backchannel *ah*. Even though Jack’s turn contains a grammatically incorrect expression after Valentin’s *ah*, in his negative feedback Valentin focusses on the word *évidence*. The tutor begins by nodding, which can be interpreted either as agreeing with Jack’s opinion or as a signal of understanding. Then Valentin recasts Jack’s utterance using the word *trace*. This recast is not uttered with a particular emphasis on the lexical item. At the same time, Valentin produces a rising intonation that probably indicates a request for confirmation. This is confirmed by the next turn proof when Jack begins his turn with a “yes” and ends it with “exactly,” in order to signal to Valentin that he has understood his communicative intention.

### Content Analysis

Finally, we coded extracts of the reflective report when the tutors made explicit their perception or intentions related to one of the pedagogical actions we analysed, or when they established links between the (inter)actions across environments, such as in the extract below taken from Jennifer's report after joint work with her fellow tutor Jimmy.

#### Extract 2

*[Jimmy] et moi n'avons pas eu le temps de répondre aux commentaires laissé par les apprenants et je le regrette. Cependant nous avons pu revenir sur ce qui a été dit pendant la session synchrone.*

[Jimmy] and I did not have time to respond to the comments left by the learners and I regret that. However, we were able to go back to what was said during the synchronous session.

In this extract, we can see that due to the large number of comments in a discussion forum of the LMS, the tutors were not able to provide an answer to all of them. They also decided to begin interactions in the asynchronous platform on topics that were dealt with in the synchronous platform.

### Second Stage

In the second stage of the analysis, we compared how the same pedagogical regulation was accomplished by each pair of tutors across the environments. Then, we analysed the multimodal discursive/conversational strategies visible in the interactions and triangulated our analysis with what the students made explicit in their reflexive writings. Triangulation (Denzin, 2015) with reflexive writings helped us gain insight into tutors' perceptions of the interactional dynamics at work. Triangulation was also informed by the metaphor of DCST to understand how the different online environments were perceived and used as elements of a complex system for interaction between each pair of tutors and their learners and, in the case of the SNS group, between the two wider groups of students. At the end of this stage, we created a table for each pair of tutors, which we will discuss in the following section. For instance, for the instruction giving in the LMS platform, we arrived at the following list for Valentin and Cécile (see [Table 1](#)):

- Structure and 'media making'
- Beacons for learners' contributions
- Enrolment and gain in agency
- No technical support

### Third Stage

In the third stage of analysis, we compared the results across the pairs of tutors to understand which similarities and which differences were present in the ways of apprehending and using the different environments in the pedagogical interactions with learners.

## Findings

In this section, we present the results of the analysis on how each pair of tutors accomplished the pedagogical actions of instruction giving and of positive and negative feedback in the three online environments. Due to space constraints, we will provide an overview of the analysis and cannot provide in-depth analyses of specific excerpts or conversational sequences.

### Pair 1. Valentin and Cécile

Instruction giving in the LMS platform was described above to provide an example of analysis. Valentin and Cécile drew on the affordances of the LMS platform to provide a structure where the different parts of the scenario related to instruction giving are distinguished by means of font, colour, and use of graphic features such as bullet points. Tutors built a pedagogical relationship where learners are recognised as

agents, taking an active role in communication and bringing substantial contribution to the scenarios with their ideas. Finally, there was no specific technical support for the learners to become familiar with the LMS platform. As for positive feedback in the LMS platform, Cécile and Valentin provided three types. The first one was pre-set positive feedback in the questionnaires they designed to guide written and oral comprehension. Once it is set up, this kind of positive feedback acknowledges the learners' right answers and congratulates them. Positive feedback was also visible in forums as manual minimal feedback in the form of short messages. The third type was manual positive feedback where the tutors provide an appraisal of the learner's answer and then build on their answer to develop a subsequent idea. Negative feedback in the LMS platform was provided through two strategies. The first one was pre-set automatic direct feedback in comprehension activities. The second strategy consists of an appraisal of the learner's answer, followed by indirect forms of feedback such as recasts. The reflective reports make explicit that at the beginning, negative feedback in the LMS platform only focused on content issues. After the first synchronous session, tutors provided negative feedback on form too.

In the audio-visual platform, we found three strategies for instruction giving. The first strategy was what we called "conversational instructions" (Cappellini & Combe, 2017); that is, forms of instructions that drew on learners' contributions to direct the conversation toward the objectives of the sessions. The second was that technical instructions, such as how to activate the microphone, were provided orally at the beginning of the session and then in the chatroom during the session. The third element was that instruction giving drew on graphical documents, such as pictures used to provide structure to the conversation. Positive feedback in the audio-visual platform was provided in two ways. The first one was minimal feedback with conversational backchannels such as nodding, which was probably unconscious since tutors did not mention it explicitly in their reports. The second was the same as in the LMS platform, with appraisal followed by the development of the idea discussed. Negative feedback was provided mainly on content, with the exception of negative feedback on form only when this was solicited in some way, such as with hesitations as in the example analysed in the [Data Analysis](#) section. The general strategy was an appraisal followed by indirect feedback, mainly recasts.

As for the SNS platform, even though the creation of a closed group was the result of Valentin's initiative, Valentin surprisingly did not take part in interactions on the SNS platform. Cécile did, but with no instances of any of the pedagogical actions we analysed. Analysis of this pair is summarised in [Table 1](#).

**Table 1**

*Valentin and Cécile's Pedagogic Regulations*

| <b>Environment</b>    | <b>Instruction giving</b>   | <b>Positive feedback</b>   | <b>Negative feedback</b>  |
|-----------------------|---|--|---|
| LMS                   | Structure and 'media making'<br>Beaconing for learners' contributions<br>Enrolment and gain in agency<br>No technical support | Automatic direct feedback<br>Minimal feedback<br>Appraisal-development | Automatic direct feedback<br>At the beginning, on content only<br>On form after the audio-visual session<br>Appraisal-indirect feedback |
| Audio-visual platform | 'Conversational' instructions<br>Technical support (chatroom)<br>Graphic documents  | Minimal feedback (not conscious)<br>Appraisal-development              | Appraisal-recasts<br>On content mainly<br>On form only if solicited   |
| SNS                   | X   | X  | X   |

## Pair 2. Jade and Janice

Analysis of the LMS data set showed similar strategies to the first pair. Instruction giving was also present in the SNS group, where tutors provided technical support for connecting to the LMS platform. As for feedback in the LMS group, this pair also pre-loaded automatic positive and negative feedback into questionnaires activities. What is specific is that they asked learners to publish their productions both in the LMS and in the SNS groups. Positive feedback was given in the form of appraisals, which tutors linked to social presence in the reflective writings. Negative feedback consisted of initial appraisal followed by direct feedback and metalinguistic explanations. Positive feedback in the SNS group was related only to content, and learners were told that they could find more specific feedback on the LMS platform.

As for instruction giving sequences, including technical support, in the audio-visual platform, Jade and Janice always used ‘foreigner talk’ (Long, 1983); that is, they adapted their utterances by speaking more slowly and articulating more than in other parts of the synchronous session. Learner contributions were guided in two ways: they were solicited and valued by the tutors; then, tutors shared a document (Figure 2) and used it to structure the interaction.

**Figure 2**

### *Jade and Janice’s Use of a Shared Document*



Positive feedback in the audio-visual platform reproduced the same strategies as the first pair. Negative feedback was provided only in the form of vocabulary support when solicited. Table 2 summarizes these results.

**Table 2***Jade and Janice's Pedagogical Regulations*

| <b>Environment</b>    | <b>Instruction giving</b>   | <b>Positive feedback</b>                                    | <b>Negative feedback</b>   |
|-----------------------|---|---|--|
| LMS                   | Structure and 'media making'<br>Beaconing for learners' contributions<br>Enrolment and gain in agency                         | Automatic direct feedback<br>Appraisal in MS Word documents | Automatic direct feedback<br>Appraisal<br>Direct + metalinguistic feedback (MS Word documents) |
| Audio-visual platform | Always foreign talk<br>Beaconing for learners' contributions<br>Instructions framed by a shared document<br>Technical support | Minimal feedback (not conscious)<br>Appraisal-development   | Vocabulary support   |
| SNS                   | Technical support for other environments  | Feedback on content<br>Reference to feedback in the LMS     | Reference to feedback in the LMS   |

**Pair 3. Isabelle and Lise**

This pair wrote their instruction giving sequence using colours and pictures into a Google Doc and then pasted it into a label in the LMS. Tutors signalled where and how learner contributions were expected, with some enrolment used. Technical support was delegated, with learners sent to a support blog. Positive and negative feedback on the LMS platform was provided manually only. Positive feedback took the form of appraisal. As for negative feedback, the pair adopted a creative use of Microsoft Word to provide indirect feedback. The mistakes, both form and content-related, were highlighted using different colours. Then, tutors provided the correct answer in a footnote, using the same colour for font and highlight, therefore rendering writing invisible unless selected. Negative feedback was also introduced by appraisal of the learners' productions.

As for instruction giving in the audio-visual platform, analysis shows a combination of two strategies: conversational instructions such as observed previously, and the use of a shared document. Based on the reports, conversational instructions were not designed as such, but rather the result of negotiation of interaction management with learners. In fact, one of the learners took many initiatives to direct the conversation, mainly asking tutors their opinion on the main topic of the session. Isabelle and Lise also favoured horizontal communication, letting their learners interact with each other. Technical support was provided orally.

In Adobe Connect, positive feedback was presented as conversational backchannels, which was a conscious strategy made explicit in the reflective writings. Negative feedback on form and content was very rare, and all but two of the learners' solicitations were ignored. Based on their reflective writing, tutors perceived the audio-visual platform to be ill adapted to providing negative feedback on learners' speech. Negative feedback was provided during the synchronous session about learners' productions on the LMS platform. The same negative feedback was repeated in written form to each learner in an email the tutors sent them. The SNS group was not used by these tutors. [Table 3](#) summarizes the results for this pair.

**Table 3***Isabelle and Lise's Pedagogical Regulations*

| <b>Environment</b>    | <b>Instruction giving</b>   | <b>Positive feedback</b>     | <b>Negative feedback</b>   |
|-----------------------|---|------------------------------|--|
| LMS                   | Structure and 'media making'<br>From a Google Doc<br>Beaconing for learners' contributions<br>Little enrolment and gain in agency<br>Delegated technical support (blog) | Appraisal                    | Appraisal – indirect feedback (font colour and highlighting)   |
| Audio-visual platform | 'Conversational' instructions, framed by a shared document<br>Interaction between learners<br>Negotiation of roles<br>Technical support                                 | Minimal feedback (conscious) | Some ignored solicitations for vocabulary support (affordance perception)<br>Link to activity in the LMS + subsequent use of email |
| SNS                   | X   | X                            | X  |

**Pair 4. Jimmy and Jennifer**

This pair also used fonts and colours in their instruction giving on the LMS platform. Rather than guiding through written discourse, they consciously decided to use logos to structure their scenario (Figure 3). Despite learner participation, this pair of tutors provided no positive or negative feedback on learners' productions in the LMS. In their reports, they explained this was due to lack of time and because they provided feedback during the synchronous session. As a result, no learner completed this scenario.

**Figure 3**

*Jimmy and Jennifer's Use of Pictures and Logos*

Quelles plateformes pour communiquer?



 Ton opinion

 Découverte des plateformes



Comprenons-nous.

 Vocabulaire : Association, aide et engagement.

 Mots croisés

In the audio-visual platform, this pair of tutors used mostly foreigner talk in instruction-giving sequences. They also strictly guided learners, using a shared document containing pictures and questions. After each answer, the tutors reformulated the answer and proceeded to the next picture/question. Technical support was provided mainly at the beginning of the session, through oral explanations.

Positive feedback in the audio-visual platform was provided through (unconscious) backchannels. Positive feedback was also provided implicitly through the reformulations introducing the subsequent instructions. These reformulations did not follow any mistakes or uncommon utterances by the learners, which is why we do not consider them as recasts. Negative feedback was provided with occasional recasts and through vocabulary support, both in oral and written forms.

No instructions were produced in the SNS group, except for a general invitation to all the learners to participate in the scenarios. Positive feedback was also absent, while Jimmy produced one instance of negative feedback as a metalinguistic explanation. [Table 4](#) summarizes the results for this pair.

**Table 4***Jimmy and Jennifer's Pedagogical Regulations*

| <b>Environment</b>    | <b>Instruction giving</b>   | <b>Positive feedback</b>   | <b>Negative feedback</b>  |
|-----------------------|---|--|---|
| LMS                   | Structure and 'media making'<br>Illustrations > question<br>Illustration rather than discourse guidance   | X  | X   |
| Audio-visual platform | Mostly 'foreigner talk'<br>Beaconing for learners' contributions<br>Illustrations > question through shared documents<br>Reformulation to move forward<br>Technical support | Minimal feedback (not conscious)<br>Validation and reformulation | Occasional recasts<br>Vocabulary support (with chatroom and whiteboard) |
| SNS                   | (Invitation to participate)   | X  | One metalinguistic explanation (after solicitation)                     |

**Discussion and Implications**

Before the discussion, we would like to underscore that our aim is not to identify so-called 'good' tutoring practices, since the tutors we observed are in training and there are obvious 'mistakes' in their actions, which is part of experiential learning in its trial-error component (Cappellini & Hsu, 2020). Our aim is to glean insights from the observation of how the tutors considered and used multiple environments.

Our first research question was: How, and through which affordances do tutors engage in pedagogical actions in different environments? Analysis showed that some affordances in a particular environment are always used by the pairs of tutors, such as the manipulation of colour and font in instruction giving within the LMS platform. Other affordances are usually present, such as the use of a shared document to provide structure during the synchronous sessions in the audio-visual platform. However, since affordances emerge during interaction between the pair of tutors and the online environments or with their learners through those environments, we mainly observed differences in the perceptions of the affordances, occasionally resulting in divergent views. For instance, Pair 2 perceived the affordances of Word documents as enabling direct metalinguistic feedback, while Pair 3 used the same resource to provide creative indirect negative feedback. Therefore, this study confirms the relevance of a post-cognitive conception of affordances (Blin, 2016) and the consequent focus not on the objective properties of an environment, but on the interpretation of those properties by the tutors and learners. This leads us to partly question the pyramid framework proposed by Hampel and Stickler (2015). In fact, if perception of the affordances is more relevant than the understanding and use of the properties inscribed by the designers of an environment in it, then when a basic understanding of the functioning is present, all use is a creative one. In other words, creativity, which is at the top of the pyramid model, in this case would be at the same level as technical competence, which is at the bottom. We therefore suggest that in teacher training, basic instruction on "specific technical competence and dealing with constraints and possibilities of the medium" (Hampel & Stickler, 2015, p. 67) should not come at the beginning in the form of transmissive instruction. On the contrary, the first stage of teacher training can be one where trainees are left free to

explore the possibilities of the environment(s) in creative ways. This will allow creative use of affordances to emerge, as in the example of Pair 3 providing asynchronous indirect feedback by diverting the use of highlighting and font colour in Word documents. Only at the second stage of training should trainers introduce more common ways of using the properties of an environment, in order to be sure that key technical properties do not go unnoticed.

Our second question is: What are the relationships between interactions in different environments? In other words, what can be observed between the tutors-learners' interactions in different online environments? We observed three kinds of relationships. The first kind is when the same discursive strategy for a specific pedagogical action is adapted to the affordances of two environments. This was the case, for instance, for Pair 1's positive feedback, which was present both in the LMS and in the audio-visual platform in the form of appraisal followed by a development of the idea discussed. The second kind is when interactions in a given environment have an effect on interactions in another environment. For instance, Pair 1 began to produce negative feedback on form in the LMS platform after they realised that learners looked for it in the audio-visual platform. The third kind is when the pair of tutors deployed a strategy involving two or more environments. For instance, Pair 3 deployed a strategy for negative feedback on learners' productions where they first provided feedback in the audio-visual platform, then asynchronously through email and on the LMS platform.

Starting from the second and the third kind of relationships, our main finding is that in a perspective informed by DCST, the presence of different environments emerges as an affordance to distribute pedagogical actions across the system. In other words, pedagogical actions are co-constructed by tutors with their learners as a whole across different environments. Environments are orchestrated to enact pedagogical actions, in a similar way as modes are orchestrated in communication. We name this phenomenon *orchestration of environments*. Orchestration of environments is the common phenomenon underlying several details of the interactions we analysed. We already mentioned the strategy of Pair 3 for providing negative feedback. This is also the case in Pair 2 for the distribution of feedback across environments: the LMS for feedback on form and the SNS for feedback on content. We think that the concept of orchestration of environments can help to provide ontological status to different instances of distribution of pedagogical actions across (online) environments in other virtual exchange settings.

There are two main implications of this finding, one for models and frameworks of teacher competence and one for teacher education. For the models and frameworks of teacher competence, when dealing with multiple environments, this skillset should include teachers' ability to consider different environments as a whole rather than as discrete parts. Teachers should be able to design tasks, tasks sequences, and scenarios while considering the affordances that arise from the relationships between environments. In this sense, complex tasks, task sequences, and scenarios (Dooly, 2017; Nissen, 2019) should be designed not only considering separately each online environment and its affordances, but also thinking about them as a whole in how they provide complementary semiotic resources (Van Lier, 2004) to enact pedagogical actions. Moreover, given that affordances emerge in cycles of action-perception-interpretation (Van Lier, 2004), teachers should keep in mind the orchestration of environments while they negotiate the use of online spaces during pedagogical actions (Hampel & Stickler, 2015). In the terms of Ware et al. (2018), teachers should be able to create fluidity spaces rather than task silos when dealing with multiple environments.

As for teacher education, following Dooly and Smith (2020), we believe it is important to equip future teachers with concepts that will enable them to deal with ever-changing technologies, concepts such as task, affordance, and multimodality. We suggest that the notion of orchestration of environments can be one of the concepts to be introduced in teacher education. Since the pedagogical actions enacted through multiple environments are the result of a negotiation between teachers/tutors and learners, the notion of orchestration of environments should not only be introduced theoretically in teacher education, but also experienced in experiential learning settings such as the context we considered. We therefore suggest that teacher training through telecollaboration should include multiple environments, as in the example of

Dooly and Sadler (2020). This raises the issue of the sequence of introduction of environments, or, in Kern and Linares' terms (2018), the sequence of medium. On this point, our study does not offer insights to elaborate precise pedagogical suggestions. Finally, in line with teacher education through telecollaboration (Baroni et al., 2019), we suggest that written reflection after online interactions will enable trainee teachers to build their competency in orchestration of environments as well.

## Conclusion

In this paper, we analysed how trainee teachers interact with actual learner in a telecollaboration project developing an experiential approach to teacher training. Analysis showed that trainee teachers developed creative affordances drawing on the possibilities of the online environments and tools they used. Analysis also highlighted three types of dynamics at work between interactions within different online environments. We conceptualised two of these dynamics in terms of orchestration of environments, and discussed the implications of this notion in relation to recent literature both for the models and frameworks of teacher competence, and for teacher training.

Our study presents some limits. The first one is that being qualitative in nature, it does not aim to draw analysis from large datasets involving a high number of tutors and/or learners. The study relies on a detailed analysis of four pairs of tutors in interactions with their learners across two or three online environments. The specific strategies of orchestration of environments we observed are therefore not to be taken as recommendations. Rather, it is the concept of orchestration of environments that can be transferred to other contexts of online teaching and of teacher education. We discussed some possible implications and advanced some suggestions, hoping that they can inform future practice and research. These will need to be explored further in future studies.

## Acknowledgements

We would like to thank Benjamin Holt and the anonymous reviewers for their insightful suggestions on previous versions of this text. This paper is part of a research project funded by the [French ANR](#) (Project Number ANR-18-CE28-0011).

## Notes

<sup>1</sup> A third direction, that we will not consider, is composed of the studies that focus on the link between in class activities and online activities in telecollaboration, such as in Kurek and Müller-Hartmann (2019). We do not focus on this direction since our aim is to focus on the conceptualisation of online environments.

<sup>2</sup> We call 'enrolment' what Bruner called the function of 'recruitment' in his conceptualisation of scaffolding, namely how the tutor engages the learner in the learning task (see Wood et al., 1976).

<sup>3</sup> In discourse analysis, the communicative contract is the set of rights and duties of each interlocutor. In learning environments, the communicative contract includes the negotiation, often implicit, of how pedagogical actions are performed. For further discussion, see Cappellini and Rivens Mompean (2015).

## References

- Baroni, A., Dooly, M., Garcia, P.G., Guth, S., Hauck, M., Helm, F., Lewis, T., Mueller-Hartmann, A., O'Dowd, R., Rienties, B., & Rogaten, K. (2019). *Evaluating the impact of virtual exchange on initial teacher education: A European policy experiment*. Research-publishing.net
- Belz, J. (2003). Linguistic perspectives on the development of intercultural competence in telecollaboration. *Language Learning & Technology*, 7(2), 68–117.  
[https://scholarspace.manoa.hawaii.edu/bitstream/10125/25201/1/07\\_02\\_Belz.pdf](https://scholarspace.manoa.hawaii.edu/bitstream/10125/25201/1/07_02_Belz.pdf)

- Benoit, S., & Lomicka, L. (2020). Reciprocal learning and intercultural exchange in a virtual environment. In C. Tardieu & C. Horgues (Eds.), *Redefining tandem language and culture learning in higher education* (pp. 79–94). Routledge.
- Blin, F. (2016). The theory of affordances. In C. Caws & M.-J. Hamel (Eds.), *Language-learner computer interactions* (pp. 41–64). John Benjamins.
- Cappellini, M., & Combe, C. (2017). Analyser des compétences techno-sémio-pédagogiques d'apprentis tuteurs dans différents environnements numériques : Résultats d'une étude exploratoire. *ALSIC*, 20(3). <https://doi.org/10.4000/alsic.3186>
- Cappellini, M., & Hsu, Y.-Y. (2020). When future teachers meet real learners through telecollaboration: An experiential approach to learn how to teach languages online. *Journal of Virtual Exchange*, 3, 1–11. <https://doi.org/10.21827/jve.3.35751>
- Cappellini, M., & Rivens Mompean, A. (2015). Role taking for teletandem pairs involved in multimodal online conversation: Some proposals for counselling practice. *Language Learning in Higher Education*, 15(1), 243–264. <https://doi.org/10.1515/cercles-2015-0012>
- Denzin, N. K. (2015). Triangulation. In G. Ritzer (Ed.), *The Blackwell encyclopedia of sociology*. Blackwell. <https://doi.org/10.1002/9781405165518.wbeost050.pub2>
- Develotte, C., & Kern, R. (2018). Conclusion: Implications concerting learners, teachers, and research. In R. Kern & C. Develotte (Eds.), *Screens and scenes. Multimodal communication in online intercultural encounters* (pp. 279–297). Routledge.
- Develotte, C., Mangenot, F., & Zourou, K. (2007). Learning to teach online: 'Le français en (première) ligne' project. In R. O'Dowd (Ed.), *Online intercultural exchange* (pp. 276–280). Multilingual Matters.
- Dooly, M. (2010). The teacher 2.0. In S. Guth & F. Helm (Eds.) *Telecollaboration 2.0* (pp. 277–303). Peter Lang.
- Dooly, M. (2017). Telecollaboration. In C. A. Chapelle & S. Sauro (Eds.), *The handbook of technology and second language teaching and learning* (pp. 169–183). Wiley Blackwell.
- Dooly, M., & Helm, F. (2017). Challenges in transcribing multimodal data: A case study. *Language Learning & Technology*, 21(1), 166–185. <https://dx.doi.org/10125/44600>
- Dooly, M., & Sadler, R. (2020). "If you don't improve, what's the point?" Investigating the impact of a "flipped" online exchange in teacher education. *ReCALL*, 32(1), 4–24. <https://doi.org/10.1017/S0958344019000107>
- Dooly, M., & Smith, B. (2020). Telecollaboration and virtual exchange between practice and research: A conversation. *Journal of Virtual Exchange*, 3, 63–81. <https://doi.org/10.21827/jve.3.36085>
- Grau, M. K., & Turula, A. (2019). Experiential learning of telecollaborative competences in pre-service teacher education. *Language Learning & Technology*, 23(3), 98–115. <https://dx.doi.org/10125/44698>
- Gruba, P. (2017). Blended approaches to teaching languages with computers. In J.-B. Son & S. Windeatt, (Eds.), *Language teacher education and technology* (pp. 35–50). Bloomsbury.
- Guichon, N. (2009). Training future language teachers to develop online tutors' competence through reflective analysis. *ReCALL Journal*, 21(2), 166–185. <https://doi.org/10.1017/S0958344009000214>
- Hampel, R. (2006). Rethinking task design for the digital age: A framework for language teaching and learning in a synchronous online environment. *ReCALL*, 18(1), 105–121. <https://doi.org/10.1017/S0958344006000711>

- Hampel, R. (2019). *Disruptive technologies and the language classroom: A complex systems theory approach*. Palgrave Macmillan.
- Hampel, R., & Stickler, U. (2005). New skills for new classrooms: Training tutors to teach languages online. *Computer-Assisted Language Learning*, 18(4), 311–326. <https://doi.org/10.1080/09588220500335455>
- Hampel, R., & Stickler, U. (Eds.). (2015). *Developing online language teaching: Research-based pedagogies and reflective practices*. Palgrave Macmillan.
- Hauck, M., & Kurek, M. (2017). Digital literacies in teacher preparation. In S. Thorne & S. May (Eds.), *Language, education and technology* (pp. 275–287). Springer.
- Herring, S. C. (2015). New frontiers in interactive multimodal communication. In A. Georgapoulou & T. Spilloti (Eds.), *The Routledge handbook of language and digital communication* (pp. 398–402). Routledge.
- Hubbard, P. (2017). An invitation to CALL: Foundations of computer-assisted language learning. In J.-B. Son & S. Windeatt, (Eds.), *Language teacher education and technology* (pp. 153–168). Bloomsbury.
- Hubbard, P., & Levy, M. (Eds.) (2006). *Teacher education in CALL*. John Benjamins.
- Kern, R., & Linares, E. (2018). Medium and addressivity in French online exchanges. In R. Kern & C. Develotte (Eds.), *Screens and scenes: Multimodal communication in online intercultural encounters* (pp. 206–230). Routledge.
- Kessler, G. (2016). Technology standards for language teacher preparation. In F. Farr & L. Murray (Eds.), *The Routledge handbook of language learning and technology* (pp. 57–70). Routledge.
- Kurek, M., & Müller-Hartmann, A. (2019). The formative role of teaching presence in blended Virtual Exchange. *Language Learning & Technology*, 23(3), 52-73. <https://dx.doi.org/10125/44696>
- Lantolf, J. P., & Thorne, S. L. (2006). *Sociocultural theory and the genesis of second language development*. OUP.
- Larsen-Freeman, D., & Cameron, L. (2008). *Complex systems and applied linguistics*. OUP.
- Levy, M., & Moore, P. J. (2018). Qualitative research in CALL. *Language Learning & Technology*, 22(2), 1–7. <https://doi.org/10125/44638>
- Lewis, T., Chanier, T., & Youngs, B. (2011). Multilateral online exchange for language and culture learning. *Language Learning & Technology*, 15(1), 3–9. <https://www.lltjournal.org/item/10125-44230/>
- Long, M. H. (1983). Linguistic and conversational adjustments to non-native speakers. *Studies in Second Language Acquisition*, 5(2), 177–193. <https://doi.org/10.1017/S0272263100004848>
- Nissen, E. (2019). *Formation hybride en langues: Articuler présentiel et distanciel*. Didier.
- O’Dowd, R. (2015). Supporting in-service language educators in learning to telecollaborate. *Language Learning & Technology*, 19(1), 63–82. <https://dx.doi.org/10125/44402>
- O’Dowd, R. (2017). Online intercultural exchange and language education. In S. Thorne & S. May (Eds.), *Language, education and technology* (pp. 207–218). Springer.
- O’Dowd, R. (2018). From telecollaboration to virtual exchange: State-of-the-art and the role of UNICollaboration in moving forward. *Journal of Virtual Exchange*, 1, 1–23. <https://doi.org/10.14705/rpnet.2018.jve.1>
- O’Dowd, R., & O’Rourke, B. (2019). New developments in virtual exchange in foreign language education. *Language Learning & Technology*, 23(3), 1–7. <http://hdl.handle.net/10125/44690>

- Reinhardt, J., & Sykes, J. (2014). Special Issue Commentary: Digital game activity in L2 teaching and learning. *Language Learning & Technology*, 18(2), 2–8.  
[https://scholarspace.manoa.hawaii.edu/bitstream/10125/44362/1/18\\_02\\_commentary.pdf](https://scholarspace.manoa.hawaii.edu/bitstream/10125/44362/1/18_02_commentary.pdf)
- Satar, M., & Wigham, C. (2020). Delivering task instructions in multimodal synchronous online language teaching. *ALSIC*, 23(1). <https://doi.org/10.4000/alsic.4571>
- Sauro, S., & Zourou, K. (2019). What are the digital wilds? *Language Learning & Technology*, 23(1), 1–7. <https://doi.org/10125/44666>
- Sloetjes, H., & Wittenburg, P. (2008). Annotation by category - ELAN and ISO DCR. In N. Calzolari, K. Choukri, B. Maegaard, J. Mariani, J. Odijk, S. Piperidis & D. Tapias (Eds.), *Proceedings of the 6th international conference on language resources and evaluation* (pp. 816–820). ELRA.
- Sockett, G. (2014). *The online informal learning of English*. Palgrave Macmillan.
- Son, J.-B., & Windeatt, S. (Eds.). (2017). *Language teacher education and technology*. Bloomsbury.
- Stemler, S. (2001). An overview of content analysis. *Practical Assessment, Research & Evaluation*, 7(1), 1–9. <https://doi.org/10.7275/z6fm-2e34>
- Thorne, S. L. (2003). Artifacts and cultures-of-use in intercultural communication. *Language Learning & Technology*, 7(2), 38–67.  
[https://scholarspace.manoa.hawaii.edu/bitstream/10125/25200/1/07\\_02\\_thorne.pdf](https://scholarspace.manoa.hawaii.edu/bitstream/10125/25200/1/07_02_thorne.pdf)
- Van Lier, L. (2004). *The ecology and semiotics of language learning: A sociocultural perspective*. Kluwer Academic Publishers.
- Ware, P., Del Rosal, K., & Conry, J. M. (2018). Affordances and task design. In R. Kern & C. Develotte (Eds.), *Screens and scenes: Multimodal communication in online intercultural encounters* (pp. 182–205). Routledge.
- Wood, D., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry*, 17(2), 89–100.

## Appendix A. Transcription Conventions

|             |                               |
|-------------|-------------------------------|
| xxx         | inaudible segment             |
| <u>Text</u> | overlap                       |
| +           | short pause                   |
| text:       | prolonged sound of a syllable |
| /           | rising intonation             |

## About the Authors

Marco Cappellini is an associate professor at Aix Marseille University, where he is the head of the language centre at the Faculty of Humanities and Foreign Languages. He is a member of the Speech and Language Laboratory. His main research interests are telecollaboration and virtual exchange, teacher education, and learner autonomy.

**E-mail:** [marco.cappellini@univ-amu.fr](mailto:marco.cappellini@univ-amu.fr)

Christelle Combe is an associate professor in language sciences, didactics of French as a foreign language. Her research interests are online interactions in pedagogical contexts (online training of FLE teachers, FLE didactics via a multimodal platform, non-formal FLE pedagogy via socio-numerical networks) and outside of pedagogical contexts.

**E-mail:** [christelle.combe@univ-amu.fr](mailto:christelle.combe@univ-amu.fr)