Practice report

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Supporting second language learner reflection in teletandem videoconferencing through the visualisation of conversation metrics

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Abstract

Videoconferencing is a popular mode of communication in virtual exchange (VE) settings. Recognising technological affordances of teletandem via videoconferencing, we developed a web-based system, L2 (second language) Learning system (L2L), for university language students' teletandem reflections. L2L provides visualisations of conversation metrics, which students reflect on as a means of formative self-evaluation. It was integrated into several language courses across 10 European universities and deployed for three consecutive semesters involving 926 students. This practice report presents the main features of L2L and the student feedback received in one Irish university, with a view to support reflection in teletandem and address some inherent challenges in this VE setting.

Keywords: Teletandem, virtual exchange, videoconferencing, conversation metrics, reflection, L2L.

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1. Introduction

Virtual exchange (VE) has been steadily gaining traction in higher education (Jager et al., 2021; O'Dowd & O'Rourke, 2019). Within VE settings, 'teletandem' allows learners of a foreign language to interact with expert speakers of the target language from a distant institution via virtual means (e.g., videoconferencing) as an integrated part of course work and under the guidance of a facilitator, with a view to develop their linguistic and intercultural communication competences (O'Dowd, 2021). In this model, each side interacts in their second language with partners who act as linguistic and cultural experts for one half of the exchange; this is then swapped for the second half.

One of the technological capabilities or affordances of videoconferencing is that sessions can be easily recorded. Recognising this, we developed a web-based system called L2 Learning (L2L) that uses time-stamped transcripts of conversations from Zoom, a popular videoconferencing platform, to calculate each person's percentage participation, turn-taking, and degree of spontaneity in the interaction. L2L produces visual graphics of these metrics for learners to notice and reflect on their synchronous interactions with expert speakers (Dey-Plissonneau, Lee et al., 2021). We propose that reflecting on these visual cues help learners develop not just greater awareness of their own linguistic competences, but also confidence and learner-autonomy as they set concrete goals for future exchanges. This facilitates metacognitive development in learners. Although there are various understandings of metacognition, the skills of self-awareness and self-management in terms of cognition and emotion in one's learning process are considered as the core principles that define metacognition. Furthermore, metacognitive skills are an indispensable part of successful language learning (Guichon & Cohen, 2012; Raoofi et al., 2014) that are transferable and can be applied to any field of learning.

We integrated L2L into university foreign language modules that offered teletandem for three consecutive semesters to 926 students. After three iterations, we gathered student feedback on the impact that L2L-based reflections had on student metacognition. This practice report offers a snapshot of our work pioneering this system promoting asynchronous "reflection-in-action" (Schön, 1983) and "reflection-on-action" (Dewey, 1933) in synchronous videoconferencing for L2 development that future research needs to continue to explore.

2. Objectives

We integrated synchronous videoconference-mediated teletandem projects as part of our language pedagogy with the goal of preparing students for Erasmus exchanges and workplaces, i.e., to develop more cultural awareness and negotiation and collaboration skills in multicultural environments. However, in the process, we encountered some recurrent challenges.

Firstly, such synchronous settings resulted in high cognitive load for intermediate-level learners due to time pressure generated by synchronous real-time oral exchanges with L2 expert speakers. Secondly, learners experienced high levels of anxiety before and during the conversations due to lack of confidence in interacting with expert speakers. They, therefore, ended up having very little sense of their own level of contribution and performance during the conversations, either qualitatively or quantitatively. Thirdly, sustaining student motivation, investment and engagement online was difficult as videoconference-teletandem was daunting for learners and led to lack of engagement, unless their teachers made an effort to follow up on individual sessions. L2L emerged as an effort to allow students to notice and reflect on different aspects of their conversation practice with expert speakers with a view to induce agentive improvement in subsequent sessions.

3. Context

3.1. Related Work

Raoofi et al. (2014) review a significant body of research on the benefits of reflection for the development of metacognition in L2 acquisition. Reflection involves analysing one's own learning process in order to guide future learning actions. First conceptualised by Flavell (1976), over the past several decades, cognitivists and social psychologists have expressed that metacognition is a fundamental aspect of human cognition (Jost et al., 1998). However, metacognition-inducing tasks are difficult for course writers and teachers to design in teletandem projects because it is next to impossible to observe learners and identify their needs, attitudes, abilities and weaknesses in such autonomous online learning environments (Hurd et al., 2001, p. 345). The onus is, therefore, on the learners to learn the skills needed to assess themselves. Then they need to find out by trial and error which strategies work for them. Reflection is a skill that needs to be practised by learners for metacognition to develop. Hauck (2005) notes the ability to reflect on the self-as-learner and the learning environment and draw conclusions about effective approaches to one's own language

acquisition as indispensable parts of autonomous learning. Nevertheless, teachers need to guide learners on when and how to go about their reflection.

Ever since reflective practice was theorised by Dewey (1933) for teaching and learning and taken up by Schön (1983) in L2 learning, the concept has been interpreted and applied in different ways. Whereas Dewey encouraged practitioners to reflect after the action, or "reflection-on-action," Schön supported that practitioners reflect during action, or "reflection-in-action". Hence, it is important to consider the timing, frequency and task types in order to evaluate the full impact of reflection on the development of metacognition. However, the methodology of the operationalisation of reflective tasks and its evidenced outcome on language learners' metacognition still need to be explored in the literature pertaining to fast-paced synchronous VE-teletandem. While learners reflect on cognitive items (lexicon, grammar), socio-pragmatic skills, and intercultural competences as VE pedagogical affordances (Dooly & Vinagre, 2021), there is not much evidence of the effects of formative reflection-in-action/reflection-in-project self-assessment type reflection, as opposed to reflection-on-action/post-project reflection, and its effect on subsequent sessions in terms of confidence and attitude, interpersonal communication and interactional performance (i.e., participation rate, turn-taking, and interaction dynamics). We look into "reflection-in-action" as the reflective space in between each session and as part of the action space. We argue that in-action reflection tasks as formative self-assessment can potentially lead learners to trial their L2 strategies and develop metacognitive skills. This helps learners 'notice' (David & Kochappan, 2001) linguistic/non-linguistic cues in their interactions themselves and regulate them in future interactions.

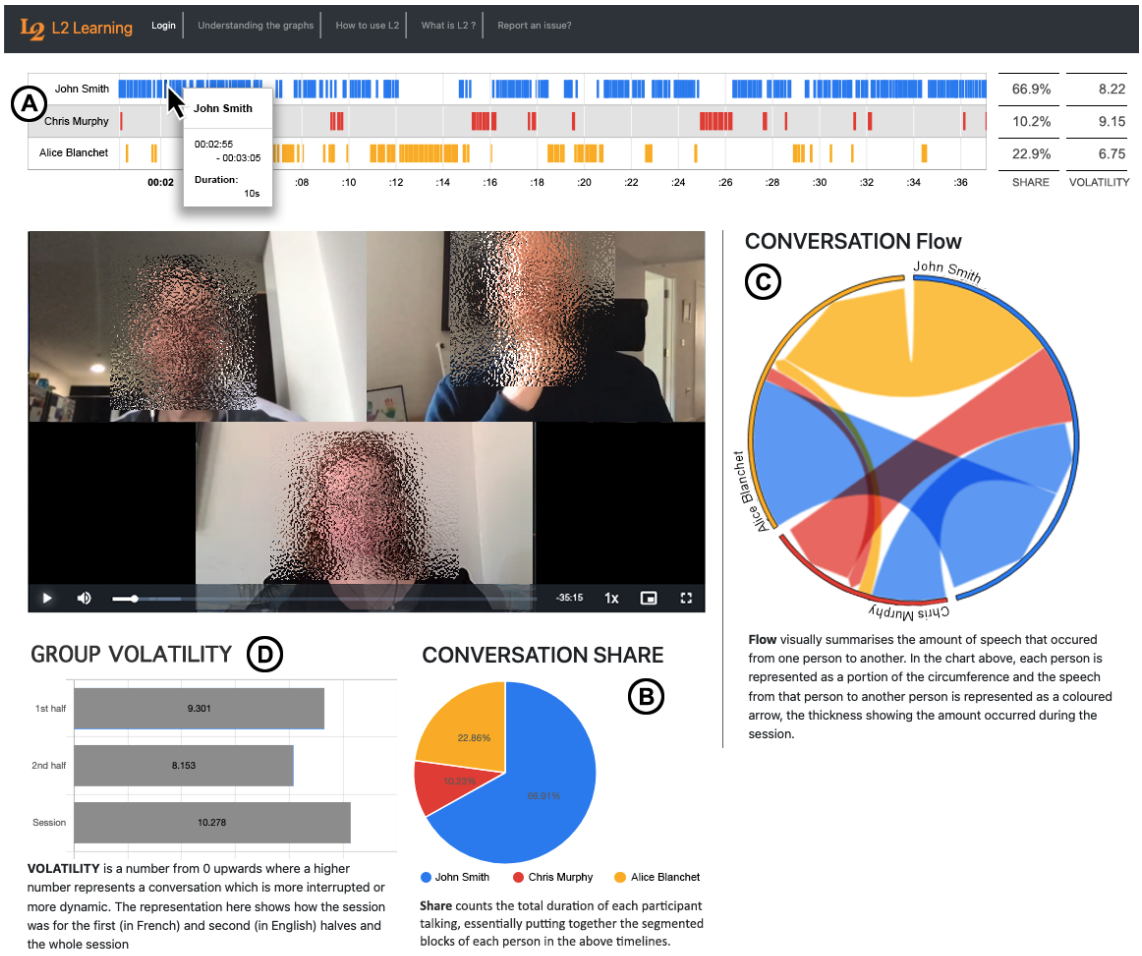
Moreover, it is important to consider how the reflective task is operationalised. The drawback with the current practice of relying solely on anecdotal reports by learners in evaluating their cognitive/metacognitive competencies is that they are not necessarily evidence-based, and tend to be produced with the objective of pleasing the assessor (Dooly & Vinagre, 2021). In this regard, Dewey (1933) notes that all reflective activity is composed of two key inter-related factors, namely data-driven facts and possible solutions for future actions (p. 104), consequently leading us to the question of how to gather data/evidence in fast-paced synchronous teletandem interactions that are autonomously organised by students outside classrooms. The answer lies in the technological affordance of recording that makes it possible for learners to visualise their own authentic examples of communicative practice for 'discoursal expertise' (Chambers, 2007). This also opens new avenues for data-driven evidence-based reflection-tasks (Mann & Walsh, 2017; Seedhouse, 2021).

3.2. L2L Tool

While several automated evaluation tools (www.pigai.org; iwrite.org) available for EFL writing (Zhang & Zhang, 2022) and polling technology (Google Forms, Kahoot, Socrative) provide formative feedback (Molin et al., 2020), synchronous videoconferencing tools for L2 learning have mainly allowed tutors to tag the recording timeline for real-time or delayed feedback. Visu (now obsolete) (Guichon et al., 2012) and VEO (https://veo.co.uk/; Walsh, 2019) are a few examples. The novelty of our work lies in the design and deployment of a tool 'L2L' that supports noticing and self-reflection by learners themselves after every videoconference session. Visualising their conversation metrics after each teletandem session with their international partners, allows learners to notice their strengths and areas needing improvement.

Students were ideally grouped in teams of 3-4 as the interaction floor management was more complex than if students exchanged one-on-one. Students on either side used the same language for the first half of the interaction, then switched languages for the second half. Once a meeting was registered on L2L and the Zoom meeting occurred, the transcript was processed and each student automatically received a link via email with their meeting's conversation metrics displayed on the dashboard (Figure 1).

Figure 1: L2L student dashboard (participants' names/images were replaced for anonymity)



Timelines - The colour-coded audiographs (see **A** in Figure 1) indicate when a student speaks and the total percentage of their speech duration. Figure 1 shows that this session lasted 40 minutes and that John (blue, 66.9%) was the most active speaker as compared to Chris (red, 10.2%) and Alice (yellow, 22.9%). Hovering the mouse cursor over any of the coloured segments opens a tooltip showing

the exact start/end times and the duration of that segment, and clicking on that segment results in the playback panel below it to play the video from the clicked point onwards.

Conversation share – The pie chart (see **B)** represents each student's total share of the conversation as a percentage or their participation rate. This graph instantaneously gives participants an idea of whether they spoke more, less or equal to other participants in the course of the whole conversation.

Conversation flow - The chord graph (see **C**) with its wedge-shaped arrow-heads indicate who speaks after whom and how frequently, i.e., the turn-taking behaviour which has a wide range of prior studies and literature available. A wider chord indicates more tos-and-fros between those speakers connected by the chord. We see that the conversation between John (blue circumference) and Alice (yellow circumference) is twice as dense (represented by the width of the yellow chord emerging from John's circumference and directed towards Alice) as the conversation between John and Chris (represented by the narrower red chord emerging from John's circumference and directed towards Chris).

Group volatility - The bar graph (see **D**) shows how dynamic the conversation is between the participants. Taking into account the frequency of turn-taking and its pattern throughout a session as a measure of participants' overall levels of engagement, we introduce this metric (Dey-Plissonneau et al., 2022) that indicates whether the conversation was truly interactive with longer utterances interspersed with shorter interjections, or whether it was composed of long monologues with few spontaneous interjections from others. Unlike the 'conversation share' that indicates participation for the whole conversation, the group conversation volatility in Figure 1 shows that the first half of the session (in English in this case) has a higher volatility (9.301) than the second (8.153) half (in L2), implying that the English-speaking part of the session was more interactive, with more interruptions.

3.3. Participants

Our project was an international collaboration that emerged from the desire to implement L2L beyond our university. The project involved 11 VEs and 926 students across 10 institutions in 6 European countries (Table 1) who were using L2L for the first time.

Table 1. Participants' profiles

Countries	Semester	Course	Class size	Languages	Proficiency level
Ireland – France	January 2021	Bachelors in Humanities & Business	61 46	French & English	B2.1
Ireland – Belgium	August 2021	Bachelors in Humanities	28 41	French & English	B2.1
Ireland – Spain	August 2021	Bachelors of Education	9 17	Spanish & English	B2.1
Ireland – Spain	August 2021	Undergraduate Humanities & Business	37 44	Spanish & English	B2.1
Ireland – Germany	August 2021	Undergraduate Humanities & Business	22 88	German & English	B2.1
Ireland – Belgium	August 2021	Undergraduate Humanities & Business	30 36	French & English	B2.1
Ireland – France	January 2022	Bachelors in Humanities	28 17	French & English	B2.1
Ireland – France	January 2022	Bachelors of Education	34 34	French & English	B2.1
Ireland – Belgium	January 2022	Undergraduate Humanities & Business	110 110	French & English	B1
Ireland – Spain	January 2022	Undergraduate Humanities & Business	53 73	Spanish & English	B2.1
Ireland – Italy	January 2022	Undergraduate Humanities & Business	3 5	Italian & English	C1

Two teams of lecturers/researchers participated in this project: experts in informatics handled technical matters related to L2L (updates, resolving technical issues, answering technological queries); language experts were responsible for organising the VEs, the pedagogical aspects and collecting data related to students' experience. Here, we report on the experience by the Irish university that built L2L.

4. Project design

The project had three iterations (Table 2). The first one (Spring 2021) was piloted in a French module at the Irish university. The second iteration (Autumn 2021) saw the addition of a Spanish module at the same university and three language modules (French, Spanish and German) at another Irish

university. The third iteration (Spring 2022) saw the addition of an Italian module. Each iteration involved the corresponding partners in France, Belgium, Germany, Spain and Italy (learning English).

Table 2. L2L iterations (*number of students using L2L)

	Spring 2021	Autumn 2021	Spring 2022
# Students*	107	352	467
# Institutions (# L2)	2 (2)	7 (4)	7 (5)

While each teletandem had unique characteristics, they were all designed in a similar manner to ensure that L2L was incorporated to support the reflection process. Each semester, four- to six-week-long tandem-videoconferencing aiming at collaborative production projects as an integrated part of the course work was used as the pedagogical model (O'Dowd, 2021). Students in the authors' Irish university completed a variety of hour-long tasks via Zoom: an ice-breaking activity, followed by intercultural discussions on university life, work life, and current affairs. In international groups of twos, threes or fours, they focused on collaborative multimodal presentations on current affairs topics (e.g., sexism, immigration, linguistic diversity, etc.). L2L graphs were generated after each session.

Students autonomously observed their L2L graphs after each session for self-evaluation. They reviewed their individual and group performances, and autonomously set goals for the following sessions (student-led reflection-in-action). Moreover, teacher-led structured reflective tasks were introduced after weeks 2-3 (mid-project reflection-in-action) and then again after weeks 4-6 (post-project reflection-on-action). This required students to interpret their autonomous analyses of weekly L2L reviews in relation to their specific contexts and what affected their performance (beginner's anxiety, dominant vs. shy participants, familiar vs. novel tasks, lack of preparation leading to lack of confidence, etc). Students were also required to navigate the qualitative aspects of the interaction using the timeline, find strong and weak points of the exchange, and reflect on what they could do differently.

5. Evaluation

5.1. Discussion of outcomes

We captured L2L usage data through interaction logging, post-semester questionnaires and semi-structured interviews each semester (Dey-Plissonneau, Lee et al., 2021). Here, we will examine students' and lecturers' experience with L2L in light of the challenges enumerated in Section 2 and how L2L assisted us in partly overcoming these challenges. The qualitative findings cited below are a result of the content analysis of anonymous post-semester questionnaires and interviews. The quantitative data (interaction logs and survey) have not been included in this practice report.

5.1.1. Asynchronous reflection component

The first challenge we wanted to address was students' inability to fully grasp how a conversation went due to the ephemeral nature of synchronous conversations and the high cognitive load and time pressure associated with such settings. L2L allowed us to complement our synchronous sessions with an asynchronous reflective component by providing quantitative feedback as a springboard for reflection. At the same time, the timeline allowed students to quickly navigate the conversation to critically evaluate the quality of their contributions in specific segments of the exchange.

> ... as I'm currently rewatching our sessions, I can easily identify the parts where I spoke the most/least and identify the reason why. (Dey-Plissonneau, Scriney, et al., 2021)

5.1.2. Increasing confidence

Some students noted that their conversation shares were significantly higher than they thought. The ability to concretely visualise the L2L metrics allowed students to adjust their tendency to self-evaluate negatively and gain more confidence when interacting with expert speakers (Dey-Plissonneau, Lee et al., 2021; Lee et al., 2021).

> Yes definitely, you have no idea how much you actually engage without them [L2L graphs]. Much more beneficial.

5.1.3. Fostering motivation and engagement

'Conversation share' was particularly useful to motivate students and help them persevere during the teletandem as well as to set goals for subsequent sessions.

> Useful to see the amount I spoke… so I put more effort to increase my speech portions.(Dey-Plissonneau, Scriney, et al., 2021)

> I did notice who wasn't speaking much and tried in further interactions to include them more and ask questions to have more of a conversation flow.

Students also reported that they enjoyed having the ability to track their own progress across sessions which facilitated improvement over time.

> Want to see my progress over time

> I liked this one more because last semester we only had to show 5 minutes of the interaction and to be honest that made it easier not to do the full hour which to my own fault gave me less of a chance to improve my french (sic) but this semester having to upload the full hour forced me to participate and really helped my confidence and knowledge of the French language.

Motivated students traced their weekly progression over sessions in their final reflection in a graphical form. They dug into qualitative explanations to understand why and also proposed remedial action strategies.

> Yes, it was showing if I needed to put in more work and I could analyse my interactions better and faster.

5.1.4. Providing personalised feedback

L2L facilitated personalised feedback for a large number of students. Lecturers noted that a quick look at students' graphs revealed which students might be struggling and might need additional support. Lecturers could address student attrition more effectively by identifying those who were not engaging properly and discussing with them.

5.2. Implications

The three iterations allowed us to identify areas of improvement.

5.2.1. Learning to use the visualisation

Since L2L was new to all students, they had to be instructed and guided on how to use it as well as how to interpret the graphs. In order to make the integration of L2L into the teletandems smoother, we have integrated: (1) a structured orientation session at the start of each semester, (2) a trouble-shooting channel through emails, (3) an enquiry form inside the system website, and (4) a helpdesk. Tasks that required manual handling by students have now been automated (e.g., automatic transcript-uploading process).

5.2.2. Supporting student understanding of the different L2L metrics

Students' understanding and purposeful use of each of L2L metrics varied. For instance, conversation share was easily comprehensible and students referred to this metric frequently in their post-session reflections. However, conversation volatility was hard for students to interpret which resulted in this metric being under-utilised. It is our aim to assist students in their understanding of this metric and its relevance for intercultural teletandem in future iterations. Additionally, we envision a meta-visualisation where L2L shows the changes in the metrics across all teletandem sessions in a comparable way.

6. Conclusion

Learners engaged in autonomous self-reviews with L2L's visual metrics after every session (reflection-in-action), contrary to the prevalent practice in VE-teletandem of post-project anecdotal reflections only. Coupling this with teacher-led mid-project and end-project reflection-on-action further helped in fixing goals for improvement and self-evaluating whether these were reached or not. This not only contributed towards developing metacognitive skills of self-management and self-regulation, but was also instrumental in raising self-confidence within the duration of the project. Furthermore, L2L provided individual and group quantitative feedback to a large number of students, a daunting task for a single lecturer. Although improvement in student engagement was observed following the introduction of L2L, students needed to be trained to engage in critical reflection in- and on-action, an iterative process that itself requires practice.

Since it is a virtually-hosted web-based platform, L2L is straightforward to deploy in other universities using Zoom videoconferencing platform. Currently, we are opening access to L2L for other universities.

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