

Article

Fostering Pre-Service Teachers' Information and Critical Digital Literacy Skills Through a COIL Project

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Abstract

Critical digital literacy (CDL) skills, and the ability to convey them to foreign language (FL) students have become increasingly relevant competencies of language teachers. Hence, concepts in teacher education need to be developed and explored in order to foster these skills. In our exploratory research, we examined a COIL project including pre-service FL teachers. Students worked in small international teams to discuss the distinction between credible and non-credible online sources in the discourse of the Covid-19 pandemic. The results indicate the development of awareness about the complexity, functions and mechanisms of online media as well as the strategies on how to judge the credibility of online sources. Additionally, participants reflected on the importance of fostering information and CDL of their (future) students. The data suggests that the development of these professional, digital competencies was due to the current, socially relevant topic (Covid-19) and the communicative exchange in small international groups.

Keywords

Pre-service teacher education, foreign language teachers, critical digital literacy, COIL, Virtual Exchange

1 Introduction

The importance of digital literacy skills as part of professional skills of foreign language (FL) teachers is undeniable, not only because digital media are used in the FL classroom as a means to incorporate more authentic and current materials, but also because teachers are faced with the task to foster the development of digital literacy skills of their students in all educational disciplines. These demands are reflected in recent frameworks, such as the DigCompEdu (Redecker & Punie, 2021), or in Global Citizenship Education (UNESCO, 2021).

These skills require that FL learning goes beyond traditional classroom settings and focuses on globally relevant topics and transversal skills. In order to incorporate the development of digital skills into the language classroom, teachers themselves must develop these skills beforehand, including not only the ability to apply digital tools for teaching and learning and use digital media as a resource for

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authentic language input. When including authentic FL texts (in a broad sense, e.g., including audio-visuals) in the FL classroom, it also becomes necessary to judge their reliability and credibility. Digital literacy education must therefore also include critical media reception (e.g., recognition of ‘fake news’), which, together with the responsible use of tools (e.g., in terms of privacy protection), is often understood as critical digital literacy (CDL) or information literacy.

One educational concept, often claimed to promote digital literacy in general, is Collaborative Online International Learning (COIL; e.g., [Rubin & Guth, 2015](#); also known as Virtual Exchanges), since it offers opportunities to authentically connect learners from different locations (e.g., countries) to discuss and collaborate via online tools and digital media ([O’Dowd, 2018](#)). Digital literacy and other transversal skills, such as intercultural competencies, are named as one of the main goals of Virtual Exchanges (*ibid.*) and the concept is regularly applied in teacher education ([Dooly & Vinagre, 2021](#)). However, few studies have given evidence that it is effective in fostering CDL in particular ([Hauck, 2019](#)).

In the current study, we developed a COIL project between students from a German university (Leipzig University) training to become FL teachers and students from a US-American university (Ohio University, diverse majors). The goal of the exchange was to jointly develop student’s CDL via several asynchronous online tasks including discussions, tutorials, and reflections. Students worked in small international teams to discuss the distinction between credible and non-credible online sources in the discourse of the Covid-19 pandemic in spring 2020. Our exploratory research was based on the following research question: How can CDL of pre-service foreign language teachers be promoted via a COIL project? In order to trace skill development and corresponding supporting factors in the didactic design as well as the development of metacognitions on CDL, we collected pre- and post-survey data and recorded task results, online discussions, and individual reflections.

The current paper strives to contribute to the discussion and empirical basis on how to foster the development of digital literacy in pre-service teacher training. After discussing the overarching concept of digital literacy and frameworks of digital literacy of language teachers, including the subdomain of CDL, we briefly review the literature on Virtual Exchanges / COIL.

2 Digital Literacy and CDL for Foreign Language Teachers

2.1 Concepts and frameworks

There are a great number of terms and concepts describing the set of skills and competences needed in a digitalized world. In the current paper, we are using the term digital literacy as an overarching concept. There are countless definitions and descriptions of digital literacy (or similar concepts such as media competence) in international literature ([Starkey 2020](#)). Literacy originally refers to the ability to read and write, but in a broader sense includes “the ability to creatively engage in particular *social practices*” ([Jones & Hafner, 2021](#), p. 16). The term digital literacy can be refined to refer to communication with and reflection about digital media. It hence not only includes the competence to use digital tools and media on a rather technical level, but also to understand and reflect the social practice of communication and the genesis of digital “texts”, including a socio-political dimension, such as power relationships etc. In our study, we focus on one subdomain, namely CDL. CDL, is a term derived from the teaching of literature (i.e., literacy education) and discussed as a skill, “any literate individual” should possess ([Pandya et al., 2022](#), p. 3). However, the discussion has expanded in recent years to include the reflection on disinformation as well as mechanisms of media manipulation in a digital world (*ibid.*), especially after “the rise of so-called fake news as a global phenomenon” ([Hobbs et al., 2018](#), p. 153). CDL hence refers to the set of skills needed to “critically assess information” ([Pegrum et al., 2018](#), p. 8) in a “global context of the circulation of digital misinformation and disinformation” (*ibid.*, p. 9).

According to the concept of critical pedagogy (Freire & Macedo, 2014) the main goal of education is to provide students with a better understanding of power structures in the world, empower them to understand and express their own positions as well as recognize differing perspectives, and to be able to (re)shape and transform society. Hence, CDL is of great importance, particularly for FL teaching and learning, since it combines aspects of cultural and digital learning in a relevant, authentic and societal context (Louloudi et al., 2021). However, the concept is rarely included in FL curricula and classrooms (Gerlach, 2020), due to an avoidance of controversial topics in the FL classroom (e.g., fake news; Wallace, 2003), even though it can be a basis to foster reflection and critical thinking (Jeyara & Harland, 2016).

When talking about digital literacy skills teachers need, a distinction is frequently made between general digital literacy and teaching competence with digital media (Starkey, 2020). During the last decade, several frameworks have been developed in order to describe and categorize these competencies (e.g., DigCompEdu, TPACK). The Technological Pedagogical Content Knowledge framework model (TPACK) by Koehler and Mishra (Koehler & Mishra, 2006), which is one of the most influential models, however, does not encompass CDL and will therefore not be displayed in detail.

The European Framework for the Digital Competence of Educators (DigCompEdu), published in 2017, is an adaptation of the DigComp (Digital Competence Framework for Citizens). According to the authors, it can be used by educators as well as by educational institutions and policy makers to describe learning outcomes and develop curricula (Redecker & Punie, 2017). The DigCompEdu includes the following six areas: (1) professional engagement, (2) digital resources, (3) teaching and learning, (4) assessment, (5) empowering learners, and (6) facilitating learners' digital competence (ibid.) The aspect of CDL, focused in our current research, can be located in area six under the heading of information and media literacy, which among others encompasses the ability "to compare and critically evaluate the credibility and reliability of information and its sources" (ibid., p. 23). As argued above, while critical media literacy in this model is named as a skill to be facilitated in learners, its prerequisites are that teachers not only acknowledge its importance, as well as their responsibility to foster this in their (language) classes, but it is also essential that they themselves have competencies in this area. However, since the framework is not targeted at language teachers in particular, the specific requirements and affordances for foreign language teaching are not explicated in the framework.

In their framework of digital literacies for language teaching and learning, Pegrum et al. (2018) anchor skills concerning misinformation (i.e., false information provided without the intend to deceive; cf. LibertiesEU, 2021) and disinformation (i.e., information provided with the intend to deceive; cf. LibertiesEU, 2021) in two subdomains, as information literacy, belonging to "communication-related literacies" and as critical literacy (including CDL) under the domain of (re)design-related literacies. According to Pegrum (2022), critical literacy encompasses:

the ability to evaluate information and data (as in information literacy), to appreciate the limitations and dangers of mobile communication, to critique the material underpinnings of our online environment, to take positions in debates about the coming tide of technological innovations and their implications for humanity, and to engage with thoughtful academic research into new technologies, including in education.

Accordingly, the acquisition of digital literacy is not solely focused on the knowledge and technical competence to handle, consume and produce content, but also requires complex, multidimensional skills and strategies to apply in private and professional settings and a social, contextual dimension.

While these frameworks do refer to CDL as a subset of digital literacy of teachers, they do not provide instruments for the investigation of CDL. Hence, in our study, we have chosen a rather exploratory approach in order to trace not only the development of skills and the metacognition on CDL, but also of the factors in the instructional design of the COIL project contributing to this development.

The development of digital literacy in teacher education has been part of Virtual Exchange projects for some time, since they usually involve communicating and cooperating via digital media and tools. In the following chapter, we first present the COIL concept as a form of Virtual Exchange. Afterwards, research on the development of digital literacy via Virtual Exchange projects with aspiring teachers is summarized.

2.2 COIL projects and the development of CDL

The term COIL was first introduced by the Center for Collaborative Online Intercultural Learning at the State University of New York, which advances the COIL concept since 2008 (Rubin & Guth, 2015). The goals of the center are to cultivate a network and to promote national and international exchange programs, e.g., by supporting participating universities. The four letters of the acronym COIL represent the key aspects of the concept: Collaboration between teachers and learners via online media in international exchanges that are integrated into the learning processes and learning goals of the respective courses (De Wit, 2013). The fundamental idea of COIL is to give students of different universities the opportunity to develop a variety of competences by jointly working on the same topic(s). This is fostered not only by international and intercultural communication on the respective topic(s), but also by including different scientific subjects with these diverse perspectives, which in turn should facilitate critical thinking (Starke-Meyerring et al., 2008).

Important in the concept is also a joint development of a shared syllabus, i.e., the progress, contents and tasks included in the COIL projects, by two or more instructors of different universities (Rubin & Guth, 2015). Hence, the (online) collaboration process already begins during the preparatory phase of the projects, “where teachers from two cultures work together to develop a shared syllabus, emphasizing experiential and collaborative student learning” (ibid., p. 18). Since COIL is not based on a certain technology or learning platform, the implementation can include a variety of synchronous and / or asynchronous exercises, tasks and tools. The concept is not limited to certain academic subjects or teaching modes, but can be included in any course or class (e.g., on-site, remote, or blended formats) of the collaborating institutions (ibid.). According to O’Dowd (2017), COIL projects differ from other Virtual Exchange formats since it “adds a collaborative and comparative perspective to the subject content by creating a shared syllabus which is worked on by all participating classes” (O’Dowd, 2017, p. 17).

The development of digital literacy has been proposed as a key goal of Virtual Exchanges in general and of COIL as a subform (e.g., O’Dowd, 2018). Several studies have examined the development of digital literacy via Virtual Exchanges in teacher education, often along with linguistic and intercultural learning (e.g., Fuchs, 2006; Fuchs et al., 2012; Helm, 2014; The EVALUATE Group, 2019; Yang, 2020). However, in comparison to a large research body on Virtual Exchanges and their impact on different competencies of aspiring teachers in general, there has been little research on the development of CDL of teacher students. Only a few studies focus on the impact of Virtual Exchanges on CDL, but with other target groups (e.g., Nicolau, 2021). To our knowledge, so far only two studies focused on CDL in teacher education. Based mainly on the EVALUATE project, Hauck examined the potentials and limitations of CDL in Virtual Exchange projects (The EVALUATE Group, 2019). The EVALUATE project included more than 1,000 pre-service teachers and examined, among other competencies, the development of digital pedagogical competencies. The results show that the Virtual Exchanges and the reflections on technology use in the (future) classroom had a positive impact on digital-pedagogical competence development (ibid.). Hauck (2019) defines CDL as the critical and functional understanding of digital technologies in different socio-cultural settings, where individuals are both producers and recipients and need to acquire the ability to read the world critically and to act within the world to change it (Hauck, 2019). According to the author, Virtual Exchanges can promote CDL particularly well, since they are

embedded in real life contexts, they use and reflect on different digital technologies, and they support learners in becoming aware of how digital environments shape our thoughts and actions as well as our perception of others (ibid.).

In their exploratory case study, Kopish and Marques (2020) researched the development of global and technological / digital competencies of pre-service teachers from the United States and Brazil in a COIL setting. The authors conclude that COIL projects are “a rewarding endeavor for instructors and ha[ve] the potential to be a transformative experience for the pre-service teachers” (Kopish & Marques, 2020, p. 59). While these two studies (Hauck, 2019 and Kopish & Marques, 2020) show that Virtual Exchanges have the potential to contribute to the development of digital competencies in our target group, it is also obvious that it is necessary to further investigate its contributions to CDL in particular.

3 Method

In the current study, we investigated the development of CDL in order to answer the research question: How can CDL of pre-service foreign language teachers be promoted via a COIL project? The COIL project at the center of this investigation was conducted in April 2020 and lasted four weeks. It connected the online courses “Rhetoric and Writing II” (Ohio University, USA) and the course “Computer-Assisted Language Learning and Teaching” (Leipzig University, Germany). The interdisciplinary online exchange took place between pre-service FL teachers from Leipzig (German and English as a Foreign Language) and students from Ohio University (OU), enrolled in different degree programs (all BA level). In this paper only the data from the pre-service FL students (N=8) will be taken into consideration, since their development of CDL is at the core of the study.

3.1 Participants

The eight participating students gave their informed consent to participate in the study. However, only five took part in the pre- and post-questionnaire and thus entered their demographic data. These five students were between 20 and 30 years old (three female, one male and one declined to answer). All participants were enrolled to become teachers for different types of schools (primary school or high school) and different subjects. However, all were enrolled in German as a Second or Foreign Language as a major or minor and some also studied to become teachers for English as a Second Language. None had previously attended a module with a focus on digital media during their studies. All of the participants’ first language was German and they stated that English was their first foreign language with a level of B2 to C2 according to the CEFR (CoE, 2001). Accordingly, language proficiency can be judged as sufficient for active participation in the COIL project, in which all communication with the OU students took place in English.

3.2 Materials and procedure

3.2.1 Instructional materials and procedure

In a completely asynchronous setting, participants worked in small international teams of five to six students to discuss the distinction between credible and non-credible online sources in the discourse of the Covid-19 pandemic. The asynchronous mode was chosen because of the time difference (6 hours)

between Leipzig and Ohio. Over the time of four weeks, participants engaged in a sequence of tasks (see Table 1), mainly via the virtual learning environment Blackboard, used at OU.

Table 1

COIL Tasks and Additional Research Tools in Chronological Order (SIFT refers to a method of judging the credibility of online sources using the four steps: Stop, Investigate, Find and Trace; Notion Labs Inc., 2020)

	Week 1	Week 2	Week 3	Week 4
Tasks, Process data	Audio- and video introductions (VoiceThread)	Group discussions II: Covid-19 pandemic	SIFT Tutorial	Journals using SIFT method, including reflection
	Group discussions I: Strategies	Padlet entries: Credibility of online sources	Journals on tutorial	
Additional research tools, Reflection data	Consent and information on research Pre-survey	Reflection journals		Reflection videos (VoiceThread) Group discussion in online seminar Post-survey

In the first week, the tasks included the production and reception of audio- and video-based introductions (including personal international experiences) via Voice Thread and discussions on already applied strategies for judging the credibility of online sources (group discussions I) using group discussion boards on Blackboard (see Fig. 1).

Figure 1

Instructions for Initial Discussions on Strategies in Small International Groups (week 1)

Fake News

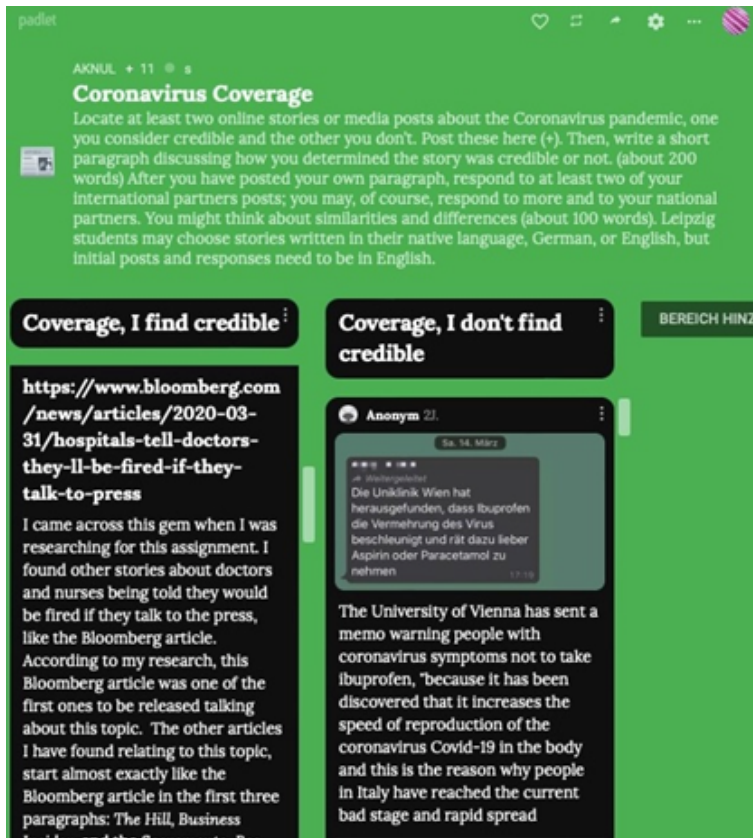
Post a short paragraph about what strategies you use to determine if an online story or social media post is credible/true or not. We are not asking you to research such strategies but rather to think about how you approach such media right now. List all strategies you can think of, even if it means asking your best friend “do you think this is real”? (at least 200 words).

After you have posted your own paragraph, **respond to at least two of your international partners posts;** you may, of course, respond to more and to your national partners. You might think about similarities and differences and whether you consider other strategies useful or not (at least 100 words).

During the second week, students discussed respective national responses to the Covid-19 pandemic (group discussion II), additionally, they were asked to individually select and jointly discuss online coverage on the Coronavirus and the credibility of these sources by using a Padlet site (see Figure 2).

Figure 2

Instructions and Clipping of Postings of Credible and Non-credible Online Coverage (week 2)



In the third following week, students took the self-study tutorial “Check, Please” (Notion Labs Inc, 2020) to learn how to analyze and check the credibility of different online sources using the SIFT method (Stop, Investigate, Find and Trace). The five short lectures were accompanied by journal tasks, in which students entered notes, answers, and reflections.

During the final week, students applied the SIFT method and documented its use via journals on Blackboard. This was concluded by the task to reanalyze the online sources they had selected in week two.

3.2.2 Research materials and procedure

For the purpose of researching digital competencies, one of the frameworks described above offers a self-assessment tool: the DigCompEdu. However, since this framework is not embedded in a specific subject-related or professional context, it is not addressed to a specific target group of educators or subject context (e.g., foreign language teachers). Hence, it remains rather general when explicating the purposes and contexts of specific (sub-)skills and competencies. The framework of Pegrum and colleagues (2018) on the other hand, is targeted at language teachers, but does not offer a tool to measure digital competencies. Additionally, in the current study we targeted a very specific subdomain of digital literacy, that is, CDL. For the purpose of our empirical study, we therefore took a more exploratory approach, including mostly open-ended questions. However, we mainly applied a range of other research tools aiming at retracing the development of the participating students' CDL more in-depth. For this purpose, we recorded all responses to the tasks described in section 3.2.1. Additionally, the data included reflection journals of individual students during and after the project (written and video reflections), a synchronous group discussion via Zoom, as well as the qualitative data from the pre- and post-survey (open-ended

questions). Through this triangulation of student output (task responses) and reflection data, we were able to trace the development of the complex competence of CDL, including students' metacognitions on the topic. The tasks and additional research tools, including both process and reflection data, are shown in chronological order in the lower part of Table 1.

To date, there is little research on CDL and its promotion via Virtual Exchange projects. Hence, a qualitative-exploratory research design is a suitable approach for research in this context (Swedberg, 2020). In our study, we were not only interested in the learning goal of CDL as a cognitive skill and its application, but we were particularly interested in the learning process and skill development throughout the project. Therefore, we focused on retracing individual processes of the participants by recording reflections, contributions to group discussions and tasks results. Furthermore, we triangulated the process data with the survey results in the form of a multiple case study (Day, 2017). In order to assure confidentiality, the data was pseudonymized.

The questionnaires included the following categories: demographic data, importance and personal significance of CDL for teaching (i.e., profession-related and subject-related), and reflection on the COIL project. Data collected in the demographic part of the survey was used to describe the participating student group (3.1). In the results section, we also refer to the open-ended questions in the pre- and post-questionnaires asking for a definition of CDL and its relevance for teaching and learning in general and in FL teaching in particular. Additionally, in the post-questionnaire we asked for any changes students perceived in their understanding of the concept and what they think contributed to this change. We also included students' reflections on the COIL project in our data evaluation.

For the evaluation of the process and reflection data, we conducted a qualitative content analysis following Kuckartz (2018). This is a suitable method for answering research questions within complex fields of investigation. In the systematic analysis, all data was classified, categorized, interpreted, and reflected (ibid.). After the initiating text work, preliminary deductive categories were compared with the learning objectives in order to analyze the process data. Subsequently, categories were assigned to the appropriate text passages or (audio-visual) data points. The complex and multi-layered construct was summarized on the basis of the analytical comparison of the CDL concepts, presented in the literature review (chapter 2). The preliminary deductive categories included: C1 – awareness of media knowledge and media usage; C2 – awareness of functions and effects of media; C3 – critical analysis and evaluation of media. The final step involved the formation of two additional categories derived inductively from the data: C4 – hitherto used strategies to judge credibility, and C5 – differentiated consideration of functions and effects of media.

4 Results

Since the data was collected in order to trace the development of CDL in the learning process and in metacognition as well as to detect factors of the COIL project contributing to this development, the results will be described for these two key aspects (development and contributing factors). Furthermore, due to the fact that this is an exploratory study, we will first describe two individual cases in detail to illustrate specific developments in the targeted skill and how this can be contributed to certain aspects of the COIL (4.1). Subsequently, we present the overall results including data from all participants (4.2). Additional results, such as feedback on the instructional design of the COIL project, will only be included, if it refers to fostering or hindering the development of CDL.

In the results section, we present excerpts from the collected data in the form of students' citations in English and German. Statements made in English (task results) are not corrected for errors. Statements in German (research tools) have been translated into English, while the original utterances can be found in the appendix (E1-E8). These citations serve as evidence on which our conclusions are based and reflect other data, which we could not include in the paper.

4.1 Case study results

In this section we present the cases of Luisa and Felix (pseudonyms) in order to depict their metacognitions on CDL and its development as well as the contribution of the COIL to this. We selected these cases for two reasons: (1) for both participants we have complete data sets (both surveys and all tasks); and (2) Luisa and Felix were part of different international groups, hence giving an insight into two group discussions. However, since most postings on Padlet (task in week 2) were made anonymously, we are not able to describe the application of strategies to determine the credibility of online sources on an individual level. Individual results concerning the development of CDL are thus based on all other disclosures and reflections of these two students.

4.1.1 Luisa (SL_01)

Luisa's development of CDL: Strategies and metacognition

Luisa displays a shift in her notion of CDL towards a more complex understanding of the concept. While in the pre-questionnaire, she describes the construct rather generically as “the ability to deal comprehensively with the use of media and the resulting outcomes” (E1), her definition after the project is more concrete and reflects a twofold concept: “CDL is the ability to assess, reflect on and evaluate different media in terms of their authenticity, reliability and respectability. It also includes the ability to handle different media safely.” (E2). This statement in the post-questionnaire reflects a widening of her view, which results in the usage of more concrete verbs (“assess”, “reflect on”, “evaluate”) as well as the naming of relevant factors in digital media. The second sentence refers to another sub-component of critical digital competence that encompasses a more active and receptive usage of media. This is complemented by her insight that it is important to include CDL training in the language classroom (post-questionnaire). Additionally, she recapitulates the development of her own CDL in the reflection video in week four: “And it was also very informative, and I definitely learned a good deal more about how to deal with fake news [...]”.

Regarding the development and extension of strategies, a comparison of the first and last tasks reveals these. For the first group discussion she used less reliable strategies, such as conferring with others: “Another way of dealing with fake news is just to talk about it with people.” (group discussion I). The reflection of her (lacking) skills is fostered by the SIFT tutorial: “The little game in the first tutorial was very revealing as to how well I am actually able to spot false information (not as good as I thought)” (reflection journal SIFT). She also establishes a connection between the discussed entries in the Padlet and the SIFT-tutorial: “The method they explained of how to best check coverage is plausible and makes sense. I thought it was interesting that they [SIFT tutorial] talked about satire magazines and websites. This was something that came up on the padlet discussion as well” (reflection journal SIFT). At the end of the SIFT tutorial, i.e., the final task, she reflects the complexity of investigating and tracing information, and explicitly names background checks as a broader strategy: “My own experience showed, that occasionally, (*website name anonymized*) can be helpful with tracing sources – however, one has to be really careful and background checks are definitely necessary” (reflection journal SIFT).

Factors of the COIL contributing to the development of Luisa's CDL

Luisa is the only participant who has had previous experience as a participant in a Virtual Exchange. She reports that the project has generally been “exciting and varied” (E3) in her reflection journal at the end of week 2. Here, she also describes the interaction within the small international group as objective and respectful. Despite different opinions and views, she sees the group's work as having been successful: “Communication worked pretty good. For the most part I'd say everyone was really nice and

collaborative” (reflection video, week 4). She emphasizes the exchange of different perspectives and opinions on global issues with people from different countries as positive factors of the COIL: “It was very interesting to see how people from somewhere else in the world are dealing with the same issues we have here” (reflection video), with which she might be referring to the problem of “fake news” and the pandemic alike. In terms of factors of the COIL fostering her development of critical literacy, she also considers the topic of the Covid-19 pandemic and its media coverage as well-chosen and stimulating for the exchange: “Fake news, that is in the USA [and] here in Europe [...] ground for discussion, so it was super interesting to hear how the people from there see it.” (E4, group discussion in online seminar, week 4). The COIL experience and the SIFT tutorial also contributed to her knowledge about new resources for teaching: “I got to know a lot more websites that I could use for Virtual Exchange tasks, if I were to do that in school, since I'm studying to be a teacher” (reflection video).

4.1.2 Felix (SL_02)

Felix's development of CDL: Strategies and metacognition

For Felix, a change in the meaning and relevance of CDL becomes particularly evident in the collected data. By the end of the COIL, he places the relevance of analyzing information and media in a wider social, professional and teaching context, compared to the beginning of the COIL project. He reflects that before the exchange he had not thought about the personal relevance of the topic “fake news”: “I wasn't really concerned about me or myself being prone to fake news before this” (reflection video). In the reflection video he also remarks that he will use the strategies to judge the credibility of online sources he learned during the project, in his function as a teacher: “It really was a new experience for me, to actually look up these kinds of news and analyze them and try to sort of debug them. So, that was special. And I think that may have given me a lot of fruitful thought and I will definitely try to include some of the strategies I've learned at my future career as a teacher. So, when I try to pass on these methodologies that can definitely be a helping factor” (reflection video). With regard to media usage in the COIL project, Felix states that he was able to get to know and use new digital tools: “I liked getting to know about new sort of tools, digital tools and media such as the Voice Thread or I haven't really worked with Padlet before.” (reflection video).

In terms of developing new strategies Felix wrote in his SIFT journal at the end of the project that the tutorial gave him useful advice and exercises to determine misinformation: “(...) I am positively surprised by the project. (...) Especially from a pedagogic point of view, I will evaluate whether I could integrate elements of this approach into my later school classes” (reflection journal SIFT).

Factors of the COIL contributing to Felix's development of CDL

In the reflection journals in week 2 and 4, Felix describes the successful exchange and discussion with the American students in his small group. In particular, he liked that they shared different perspectives on the topic: “I thought it was really interesting to get together with a group of students from such a different cultural perspective. So, I think the US, Midwest and Ohio are very different realities. And I think that definitely showed some new insights” (reflection video). The positive contribution of interindividual differences to his development of CDL is a recurring motif in his reflections. These differences did not only stem from the diverse national origins of the COIL participants, but also from their academic and professional backgrounds. While the group from Leipzig was very homogenous in this respect (“traditional” students aspiring to become foreign language teachers), the students from OU had more diverse backgrounds, with most of them being “non-traditional” students: with an age of over 30 years and working full time, e.g., as medical professionals. Being confronted with people of very

different backgrounds and experiences made Felix realize the importance of CDL: “(...) So I actually found it pretty cool to work in the small groups. What I also found exciting was the topic in general. If you are working with fake news and you notice how other people comment on what you have written, you realize that this is a very different world view, maybe. (...) then there was, for example, an article where someone wrote something like this – no – a comment where someone wrote very, almost shocked – oh, I don’t know what to believe in anymore – and so on. Afterwards I thought: o wow, okay bizarre, that (incomprehensible)” (E5). This suggests that the exchange also contributed to his realization of the importance of taking up CDL as a topic in the language classroom, since a more diverse student body has to be expected in this context. Hence, realizing that teacher students represent a privileged and rather homogeneous group, was an important result of the COIL. He, however, also expresses a slight dissatisfaction with the asynchronous group discussions in the forum and wishes for a more guided discussion in order to have a deeper discussion with a stronger focus on problem solving and an increase in participation and exchanges within the international group.

4.2 Overall results

In this section, we present the overall outcomes of our study, based on the task results as well as the data from our research tools including all participants. When referring to participants in this section, we generally mean the students from Leipzig University. However, in some of the results, the comments and answers of the Ohio University students are crucial to our interpretation. Whenever this is the case, it is specified accordingly (e.g., as OU students).

In 4.2.1, we retrace the development of CDL by describing the results in chronological order. From these, it becomes clear that the SIFT tutorial undoubtedly had an impact on the development of CDL (as was intended). However, since the tutorial took place in a self-study period, we were able to discern its influence from that of the COIL itself. We therefore include results and utterances concerning the positive impact of the SIFT tutorial in the section describing the participants’ development (4.2.1), while the factors of the COIL contributing to literacy development are described separately in subsection 4.2.2. In section 4.2.1 the respective categories from the content analysis (C1 – C5) are referenced in brackets.

4.2.1 Development of CDL: strategies and metacognition

In **week 1**, the first task after the video introductions were group discussions on the strategies students already used to discern credible and non-credible online sources and media coverage (see fig. 1, 3.2.1; C4). Strategies that were named and described by the participants were quite diverse, ranging from attempts to objectively assess sources, such as checking the source of information or of the pictures used, comparing sources (e.g., reading texts from different political positions), or using fake news checkers; to more unreliable, subjective strategies, like questioning the author’s intent, asking friends and family, analyzing the tone of a text or relying on the reputation of the source. While most strategies were put forward by both student groups (Leipzig and OU), some strategies were only named by one.

The group discussions also fostered the awareness of mechanisms underlying media production and its effects (C1/C2): “I have to admit that it will be a complex challenge due to the rapidly evolving nature of modern mass media news coverage in the realm of online and especially social media which can easily turn into an overwhelming mass of information” (SL_02). The OU students in particular reflected on sensationalism, emotional affectation of the audience and manipulation of pictures in (private) media, drawing on their personal and professional experiences (e.g., one student used to work for a Reality TV Show). Both groups also commented on information overflow, advertisements, conspiracy theories, and the skepticism toward social media as a news source.

During the **second week**, strategies and insights from week 1 could be applied via the task to post coverage on Covid-19 on Padlet, which participants judged as being reliable or unreliable (see fig. 2, 3.2.1). This task was then discussed on Padlet itself and via a second round of international group discussions in forums. The differentiated and modified (cultural and professional) perspectives, in comparison to the statements of the first week, show that participants had started to become aware of the importance of exchanging different opinions and insights. In addition, they not only considered strategies for dealing with fake news in general and in the reporting on the Covid-19 pandemic in particular, but also of the different functions and mechanisms of (online) media coverage (C4), such as sensational journalism, manipulation strategies, advertising, or satirical approaches (e.g., “The Onion”). It also became apparent that the participants considered contributions on social media in particular to be rather unreliable: “However, as soon as they are based on Whatsapp or Facebook, you automatically know that they are not well founded news” (SL_03).

In the reflection journals at the end of week 2, the participants reported that they already grew aware of their own and others’ strategies during the first weeks of the project due to the active and collective exchange of information and comparison of judgment strategies (see 4.2.2). They also became aware of the complexity of evaluating the credibility of online sources: Two of the participants (SL_02, SL_08) emphasized the overall social and professional importance of evaluating the reliability of news coverage, in the form of a conscious, responsible and critical approach to online media and information.

In **week 3**, participants completed the SIFT-tutorial and the accompanying journal, in which they mainly reflected on the methods taught and their usage (C3). The foci of the journals differ strongly between participants: Some realize that they had become more aware of their (in-)ability to judge the reliability of coverage and some feel confirmed in their approaches, e.g., when tools were mentioned on which they themselves rely. At the same time, most participants state that they learned about new tools and strategies for checking the reliability of coverage. It also becomes apparent that the tasks fostered a reflection on the differences between (public) media in Germany and the US, since the examples used in the SIFT tutorial are based on US media. One participant also commented on the pedagogical value and instructional design of the tutorial, which for him combines “(...) useful and practically oriented exercises, fundamental background information and even a bit of humor to tackle a contemporary problem” (SL_02).

During the **final week**, participants were asked to return to the Padlet entries created in week 2 and to apply the SIFT method to the coverage collected there. Here, in addition to the metacognitive realizations on strategy use, voiced in the journals in Week 3, the re-evaluation actually showed a much more systematic, triangulated or multi-level approach, applying either the SIFT method in full or parts of it. What can be seen from the reflections in the accompanying journals and the Padlet comments, is that most of the participants arrived at a more differentiated view of different functions and effects of media and used effective strategies for the systematic, multi-level assessment of online media: “When using the SIFT method to determine the trustworthiness of this story, the key seems to be to take time and systematically analyze the content as well as media outlet itself” (Anonymous, Padlet entry). Thus, the promotion of CDL is clearly evident within the reflection data (C3). The development of instructional design skills can also be noted among all participants: They became more aware of the relevance of CDL both for teaching in general and specifically of FLs. The participants recognized and emphasized their own responsibility for broaching the issue of reliability of media coverage in their own FL classes: “Gathering competencies in this area not only proves to be a great advantage and a partly necessary skill for the time in school, but it also offers many advantages at later moments (e.g., during professional training, graduate studies, and for several professions). In addition, I see the critical reflection of media and one’s own use of them as a very important component of instruction” (SL_08, post-questionnaire, E6).

4.2.2 Factors of the COIL contributing to CDL development

The collection of strategies named before the SIFT training, clearly shows that the pooling of the two groups contributes to a greater variety of approaches and strategies stated. This was especially beneficial, since some of the more unreliable strategies (such as asking family members) were proposed by the other group of students. This is probably due to the greater diversity in the OU students, such as diverse social and professional backgrounds as well as ages. On the one hand, this contributes to the realization of the Leipzig participants that CDL education is important and should be part of the curriculum (in FL teaching). On the other hand, students stated that they benefited directly from the (positive) approaches of the OU students: “It is a great enrichment to learn about such things, from the students from the United States, and to get enlightened regarding credible news channels or portals. Especially when it comes to global understanding and international information, I find this exchange very helpful.” (SL_08, reflection journal, week 2; E7).

Overall, participants evaluated it as positive having a counterpart to communicate with and stated that the different views made the communication feel more authentic. Additionally, the choice of topic was valued as a beneficial factor of the exchange: “Fake news” as a phenomenon occurring in the context of the early Covid-19 pandemic in spring 2020 represented a real-life, current, every day and socially relevant topic for the pre-service FL teachers in our study. As the results of the post-survey show, the choice of the topic was evaluated as being interesting and conducive to the discussion tasks. In the post-survey, all participants also stated that they would implement COIL projects in their own teaching and reflected on both the organizational complexity and the advantages of the method.

By defining CDL in the pre- and post-questionnaires, it became clear that students showed a development of their understanding of CDL towards a more complex definition (see cases of Lisa and Felix). While this is not recognized on a metacognitive level by all participants (some write that their understanding did not change), others clearly identify a change: “My understanding of media literacy changed, especially through an exchange with other students and their experiences and knowledge of identifying fake news. In addition, I noticed how the need for conversation shifted into my personal everyday life and I began to talk about the use of media in my personal environment” (SL_08, post-questionnaire, week 4, E8).

5 Discussion

In our study, we aimed at tracing the development of CDL in a COIL project and at identifying factors of this Virtual Exchange that might foster this development. In our 4-week COIL project, teacher students from Leipzig University (Germany) and a diverse group of students from Ohio University (USA) took part in an asynchronous Virtual Exchange, focusing on the topic of “fake news” in the early Covid-19 pandemic in spring 2020. In a series of tasks, participants discussed strategies used to discern credible and non-credible media coverage and learned new methods to do this (SIFT tutorial). Through a triangulation of documented process data (task responses) and reflection data, we were able to trace the development of the complex competence of CDL in a holistic manner, resulting in a multi-case study. The results were presented in the form of citations from our participants, on which we based our conclusions.

In summary, it can be stated that from the participants’ perspective, their CDL developed throughout the project. In addition to this metacognition, the process data indeed shows that participating students’ awareness of media functions and its effects was raised, new strategies to analyze credible and non-credible media coverage were developed, and participants’ understanding of CDL was broadened. By fostering an exchange of different personal and professional perspectives among the two student groups, the importance of broaching the issue in personal and educational settings, such as the FL classroom, was

made more cognizable. Prompted by the Virtual Exchange, pre-service teachers also reflected on the use and critical assessment of digital media in general and on Virtual Exchanges as a teaching method.

Due to the lack of previous studies on the development of CDL via Virtual Exchange projects, we followed an exploratory approach. Therefore, the results cannot be interpreted as generalizable evidence for the impact of COIL projects on the targeted skill. Rather, we propose that the results of our study can be used as a basis to infer relevant factors of Virtual Exchange projects, which in turn can be the basis for the design of larger COIL and research projects examining causal relationships.

As discussed above, developing CDL of aspiring FL teachers is necessary, not only when including authentic materials in the FL classroom, but as current frameworks postulate, FL teachers are also required to hone this transversal skill in their students. For this, however, it is a prerequisite that teachers not only have this skill themselves, but also see the relevance of including it in their instruction. In this respect, the COIL project exhibited its greatest potential, by bringing more diversity into a rather homogenous university classroom of pre-service teachers: The different social and professional perspectives of the OU students led to a greater awareness of the importance of CDL by pinpointing different stages of awareness towards media functions and effects as well as different reliable and unreliable strategies on how to judge the credibility of media coverage. Furthermore, the COIL project contributed to an authentic feeling of the discussion and thereby fostered it. Finally, the usage of different online tools and digital teaching methods for CDL provided inspiration to the aspiring teachers.

Naturally, due to the small number of participants in our study and the specific context it took place in, there are several limitations that have to be discussed. It should be noted here that the development and fostering of CDL could have been influenced not only by the COIL project but also by other factors, for example the content and theoretical literature and discussions covered in the parallel online seminar. Moreover, the data from the pre- and post-survey is limited, since not all eight students participated in the pre- and post-survey. Both should be remedied in further studies.

Also, it could be argued that the development of CDL described here would have taken place regardless of the international exchange and could be attributed solely to the series of instructional tasks. However, the data shows that this is rather improbable, as participants not only stated the helpfulness of the international perspective on the issue, but the data clearly shows that the OU students contributed additional insights and perspectives. Nonetheless, a comparative study including a group in which the tasks are set, without the inclusion of an international group, would give a more precise insight into this.

Above, we briefly discussed the lack of contextual research tools for (self-)assessing the development of CDL of FL teachers as a specific target group. While we had intended to test items, we had adapted from known self-assessment tools in our pre- and post-questionnaire, this was rendered impossible by the small number of participants. Consequently, this desideratum still remains.

Finally, our study confirmed the importance of implementing instructional tools and designs like this COIL project into university classrooms of pre-service teachers, in order to promote a transfer of these into their own FL classrooms. This confirms previous Virtual Exchange studies, such as the EVALUATE study ([The EVALUATE Group, 2019](#)): The hands-on experience in a Virtual Exchange gave pre-service teachers many opportunities for reflecting on their future teaching methods, their professional skills and the importance of CDL development of their future students, which resulted in the firm intention of including these in their future teaching.

6 Conclusion

The overall results of our study show that the participating students were able to expand their knowledge and strategies, and to apply these purposefully and systematically especially through the current, socially relevant topic (Covid-19) and the cross-national, communicative asynchronous exchange in small groups.

This successive, meaningful and (at least partially) jointly constructed knowledge and the exchange and comparison of different perspectives led most participants to a more differentiated assessment of the reliability of online sources. The individual case observations made it possible to draw a differentiated picture of the perception and of the promotion of CDL and the different COIL factors contributing to this.

Nonetheless, the COIL design implemented here should be reflected and redesigned for further implementation in the classroom. For example, many participants wished for synchronous meetings or a communication medium closer to everyday life in order to be able to discuss more actively. Also, a final cooperative task of developing instructional material and its implementation might have strengthened the productive, instructional design competences and enabled a transfer into a professional and subject-relevant context.

Further desiderata include the adaptation of the study for broader empirical explorations and the development of specific research tools. Finally, the Virtual Exchange research field still lacks long-term studies, the planning of pilot and follow-up studies as well as further large-scale studies that deal in a differentiated way with the research of subject-related or interdisciplinary CDL. Since the present work is an exploratory study, it is necessary to conduct further studies in the future.

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Appendix

Data excerpts in the German original

- E1. “Kritische Medienkompetenz bezeichnet die Fähigkeit, sich mit der Verwendung von Medien und daraus resultierenden Ergebnissen umfassend auseinanderzusetzen.” (SL_01, pre-questionnaire)
- E2. “Kritische Medienkompetenz ist die Fähigkeit, verschiedene Medien hinsichtlich ihrer Authentizität, Reliabilität und Seriosität einzuschätzen, zu reflektieren und zu bewerten. Außerdem beinhaltet es die Fähigkeit, mit unterschiedlichen Medien sicher umzugehen.” (SL_01, post-questionnaire)
- E3. “spannend und abwechslungsreich” (SL_01, reflection journal)
- E4. “Fake news, das ist ja gerade in den USA [und] hier in Europäischen Raum [...] Stoff für Diskussion, deshalb war es super interessant da mal zu hören, wie das die Leute von dort sehen.” (SL_02, group discussion in online seminar)
- E5. “(...) Also ich fand sozusagen die Arbeit in den Kleingruppen ziemlich cool, eigentlich. Was ich noch spannend fand war einfach generell so ein bisschen der Inhalt. Wenn man sich gerade mit Fake News beschäftigt und dann merkt dadurch wie andere Leute das kommentieren, was man selbst irgendwie geschrieben hat, dass das schon eine sehr andere Weltsicht herrscht, vielleicht. (...) da gab es zum Beispiel dann so einen Artikel, wo jemand so - Quatsch - ein Kommentar wo jemand sehr, fast schon schockiert geschrieben hat - oh, ich weiß gar nicht mehr, woran ich glauben soll - und so. Danach dachte ich so: oh wow, okay krass, dass (unverständlich).” (SL_02, group discussion in online seminar)
- E6. “Kompetenzen in diesem Bereich zu sammeln erweist sich nicht nur für den aktuellen Zeitpunkt in der Schule als großer Vorteil und teils notwendige Fähigkeit, sondern bietet auch zu späteren Momenten (z. B. in der Ausbildung, im Studium, während der Ausübung einiger Berufe) viele

Bonuspunkte. Zudem sehe ich die kritische Reflexion von Medien und der eigenen Nutzung dieser als sehr wichtigen Bestandteil für den Unterricht.” (SL_08, post-questionnaire)

- E7. “Es ist eine große Bereicherung über solche Dinge, von Seiten der Studierenden aus den Vereinigten Staaten, zu lernen und Aufklärungen bezüglich glaubwürdiger Nachrichtensender oder -portale zu bekommen. Vor allem, wenn es um das globale Verständnis und internationale Informationen geht, erscheint mir dieser Austausch sehr hilfreich.” (SL_08, reflection journal)
- E8. “Mein Verständnis von Medienkompetenz hat sich insbesondere durch einen Austausch mit anderen Studierenden und deren Erfahrungen und Kenntnisse gegenüber dem Identifizieren von Fake News verändert. Außerdem merkte ich, wie sich das Gesprächsbedürfnis in den persönlichen Alltag verlagerte und ich in meinem persönlichen Umfeld begann über die Nutzung von Medien zu sprechen.” (SL_08, post-questionnaire)

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