Studying language learning opportunities afforded by a collaborative CALL task

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Abstract

This research study explores the learning potential of a computer-assisted language learning (CALL) activity. Research suggests that the dual emphasis on content development and language accuracy, as well as the complexity of L2 production in natural settings, can potentially create cognitive overload. This study poses the question whether, and how, a collaborative and open CALL task designed to simulate an authentic context of language use can support advanced learners in the process of language learning. The originality of this study lies in the fact that it is a qualitative study in which data was collected and analysed using screen-capturing software. The learner language output generated by the task was studied for evidence of episodes in which the focus was on language form (defined by Swain as language-related episodes), as such episodes are considered by output theory to be windows into language learning processes. The results showed that students engaged in interaction about language form, and that by seeking help from their peers and from online dictionaries they were able to increase the accuracy of their language. There is evidence of self-correction, hypothesis testing and metalinguistic talk in the data. Collaborative proof-reading was particularly successful in improving L2 accuracy.

Keywords: SLA in open CALL task, output theory, advanced language learners, methodology in CALL research

1. Introduction

Academic papers which deal with computer-assisted language learning (CALL) are frequently critical of a lack in focus in two areas: second language acquisition theory (Coleman, 2005; Smith, 2008) and how students engage with the technology, what they actually do when completing CALL tasks (Chun, 2013; Smith, 2008). The present study explores how a group of advanced learners of German as an L2 engaged with a collaborative open CALL task and what kinds of language learning opportunities it offered.

The paper begins with a discussion of the theoretical framework for the project, which outlines relevant insights from second language acquisition research and introduces terminology which will be used in the presentation of the research. Some methodological difficulties associated with researching advanced language learning are also recognised, and the use of screen-capturing software which served as the data collection and data analysis tool is explained.

Second language acquisition (SLA) research investigates how people acquire a language other than their mother tongue and what conditions can support this process. Both the process and the product or outcome of learning another language are explored, and both natural and instructed contexts of learning are examined. In the context of this article the issue of whether the L2 is the learners' second or another subsequent language is not problematized (for a discussion of this see Block, 2003), nor is it relevant here to make a distinction between (conscious) learning and (subconscious) acquisition of the second language[i] (Krashen, 1985). In this article, the terms L2 acquisition and L2 learning are used interchangeably (Blake, 2008).

It is generally accepted that SLA requires rich but comprehensible L2 input ($i + 1$, Krashen, 1985), and that there is a connection between complexity of input and complexity of output (Collentine, 2013). Another important condition for successful SLA is opportunities to use the language for interaction and negotiation (Long, 1996). A sociocultural perspective on SLA extends this input-interaction-output model with the notion that L2 learning, like other "higher forms of human mental activity" (Lantolf, 2000, p. 80), is mediated through social interaction, private speech, or by artifacts (ibid). In other words, language learning involves learning through the language as well as about the language, and these processes are "complementary and mutually supportive aspects of learning a language" Matthiessen (2006, p. 33). L2 learning viewed as a sociocultural activity therefore goes beyond acquiring a formal language system (Wertsch, 2006). It is facilitated by social interaction with others and requires L2 input at a level which stretches the learner beyond their comfort zone, but remains in their zone of proximal development (Vygotsky, 1978). It is assumed that interaction and negotiation with another interlocutor (possibly a more competent one, such as a teacher or native speaker) pushes the learner to communicate and engage with any difficulties posed by the input. In this process opportunities for L2 learning are created. Such a view of language learning is shared by students themselves: Fernandez Dobao and Blum's (2013) study on learner perceptions towards collaborative writing reports that 54 out 55 students view working in pairs as a positive strategy for L2 writing.

A study by Storch (1999) showed that pair work can improve grammatical accuracy in student L2 output. However this quantitative study was based on very small numbers of participants and only analysed the product of the student output, rather than the process leading to it. It was found that students working in pairs took nearly double the time to complete tasks compared

to students working alone, and that the resulting output showed greater accuracy. This was interpreted as evidence that student output improved when they worked collaboratively.

Engaging in interaction as a learning strategy may also help to explain the learning process itself because it externalises and makes visible some of the cognitive processes involved. Long and Robinson (1998) point out that when interacting in an L2 the speakers are primarily focusing on the communication of meaning, but from time to time they will shift to a focus on form. This is particularly true when the interaction is taking place in a learning context such as a classroom. Such focusing on language form is seen to be beneficial for language learning itself (Chapelle, 2001), as well as providing a means of understanding language learning processes (Swain, 2006) since it offers a window into the cognitive processes involved.

Specifically, output theory (Swain, 1995; Swain & Lapkin, 1995) identifies three observable behaviours or functions of output as potential windows into the learning processes that support SLA. According to Swain (1995), these windows are characterized by incidents in which the learners either (a) notice a gap between what they want to express and what they are capable to, or (b) test out a hypothesis regarding an L2 form (whereby the hypothesis is represented in the output itself), or (c) when the learner reflects on language through the language (metalinguistic function).

Swain's initial theoretical framework was later developed to incorporate phenomena which she named 'verbalization', 'collaborative dialogue' (Swain, 2000), language-related episodes (Swain & Lapkin, 2001) and 'languaging' (Swain, 2006). These changes of terminology reflect a developing understanding and refinement of the hypothesized L2 learning processes. Swain's later understanding is increasingly influenced by the sociocultural approach to SLA, in particular by the notion that language learning cannot be captured through an "information-processing perspective" alone, but needs a broadening of perspective "to one in which all social activity forms a part of the learning environment" (Swain, 2000, p. 99). The fluid quality of language learning is expressed in the term "languaging" which conveys "an action – a dynamic, never-ending process of using language to make meaning" (Swain, 2006).

As outlined above, this approach concentrates on defining second language learning as a process rather than focusing purely on the end product, the manifested evidence of what has been learned. It seeks to understand "what learners *actually do*, not what the researcher assumes instruction and task demands will lead learners to focus on" (Swain, 1998, p. 80; emphasis in the original). Research into language output therefore needs to describe findings which relate to situations in which language may be acquired, rather than concentrating only on finished outcomes and results (Shehadeh, 2002).

2. Methodology

Studying language learning processes in advanced language learners can present several methodological challenges. It is recognised that "the nature of advancedness itself […] differs from other acquisitional levels" (Byrnes, 2006, p. 23) and this fact, together with the methodological problems associated with developing effective research frameworks for advanced language learners, is reflected in Byrnes' observation that advanced L2 levels are underrepresented in SLA studies (Byrnes, 2006).

Quantitative research frameworks have been used to study beginner to intermediate L2

learners, for example using pre- and post-treatment tests to establish whether L2 learning has actually taken place. Swain, Brooks, and Tocalli-Beller (2002) review several such studies. However in the case of advanced language learners it is more problematic to attribute L2 output directly to specific interventions, due to the number of uncontrollable variables (which increase with the learners' advanced proficiency levels and also relate to the level of openness of the task).

CALL has established itself as a research field in the sense of Block's definition (2003, p. 11) which includes "publications and academic programmes of study", but is still a relatively young discipline and has not yet developed an 'established' research methodology (Colpaert, 2013; Hubbard, 1996), particularly for dealing with the study of advanced SLA. A further dilemma of doing research into communication tasks which involve multimedia[ii] was commented on by Plass and Jones who highlight that the "study of language acquisition during natural communication does not readily allow for the use of rigorous quantitative designs". They suggest that "researchers must either conduct studies of a more experimental nature in less authentic settings, or employ research methodologies that are more appropriate to the study of language acquisition in situ" (Plass & Jones, 2005, pp. 477-478).

Taking these comments into account, a qualitative case study approach was chosen for the present study, which employed screen-capturing software for data collection and data analysis. The study's main aim was to investigate the language learning potential of an open CALL task for advanced learners. The task itself was primarily a meaning focused activity which involved processing authentic language. Engaging in the various activities required the students to modify and develop their use of the L2. The approach is similar to the one used in genre-based curricula (Crane, 2006), and also required the students to demonstrate higher order skills such as summarising. The task output was analysed for evidence of 'languaging' (Swain, 2006), as defined above, which would show how the task generated opportunities for the students to focus on aspects of the language itself (focus on form) within the interaction and negotiation required to complete the task successfully.

The specific research questions to be investigated were as follows:

1)To what extent can advanced language learners acquire L2 in a collaborative and open CALL task?

2)Can the L2 learning potential of such tasks be evidenced?

2.1 Participants

Ten students participated in the study, of whom seven were majoring in International Business and studying German as a minor subject. They were all in their final year of their BA course at a British university. The other three participants joined the class through the route of the institution-wide language programme, which is open to all university students[iii]. Six students were female and four male. Eight students were L1 speakers of English, with a further two L1 speakers of French and Russian. The project lasted for four weeks, with one two-hour class each week. The students worked in pairs in a computer room. They chose their own partners. Each pair had access to two computers during the whole class time.

The participants were all advanced learners of German. Advanced learner level is defined here as B2 to C1 according to the Common European Framework of Reference for

Languages (CEFRL). The learning outcomes specified for the language class of the final year of the BA course can be described as C1 level. The BA students would have entered university with an A-level pass in German and had studied the language at university for a further 2 years, as well as spending one year in Germany. The project described here took place during their final year at university, after their return from the year abroad. By this stage it would be assumed that students had successfully reached level B2.

Foreign language competence at level B2 describes the learner to be able to "understand the main ideas of complex text […], including technical discussions in his/her field of specialisation." Furthermore, students should be able to "produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options. (CEFRL, 2011, p. 24)

2.2 The Task

The four-week task required the students to develop an outline of a marketing strategy for a product of their choice, to be launched in the target language country. This involved researching the internet for specific information and summarizing or synthesizing it in L2. Once the students had decided on 'their product', they were expected to work with authentic German texts using the internet as a resource. While this approach is considered to be problematic for learners with lower levels of L2 proficiency, since subject-specific texts may be overwhelming if the learner is not provided with some form of scaffolding (Donaldson & Haggstrom, 2006; Fischer, 2007; Skehan, 2003), at level B2 students are expected to be able to deal with such activities. A task which involved skim reading, extracting and using specific information to produce a marketing strategy was therefore considered appropriate and relevant to their interests. In order to limit the cognitive load, the task was divided into different input and output phases, with initial gathering of information (input) leading to the evaluation of its usefulness and incorporation into a presentation and report (output).

The five student pairs each worked on different aspects relating to the collaborative production of an outline for the marketing strategy. Collaboration is seen here as a "joint response to the problem to be solved, [which] requires constant negotiation of procedures and relevant strategies for meaning making on a group level" (Lund, 2013, p. 80). Key characteristics of the task were its student-centeredness (the students were responsible for all the decisions relating to the product, target group, marketing approach etc.), the use of authentic internet-based texts as the main source of information, and the opportunities to use the L2 to interact and negotiate with other students, both orally and via emails, as they worked collaboratively towards a successful outcome. The task was designed to combine the students' subject-specific knowledge and practice of the foreign language they were studying, within a 'natural' setting.

The language skills to be demonstrated (especially in reading and writing) were matched to the CEFRL. At level B2, students' expected ability to write reports and essays is described to include a systematically developed argument, based on the synthesis and evaluation of different ideas (CEFRL, 2011, p. 62).

In order to achieve the overall objective of developing an outline of a marketing strategy, some groups undertook sub-tasks, acting as researchers and suppliers of relevant information (summarizing, synthesizing information) under the direction of a lead group who made the main business decisions. In this way everyone worked collaboratively

towards a common goal, while also exploiting opportunities to produce L2 output.

2.3 Data collection tool

Data was collected using screen-capturing software (Camtasia), which also recorded sound in the vicinity of the computer. This software records on-screen activities visually, film-like, not in the form of text or code. The researcher can observe everything that happens on the screen, such as all the mouse movements, the processes of typing and deleting text, the websites accessed by the learner, and their switching between websites and applications, while at the same time listening to the students' recorded interaction and comments.

Using screen-capturing software to investigate a collaborative CALL task has been little exploited up to the present time (examples of exceptions are Lai & Zhao, 2006; Smith, 2008). The software offers different types of multimodal data, including aural, visual and text-based. This data is best represented in form of tables which can indicate the turn-taking, the interaction between the student and the computer (for example the use of online dictionaries and internet searches) and the language produced by the students, including false attempts which are subsequently amended or deleted (see for example table 1). This on-screen activity can be related to student talk, i.e., off-screen oral discussions between students which are simultaneously recorded by the software (see for example table 2).

2.4 Data collection procedure

At the start of each class students activated the screen-capturing software. At the end of each class, the recordings were downloaded and burnt on DVDs. All the student participants had given consent for their work to be recorded and for the data to be used anonymously. The software intermittently activated popup windows which reminded the students that the recording was ongoing.

Overall, 54 hours of screen footage and sound were recorded. Other collected data included the emails which were exchanged between the groups, and their individually written reports and oral presentations to the class.

The first two weeks of the project practised primarily the students' receptive language skills and higher order cognitive skills. In the last two weeks the focus was predominantly on their productive skills, with the last two weeks used to deliver oral presentations of the groups' findings and individually written summaries. Development of the higher order skills specified in the B2 descriptor of the CEFRL was evidenced in the processes by which the students developed the task content. For example, they researched web pages for information which could be relevant to developing their marketing strategy. They filtered information through gist reading, considered the importance of various types of texts (word-based, statistical, etc.) and wrote short summaries of the information they considered important. Representing the screen action in the form of tables, complemented by the student talk, made visible the students' thoughts and concerns as they were completing the task. For example, a decision about the relevance of a text would be dependent on its comprehension. When the cursor movement points towards a particular word and the off-screen student voice asks their partner 'what does that mean?' the viewer can clearly see what the questioner is referring to. Alternatively, a student pair may be discussing the accurate use of a language structure. The method of data collection adopted in this study can facilitate insights into cognitive processes similar to 'think aloud protocols'.

This article concentrates on examples relating to SLA processes, in particular self-directed

focus on form, and various forms of collaboration between partners, rather than the higher order skills referred to above.

2.5 Data analysis

The B2 level descriptor of the CEFRL (above) alludes to the methodological difficulties SLA research may encounter when investigating the outcome of acquisition. How can it be established that a particular treatment leads to the result or outcome for which students are tested at the end of the treatment? Unlike beginner and intermediate L2 learners, advanced learners are already familiar with most of the grammatical and structural features of the L2. With regard to language form, it is therefore problematic to attempt to establish causality between the advanced learner being exposed to particular forms during a particular period and their subsequent L2 output, in other words to test whether language forms have been internalized and can be correctly applied in other contexts. At the advanced level, students need opportunities to practise and expand their knowledge of the L2 within the context of more advanced skills and natural language settings, for examples by dealing with language use in a variety of genres (Crane, 2006) and within authentic texts.

The method of data analysis applied in this study is directly linked to the method of data collection, since the screen-capturing software is instrumental in both. As alluded to above, the recordings of screen movements and the transcripts of the oral interaction between partners constituted the basis for analysing the process by which the students' pairs interacted and negotiated to complete the task, thereby generating L2 output.

In order to answer the research question whether this kind of CALL task can support L2 learning, the data was investigated for evidence of SLA opportunities. A two-fold approach was used. Firstly, grounded theory (GT) methods were applied for the initial data analysis, which interrogate data with questions aimed at understanding the data within its own context. Such questions ask 'what is going on?' (Charmaz, 2004), 'what are the persons' main concerns?' (Glaser & Holton, 2004). Continuously interrogating the data in this way allows categories and associated properties to emerge, which enable the cross-referencing of on-screen actions, student talk, and features in the written documents. In GT, the term 'category' refers to a concept of a higher level of abstraction than that of a 'property'. Properties are lower level abstractions of concepts (Glaser, 1992) which emerge from the category. For example, properties which emerge from the category *Focus on Form* can include *lexis, formal and informal address, grammar, use of online dictionaries and spell checkers* etc. Properties associated with a category can then be used to analyse incidents in the data which exemplify the category. Incidents which represent the category "focus on form" in the current data may be identified as evidence that the learner is pushing their L2 output to a higher level and developing their interlanguage. These instances in the data can be interpreted as language learning opportunities.

In other words, output theory (Swain, 1995, 2000), language-related episodes (Swain, 2001), students' verbalization and their collaborative dialogue (Swain, 2000) were used as "diagnostic tools" in order to investigate the potential for SLA.

Below, examples are given which represent such encountered language–related episodes.

3. Results

The data analysis showed evidence of what Swain (2006) calls 'languaging', situations in which students were actively engaging with language form, considering how to express their

meaning appropriately and correctly. These moments of considering language form are fleeting and cannot be recognized just by looking at written language output in, for example, emails or written reports. The latter represent the finished result, but do not reveal details about the process of text production.

Examples of "languaging" found in this study, which are analysed below, are categorised under three headings: (1) self-directed focus on form and self-correction or self-repair, (2) various forms of collaboration between the partners in a group, such as asking for confirmation or providing a translation, and (3) examples of peer correction and peer proof-reading.

There is some overlap between the different categories chosen and some of the examples given here could be listed under more than one heading. For example, point 3.2.1 (asking for confirmation) can represent self-directed focus on form (grammar) and can serve as an example for collaboration between partners.

3.1. Self-directed focus on form and self-repair

The following are two examples of 'focus on form', which occurred while the students were drafting written texts.

3.1.1. Composing an email

In the first example, Claudia[iv] is taking steps to deal with the session on her own as her partner is absent. She writes to the lead group and asks to be reminded of what she needs to do. In turn 1, she explains why she does not have access to the record of the previous week's work which she should continue this week: Her partner is absent, and the work record is in her partner's email box. This leaves her lost, or "confused", a term she looks up in an electronic dictionary after abandoning a false start with the uncompleted word "ain". Using the dictionary, she actively chooses the translation she considers most suitable, "verwirrt", which is the third option in the list of translations (turn 2). She continues writing, incorrectly using the infinitive of the verb "sollen" with the 1st person pronoun "ich". Recognising that she has made a conjugation error, she deletes the infinitive ending of the verb and the pronoun (turn 3) before completing the question correctly (turn 4). She then wants to ask the leading group to remind her of what she needs to do, but she does not know how to express this. She looks up the verb "remind" in the dictionary, checks the various translations and examples given (this process is visible to the researcher via her on-screen cursor movements) and eventually settles on an incorrect translation (turns 6 + 7), *an *mir erinnern* (can you remember me) instead of *mich an etwas erinnern* (can you remind me).

Table 1: Composing an email

turn	*Claudia week 2, 11:23-13:12 screen*	*false attempts*	*dictionary use*
1	Es tut mir leid Bill und Anna, aber Dorothy ist heute krank und letztes Woche haben wir ihre email benutzt. Also, ich bin ~~ain~~	deletes: ain	enlarges dictionary from bottom bar; checks "confused", uses in text: verwirrt
2	ganz verwirrt		verwirrt was the 3rd option in the translation list

3	was soll~~en ich~~	deletes: en deletes: ich	
4	was soll ich antworten. ~~Can~~ ~~knn~~	deletes: can deletes: knn	
5	Kannst du mir		goes to dictionary, checks: "remind"; changes text to
6	Konnen sie an mir ~~du~~ erinnern?	deletes du	
7	Konnen sie an mir erinnern?		
8	Vielen Dank Claudia		
	Sends email (13:12): Es tut mir leid Bill und Anna, aber Dorothy ist heute krank und letztes Woche haben wir ihre email benutzt. Also, ich bin ganz verwirrt was soll ich antworten. Konnen sie an mir erinnern? Vielen Dank Claudia*	I am sorry Bill and Anna, but Dorothy is ill today and we used her email last week. Well, I am confused what I should answer. Can you remember me? (She probably means: remind me) Many thanks Claudia	

This example shows how Claudia deals with a problem of language form by herself, how she succeeds in overcoming the problem to some extent and can self-repair. She can make informed decisions about the translation choices offered and does not simply use the first option. However, the email version she sends still includes errors, some of which represent low level proficiency, e.g., ignoring the capitalization rules in written German and issues of word order. This observation is considered further in the discussion section below.

3.1.2. Thinking about spelling (Umlaut)

The following example illustrates self-directed focus on form while composing a text for a powerpoint presentation. Fred considers whether the word *beantwortet* may need an Umlaut; he inserts an –e- after –o- (turn 2), and draws attention to this move by saying "Hier" to his partner; but then without waiting for his partner to respond, he decides that the Umlaut is not necessary and deletes the –e again, declaring "Nein" as he does so.

Table 2: beantwortet (Fred week 3, 51:50)

turn		*student talk*	*screen*
1	Ellie	Just write: Unsere Fragen waren nicht beantwortet [Our questions were not answered]	Unsere Fragen waren nicht beantw**or**tet
2	Fred	Hier … [Here…] (refers to Umlaut in beantw**oe**rtet) – Nein [No] (he deletes the -e- immediately again)	Inserted e to beantw**oe**rtet beantw**or**tet

3. 2. Collaboration

The examples below refer to sequences of collaborative construction of text. The class was divided into 5 student pairs, each of whom was preparing their class presentation during this session.

3.2.1 Asking for confirmation with focus on grammar

When a learner becomes aware of a gap between what they want to express and what they are able to express confidently, they often turn to their partner for support. The following exemplifies this. Fred is creating a presentation slide showing the initial research questions that his team set out to answer during the project. He copies and pastes the questions from their notes of previous sessions. He copies "Unseren Fragen" (our questions) and pastes this into the slide's headline box. In turn 1 he considers the grammatical case, should it be dative (*unseren*) or nominative (*unsere*)? He appears to have noticed that the form is incorrect, but asks his partner for confirmation. She confirms that the nominative case is required and he deletes the dative marker.

Table 3: Case: "unsere Fragen" (Fred week 3, 44:06)

turn		*student talk*	*screen*
1	Fred	Is it unser**e** Fragen [our questions] oder [or] unser**en**? Unser**e**? – oder [or] unser**en** – Fragen [questions]?	Unser**en** Fragen
2	Ellie	unser**e**	
3	Fred	unser**e**	Deletes -n
4	Ellie	Ohne –n [without –n]	Unser**e** Fragen

3.2.2. Partner provides translation

Fred suggests that he and his partner should compose the conclusion together, but he cannot recall the German term for 'conclusion'. His partner, Ellie, provides him with the translation which he repeats and simultaneously inserts into the text.

Table 4: translation (Fred week 3, 51:30)

turn		*Talk*	*screen*
1	Fred	Also jetzt koennen wir zusammen ein conclusion machen [so now we can do the conclusion together]	
2	Ellie	Ja, ok	
3	Fred	Conclusion	
4	Ellie	Zusammenfassung [conclusion]	
5	Fred	Zusammenfasssung […]	Zusammenfasssung

The partners in this dyad work fast and productively together and seem to complement each other with the various skills they bring to the task. Ellie is more confident in using the German language, while Fred types fast (he is the scribe for their powerpoint presentation) and often leads on content issues relating to business concepts.

3.3 Proof-reading as teamwork and peer correction

After completion of the first draft of the presentation, Fred and Ellie proofread the slides together.

The first draft text on a slide to be revised reads:

first draft	English translation	after revision (Table 5)
Was ist die struktur fuer ihr Expansion Plan? Das heist, wollen Sie "organically" expandieren, also Wollen Sie selbst in den Markt eindringen und alles selbst vorbereiten.	[What is the structure for your expansion plan? I.e., do you want to expand 'organically', so Do you want to enter the market yourself and prepare everything yourself?]	Was ist die **S**truktur fuer **unseren** Expansion**sp**lan? Das hei**ss**t, wollen Sie "organically" expandieren also **w**ollen sie selbst in den Markt eindringen und alles selbst vorbereiten?

Working on the draft text of the slide (left-hand column above), Fred and Ellie amend the L2 forms in dialogue with one another (see transcript below, Table 5). Fred reads the text aloud and comments at the same time (turn 1). He recognizes that the noun needs to be capitalized, according to the German spelling convention, so he corrects the S of "struktur" to a capital letter. Ellie spots that there is a pronoun case error and changes *ihr* to *ihren* (turn 2). Fred suggests changing the possessive pronoun from the 3rd person plural to the 1st person plural (turn 3), but repeats the case error (turn 3+5) which Ellie corrects again in turn 6. In turn 7, Fred repeats the correct form and amends this on the slide too. Elli highlights the spelling mistake in "Expansion Plan", i.e., the missing –s- which should link the two nouns (turn 8). Fred misunderstands Ellie at first who wants to say that Expansion**s**plan is one word with a linking –s- in between. He inserts 2 times the letter –s, at the end of each of the nouns. Between turns 8 and 12 they communicate in 'shorthand' about the spelling of this noun. The spoken communication would be meaningless here, unless the computer screen is part of the communication model. This phenomenon in which the computer screen is a constituent 3rd part of the communication between 2 interlocutors has previously been referred to as triadic interaction (van Lier, 2004) or triangular communication (Leahy, 2004). Since both interlocutors can see the spelling on the screen, their shorthand communication makes sense and Fred successfully corrects the noun in turn 11. Between turns 12 and 14 Ellie highlights the misspelling of "heist" and Fred amends it. In turn 15, Fred suggests another change on the content level, to insert the term customer, but they both agree that this would not be necessary.
Ellie then points towards an error (turn 17) where the spelling convention is not adhered to. Fred instantly corrects this.

Table 5: Draft revision (1:04:53 - 1:05:58)

turn		*talk*	*screen*
1	Fred	Hier: Was ist die –Struktur - ist gross	Was ist die **s**truktur fuer **ihr** Expansion Plan? (He inserts capital **S**) Was ist die **St**ruktur fuer ihr Expansion Plan?
2	Ellie	fuer Ihr**en**	
3	Fred	Fuer unsere – Sollen wir – cause, das war so – ihre Email	
4	Ellie	Ja	

5	Fred	unsere	Was ist die **S**truktur fuer **unsere** Expansion Plan?
6	Ellie	unseren	
7	Fred	unseren – das heisst	unsere**n**
8	Ellie	Expansion**s**, **–s** together, without	Was ist die **S**truktur fuer **unseren** Expansion**s** Plan**s**?
9	Fred	Ah – without gross	Expansion**s** **p**lan**s**
10	Ellie	Ja – und nicht Plan**s,** just plan you do not have many plans – Expansionsplan – together	
11	Fred	together	Was ist die **S**truktur fuer **unseren** Expansion**sp**lan?
12	Ellie	Zusammen - das heisst	Das heist, wollen Sie "organically" expandieren also Wollen sie selbst in den Markt eindringen und alles selbst vorbereiten? …
13	Fred	We have to change it to	
14	Ellie	Double ss	hei**ss**t
15	Fred	Ja, shall we change it to customers?	
15	Ellie	No, dies war die Frage warum	
16	Fred	OK, yeahyeah	
17	Ellie	Wollen sie organically expandieren Nicht mit capital	Cursor next to Wollen
18	Fred		Changes W to w: wollen

After the proof-reading exercise in teamwork which took them 1 minute and 5 seconds, the text was changed to:

> Was ist die **S**truktur fuer **unseren** Expansion**sp**lan? Das hei**ss**t, wollen Sie "organically" expandieren also **w**ollen sie selbst in den Markt eindringen und alles selbst vorbereiten?

In the next sentence which follows the dialogue above, a similar structure to the last error is used in which the question word appears with a capital letter while it is preceded by a conjunction ("Oder, **W**ollen Sie eine Deutsche Firma suchen …"). Fred recognized the repeat error, i.e., capital -W in "Wollen" and changes it to lower key. This incident of self-repair could be seen as either a window into learning taking place or simply a heightened awareness of or concentration on spelling conventions, because of the close temporal proximity to a similar error in the previous sentence.

4. Discussion

The results of this study show that when students focused on language form they were able to correct their own L2 output. When uncertain about specific structures or forms, they were able to employ strategies to overcome their perceived weaknesses, for example by using an

electronic dictionary or consulting a peer. Difficulties were solved collaboratively (Leahy, 2004). Proof-reading in a team was effective, and led to a higher degree of accuracy than individually produced output. However, this process did not overcome all the errors that were produced, as some errors were overlooked by the students. This finding supports similar findings in studies which did not necessarily include CALL, such as Storch's (1999) study about the positive influence that collaborative pair work can have on L2 accuracy in the traditional classroom. Storch (1999, p. 370) found that "collaboration and the metatalk it generated led to an improvement in the grammatical accuracy of the texts produced". However, that study also found that the overall linguistic complexity was lower in the texts produced collaboratively and the positive effect on accuracy did not affect all grammatical items equally.

In the present study, the level of L2 accuracy was low. This may be explained partly by the task framework and partly by what is known about the progression of L2 learning in general. It may be argued that working on a content-focused task affected the students' ability to concentrate on accuracy and led to cognitive overload (compare with Skehan, 1996, 2003; Robinson, 2001). This interpretation seems to be supported by the finding that language (results point 3.3) was corrected successfully when the partners were concentrating on proof-reading only. From this it could be concluded that separating tasks into two stages, and separating focus on language from focus on content, may be beneficial for L2 output. However, such an interpretation could be questioned in the light of Collentine's study (2013) which concluded that the linguistic complexity in learner output is affected by information-rich input, rather than primarily by linguistically complex input.

Cognitive overload can be triggered by the competing demands of content and language accuracy (Skehan, 2003). However another factor contributing to cognitive overload is the complexity of L2 output in a natural setting. The more advanced the L2 proficiency, the more complex becomes the communication, drawing on more and more L2 features in order to express the intended meaning or content.

Comparing the cognitive demands of L2 output between advanced learners and beginner learners shows the different quality of that demand on them. Beginner learners are introduced to new language features which are then practised discreetly, advanced learners are likely to have encountered most L2 features and structures already which they then have to successfully combine in their output. They may have shown mastery of these features when they were practised discreetly, as indicated in the simplified L2 learning cycle shown in figure 1. For example, following the introduction of a verb form in a traditional grammar class, the student might practise that form in relative content-free activities, e.g., by completing gap-filling tasks, and thereby maintain the focus and attention on the particular form. However, free composition and meaningful communication puts additional cognitive demands on learners of all levels, compared to L2 output which is controlled and designed to practise a limited number of L2 features. As the study results show, learners composing free text can encounter difficulties in recalling and applying their L2 knowledge in relation to, for example compound nouns, grammatical cases and spelling conventions (figure 2). The more natural and authentic the setting, the greater is the potential for L2 inaccuracies.

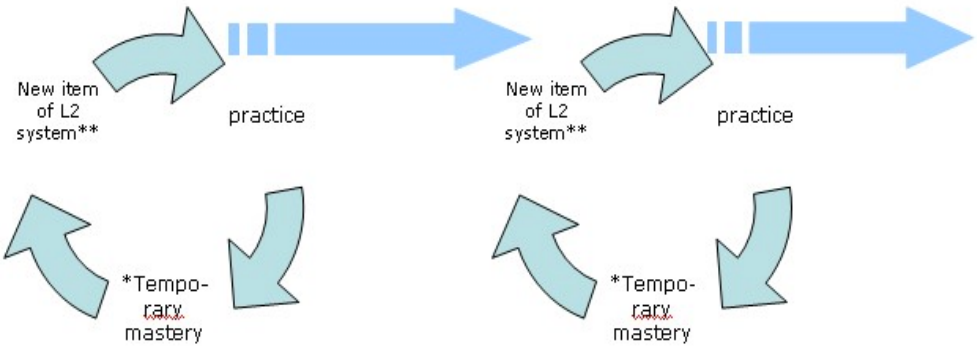

Figure 1: Simplified L2 learning cycle

*Temporary mastery refers to mastery as evidenced in the accurate use in controlled tests with limited and selective demand on the L2 production, e.g., cloze tests.

** New item of L2 system can refer to any part of the language system, e.g., structure, including word order, grammar, and vocabulary.

Advanced level learners "seek to enhance […] language capacities toward academic levels of performance" (Byrnes, 2006, p. 2). In other words there is an expectation that they can communicate at a high level of proficiency about complex content. The challenge for advanced learners lies therefore in the activation of high-level L2 proficiency in naturalistic situations, encompassing all their previously acquired L2 knowledge (figure 2). This goal requires the ability to manage complex communication skills, and is far more demanding than simply practising isolated structures in L2 exercises or doing scaffolded text composition. Advanced SLA tasks need to be designed accordingly to give learners the opportunity to practise L2 in authentic real-world settings (Chapelle, 2001). Even though such holistic and content-based tasks increase the cognitive demand on the learner, the associated problems with L2 accuracy can be addressed in various ways. Working with peers can lead to improved accuracy (Leahy, 2004; Storch, 1999). External incentives to produce higher accuracy could be introduced by, for instance, linking the task to a graded assessment or widening the audience beyond the boundaries, for example through the publication on a web page.

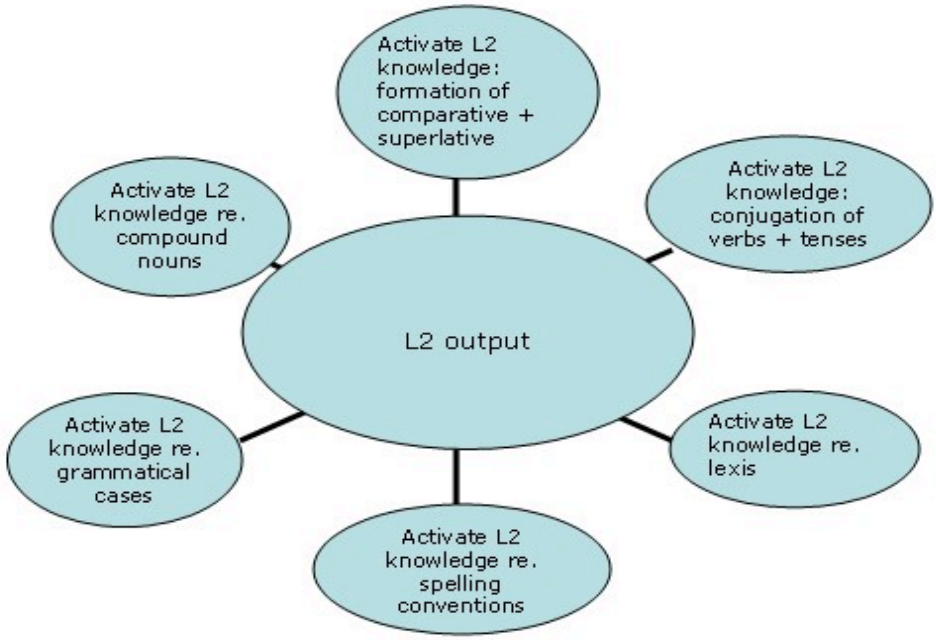

Figure 2: Activating prior L2 knowledge
In free text productions, learners have to activate their knowledge in relation to a multitude of L2 phenomena, which include lexis, structures, and grammar. The higher the proficiency level, the more specific knowledge about forms (symbolized above in satellites) needs to be quickly integrated into output (represented by the central circle).

The research design proved useful for generating insights into student behaviour. It enabled the researcher to see in detail actions undertaken in order to complete the task, and in particular to examine the production and construction of L2 output. Differences in data interpretation, depending on whether data is purely text-based or includes visual elements as generated through screen-capturing software, has been highlighted in other research, albeit with different foci. For example, Lai & Zhao (2006) compared face-to-face interaction with online chat with a view to exploring potential differences in noticing a gap (as a pre-requisite of SLA). Their findings suggest that the extra time afforded by the online chat mode facilitated self-repair. A study by Smith (2008) looked at self-repair in chat logs compared with video files relating to those chat logs, and found significantly more incidents of self-repair in the data generated with screen-capturing software. He concludes that "relying on printed chat logs alone when analyzing SCMC [synchronous computer-mediated communication] data is a very tenuous undertaking" (Smith, 2008, p. 98). It should be noted that both of these studies were conducted in a quantitative research framework which did not generate detailed descriptions of the text production processes.

The study discussed here differs in fundamental ways from those referred to above. Here, students completed a complex task based on their own research which involved creating the outline of a marketing strategy. On the content level, the task was embedded in academic context which was relevant to the students and was therefore more complex and challenging than the spot-the-difference picture task (Lai & Zhao, 2006) and jigsaw task (Smith, 2008) used by the other researchers. Secondly, students worked collaboratively in class, and engaged in a combination of synchronous face-to-face discussion and computer-mediated written L2 output.

5. Conclusion

The aim of this study was to explore the language learning potential for advanced language learners afforded by open, task-based CALL. While it was recognised from the outset that an open-task framework hinders the prediction of specific language use and therefore the testing of the same, the study shows various incidents of language-related episodes which are involved in the process of L2 learning. Analysis of the collected data suggests that advanced language learners can acquire L2 in a collaborative and open CALL task. The findings show that students were able to resolve some of the difficulties they encountered by working collaboratively. Collaborative text construction followed by proof-reading helped to overcome difficulties such as uncertainty regarding grammatical cases (result point 3.2.1), and spelling (result point 3.1.2), the formation of compound nouns (result point 3.3), and vocabulary (results point 3.2.2). These findings support the researcher's decision to design a task in which learner activity was embedded in a sociocultural collaborative framework.

The methodology applied to the study proved useful. Concentrating on the process character of L2 output gave an insight into students' decisions while creating output and thereby a window into their learning process. The use of screen-capturing software to record the students' talk and their on-screen activity while working on the task, facilitated close observation of the process of language production and enabled language-related episodes such as self-correction or self-repair to be evidenced. The data revealed the steps taken by students towards activation and (and possibly internalization) of previously studied features of L2. It also gave insights into challenges that the learners had to deal with, in particular the cognitive demands when several L2 features need to be activated simultaneously in order to compose text. It is argued that this form of CALL activity provides a collaborative and naturalistic environment in which individual learners can be stretched and can gain confidence in using the L2.

While qualitative studies like this one cannot make claims of transferability, the findings support similar research undertaken in different settings and with less challenging tasks. The particular significance of the research discussed here lies in the combining of an open CALL task for advanced L2 learners, with the use of screen-capturing software for data collection and data analysis, and the application of a qualitative research approach using grounded theory and output theory.

More qualitative studies of advanced learners are needed in order to develop a broader picture of the learning strategies students employ in the CALL environment. With a view to future task design, one potential area of interest is whether self-directed and peer-directed focus on form shows a preference for one aspect of language over another, for example a focus on lexis rather than grammar.

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Notes

[i] See Block (2003) and Mitchell & Myles (2004) for a discussion of the terminology.

[ii] Students had the opportunity to access any internet material as research sources, including multimedia, and were not restricted to written texts.

[iii] Due to small numbers of advanced foreign language learners, institution-wide language classes and those of bespoke courses like this BA business language course are frequently merged, as was done in this case.

[iv] All names were changed in order to protect the student identity.