

BECOMING LITTLE SCIENTISTS: TECHNOLOGICALLY-ENHANCED PROJECT-BASED LANGUAGE LEARNING

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This article outlines research into innovative language teaching practices that make optimal use of technology and Computer-Mediated Communication (CMC) for an integrated approach to Project-Based Learning. It is based on data compiled during a 10-week language project that employed videoconferencing and *machinima* (short video clips featuring virtual world avatars) to introduce young language learners (7 to 8 years old) to concepts of good and bad habits related to personal hygiene, physical activities, and eating. Within the Project-Based Language Learning approach (PBLL), the students gained new information about the topic under study, and this information was then used to communicate face-to-face (with classmates) and online (with telecollaborative partners) in the target language of English in order to resolve problems related to the topic. The authors provide a detailed overview of the project workflow as part of a qualitative study into the efficacy of the proposed pedagogical framework.

Keywords: Collaborative Learning, Computer-Mediated Communication, Language Teaching Methodology, Second Language Acquisition, Task-Based Instruction

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INTRODUCTION

Language teaching is becoming increasingly more sophisticated as teachers take up the call to integrate innovative materials, resources (including technology), and strategies into their own practice. For instance, the rise of freely available social media for communicating with others, combined with time-tested teaching approaches such as project-based learning, is attracting growing interest from language educators (what Gumock, Debski, and Wigglesworth (2005, p. 121) call “Project-oriented computer-assisted language learning or PrOCALL”). This bespeaks the need for a variety of research into the optimization of this pedagogical proposal—what we call Technology-Enhanced Project-Based Language Learning (herein TEPBLL). Accordingly, studies into TEPBLL should not only focus on validating the approach via individual results of *products* stemming from its application but extensive investigation of *processes* should be carried out, in order to facilitate better understanding of how the integration of project content, materials, resources, technology, teaching strategies, and human interaction all contribute to the successful implementation of TEPBLL.

As a follow-up to a prior study that looked at learners’ language output (Sadler & Dooly, 2013), this article provides an in-depth exploration of a TEPBLL project carried out with young, beginner language learners. The previous study found that the young language learners increased their production of simple sentences in the target language following a semester of TEPBLL instruction. Following on that pilot study report, the aim of this study is to account for “the social and cultural complexities entailed when diverse individuals come together for joint purposes” (Meskill, 2013, p. 1)—in this case, the completion of the task sequences encompassed within a second, 10-week TEPBLL venture. To do so, the researchers adopted an “inductive, data-driven, bottom-up approach” in order to see the “relevant social and linguistic

phenomena” (Levon, 2013, p. 197) that emerges through *participant observation* (data collection that allowed the researchers “to become both an active member of the goings-on of the community and to observe those activities as they unfold” (Levon, 2013, p. 204). As will be demonstrated further on in the article, the data indicate that the TEPBLL design was highly motivational and provided ample opportunities for the young learners to mediate both language learning and complex concepts related to the content of the project while at the same time providing them with purposeful moments to practice social language.

Following the “principles of operation” for educational ethnography to ensure transparency in the analytical process (Heath, 1982, quoted in Green, Skukauskaite, & Baker, 2012, p. 312), the authors offer a rich description of both the project design and its implementation before moving on to an emic approach to the language teaching and learning process in order to explore the complexity of this type of pedagogical framework (e.g. interaction of teacher-initiated scaffolding, peer collaboration, material-supported- and technologically-enhanced knowledge production, etc.).

THEORETICAL BACKGROUND AND BRIEF LITERATURE REVIEW

The past decade and a half has seen critiques of “classic” language assessment, which principally focuses on the testing of final output that is either correct or incorrect. Researchers and theorists have begun to call for a more context-sensitive model of dynamic assessment which takes into account process as well as product (see Poehner & Lantolf, 2005; Rea-Dickins & Gardner, 2000). At the same time, there has been a growing interest in research and practice of telecollaborative practices in language teaching and learning (cf. Guth & Helm, 2012; Helm, Guth, & O’Dowd, 2012; Kessler, 2013; Schenker, 2012), especially as teachers and learners become more familiar with what Thorne (2012) calls “conventional Internet-mediated tools” (p. 19); however, there have been few studies on the use of online collaborative learning with young (beginning) language learners (although see Gruson, 2010; Gruson & Barnes, 2012; Kennedy & Miceli, 2013; Ko, 2012; Ramírez Verdugo & Alonso Belmonte, 2007; Tolosa, East, & Villers, 2013). There may be several possible reasons as to why the use of CMC (apart from some practices such as school blogs) occurs principally in secondary education or university levels (Milton & Garbi, 2000). The main challenges stem from specificities of teaching the young language learner: limitations of interests and comprehensive topics, minimal technological skills, and the fact that little or no written input can be used (depending on the age and level). Further complications lie in the need for somewhat sophisticated oral language use if the pedagogical design aims for telecollaboration with other speakers.

Another issue may be the teacher’s understandings of the (ir)relevance of CMC for primary education. Computer-Assisted Language Learning (CALL) games—many of which, especially virtual worlds, resemble CMC platforms—have been used in primary education for years; however, these games, although perhaps more cartoonish in order to appeal to young learners, usually involve individual-computer interaction without much need for social interaction with others in the virtual environment. The interaction tends to be linear, controlled tasks that build on “correct” input so that learners advance from more simple to more complex learning situations. They also focus more on acquiring lexicon, syntax, and morphological knowledge and less on real communication.

Despite the oft-cited constraints of implementing technology-enhanced online collaborative learning with very young language learners, this project embraced the premise that telecollaboration—even with beginning learners—can provide fundamental opportunities for communicative exchanges which are key to long-term language learning.

Project-Based Language Learning

The pedagogical framework for *Healthy Habits*,⁴ the series of lessons used in this study, is Project-Based Language Learning (PBL) as promoted by Beckett and Slater (2005), Fried-Booth (2002), and Stoller

(2006), who, in turn, based their work on socioconstructivist principles that underlie what the Buck Institute of Education (BIE) refers to as Project-Based Learning (BIE, 2003). The BIE defines Project-Based Learning (PBL) as a “systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured around complex, authentic questions and carefully designed products and tasks” (BIE, 2003:4). As discussed by Dooly (2013), PBLL fits easily within an approach consistent with Communicative Language Teaching (CLT; see J. Richards, 2005). As part of a larger, ethnographic study, this article focuses on learning development rather than on specific quantifiable, isolated language production because the aim of this study is to have a better understanding of the socially constructed learning process (cf. Johnson, 2009; Lantolf & Thorne, 2006; Meskill, 2013) and whether the TEPBLL design is validated.

METHODS

To establish a baseline for measuring the success of the pedagogical intervention, a collective overview of the prescribed set of learning objectives (pre- and post-project) for the students is given. This is followed by a presentation of naturally occurring talk-in-interaction (Antaki, 2004; Heritage, 1999, 2004, 2010; Sacks, 1972; Schegloff, 1988, 1989) in order to tease out the way in which the participants produce an orderly social world, thereby allowing an emic perspective of the integration of teacher and material “scaffolding” (Vygotsky, 1978) in the complexity of the in situ learning process taking place within the pedagogical framework.

The analysis of the interaction follows from Goodwin and Goodwin’s (2004) understanding of talk as embedded in social activities (see also Goodwin, 2000; Olsher, 2004). According to Goodwin and Goodwin, the act of speaking always emerges within complex and changing contextual configurations. These configurations include participants drawing on the semiotic resources provided by the context (gestures, artifacts, etc.) to orient themselves and others toward the actions in progress (in that moment) as well as broader activities (e.g. entire lesson, project, etc.). This understanding of the interaction provides a framework for investigating how individuals mutually build action (in this case, co-production of knowledge), while at the same time attending to, and helping to construct, other relevant actions and context. Moving from this premise, this study examines the complex ways in which the different resources provided by the pedagogical design become integrated into the co-constructed meaning-making process between the teacher, student, materials and technology during the TEPBLL implementation.

Student Participants

The student participants in this project came from three classes, two from Spain (classes A and B) and one from Austria (class C). In class A, there were 26 students (14 boys, 12 girls), while in class B there were 25 students (13 girls, 12 boys), all between the ages of 7 and 8 years old. They were in their 2nd year of early childhood education and were beginners in English as a Foreign Language. Class C, which was made up of mixed development levels and ages (from 6 to 8 years old), consisted of 24 students. As with their counterparts, they were beginners in English as a Foreign Language.

Given the parameters of PBLL and the constraints found in teaching a foreign language in an environment where the target language is not a daily factor in the learners’ lives, the use of telecollaboration became an integral component of the project. It is not only the straightforward means of communication between distanced learners that justifies the integration of telecollaborative practices into the learning process: adherents of this approach also underline the role computer-mediated communication can have in promoting increased shared knowledge construction based on collaborative student interaction (Hampel & Pleines, 2013; Lamy & Hampel, 2007; Müller-Hartmann & Schocker-v. Ditfurth, 2011), which provides the foundation for successful PBLL planning and implementation.

Project Design: Pedagogical Framework

Healthy Habits was designed from the perspective that language practice and content knowledge acquisition are part of the same process. The project endeavored to create learning opportunities that allowed the students to become immersed in the use of the target language while learning to work in groups (face-to-face and via online collaboration). The students also came to relate topics across subjects (although the collaboration between subject teachers was not to such an extent that this project can be considered Content and Language Integrated Learning (CLIL; see Coyle (2008) for a more in-depth discussion of CLIL parameters). The interrelationship between topic and language stemmed from learner reflection and discussion on the relevance of the learnt concepts: apart from direct subject knowledge (good habits, bad habits, specific lexicon), students were required to reflect on cause and effect of the daily actions that were the focus of the project. In short, the TEPBLL design allowed for a highly complex, yet wholly integrated learning environment, where meaning-making occurred through interaction and mediation between the teachers, students, materials, and technology.

Stoller (2002) proposes a sequencing of steps for designing and implementing a language learning project that involves the students in the beginning phases of the project design and development. However, given the age of the students, decisions concerning initial stages of the project (theme, final outcomes, project structure, materials development for preparing the students for the language demands of each phase) were taken by the teachers and researchers involved and did not involve negotiation with the students. A complete outline of the focal activities, related tasks for language preparation, and anticipated gains in specific competencies for the 10-week period is shown in [Table 1](#).

Table 1. Activity Outline: 10-Week Period

Specific student tasks	Specific linguistic aptitudes and/or target lexicon	Cross-disciplinary activities & competences
Week 1: Creation of VoiceThread™ presentations		
Individual written presentations (name, age, something unique...)	Introducing one's self	ICT: use of audio recorder (diction with a microphone, etc.)
Orally record prepared text	Personal information: age, likes and dislikes, family relationships, physical descriptions...	Interpersonal: introductions
Week 2: Listening to partner schools' video presentations (information gathering)		
Watch partners' video presentations	Listen for gist	Geography: locate partner school on map; learn expansive domains (city, state, country, continent)
Compare information (similarities & differences) between groups	Comprehension of descriptions Use of comparatives	Intercultural competences: interest in others
Week 3: Use of flashcards (specific target language); creation of posters about partner schools		
Listening/comprehension & giving physical descriptions (using avatars and games)	Use of specific lexicon (physical descriptions)	Physical education: physical activities needed for healthy body
Create posters about partner school based on information from video presentation	Use of greetings Formulate simple questions	Intercultural competences: interest in others

Week 4: Short videoconference; machinima (healthy/unhealthy habits); poster of good/bad habits		
Videoconference (small groups)	Oral comprehension; recognition of different intonations/accents	Social Studies: visit local market to buy healthy snacks
Machinima clip: respond to avatars' statements (e.g. smoking is a healthy habit) with true/false	Oral comprehension aided by visual and textual imagery	Intercultural competence: relating known facts with new knowledge about other cultures
Poster of information: good/bad habits	Use of greetings Simple questions Polite responses	ICT: use of social media; video cameras & microphones
Week 5: Vocabulary flashcards; poster (connections between good/bad habits and consequences)		
Flashcard games: habits and consequences	New specific lexicon	Catalan: individual dossiers of trip to market
Create poster of consequences	Comprehension of causal conjunctions (e.g. 'because')	Maths: market budget (to spend & amount left over)
Week 6: Machinima (How do scientists observe human behavior?); simple report; case studies		
Revise what scientists do	Comprehension skills (gist using context and visual cues)	ICT: use laptop computers (stop, rewind, repetition, etc.
Learn to observe and fill in simple report	Make connections btw oral input and written text	Reasoning: relate oral statements to listed facts
Observe case study and fill in report (small groups)	Recognition of target lexicon (oral & written)	
Compare/correct answers with others		
Week 7: Case studies; Videoconference 2		
View case studies (whole class)	Greetings	Intercultural competences; interest in others, learn about other cultures
Act as "experts" to facilitate comprehension of behaviour for rest of class	Give simple information	ICT: use of social media; video cameras and microphones
Videoconference 2: information gaps	Ask for clarification Give polite responses	
Week 8: Final report; cause and effect; suggestions		
Compare information gathered	Making suggestions (use of modal auxiliary <i>should</i>)	Interpersonal competences: empathy for others
Fill in final report regarding avatar's habits and subsequent health problems	Revision of target lexicon	Social Science: understand causal relationships (e.g. bad posture causes backaches).
Draw conclusions; make suggestions to improve avatars' health	Experiment with new language possibilities (language creativity & risk-taking)	

 Week 9: Machinima viewing

Listen to scientist avatars explain actions taken (based on suggestions) and results of actions	Oral comprehension of cause-effect explanations	Social Science: understand causal relationships (e.g. bad posture causes backaches).
	Connect oral comprehension to written texts (handout)	

Week 10: “Talk show” interview; final written evaluation

Answer avatars’ interview questions about what they have learnt	Oral comprehension of direct questions	Cross-disciplinary
Demonstrate comprehension of written text, with use of images	Formulate simple answers	
Categorize information (problem, good habit, bad habit, etc.)	Read target lexicon	
Show understanding of causal relationships	Explain causal relationships	
	Use of conjunction (<i>because</i>)	
	Make suggestions	

Project Design: Materials and Technological Resources

The project was carried out during 10 weeks in the 2011-2012 academic year. The teachers and researchers involved in *Healthy Habits* were two EFL primary education teachers: Maria Mont (CEIP St. Jordi, Catalonia, Spain) and Manuela Ebner (Praxis Volksschule, Vienna, Austria); teacher educators and researchers Melinda Dooly, (Universitat Autònoma de Barcelona, Spain) and Randall Sadler (University of Illinois Urbana-Champaign, USA). The materials were developed by Dooly and Sadler in close consultation with the EFL teachers and with some collaboration from student-teachers enrolled in their university classes at the time.

The teachers began with specific linguistic objectives that they had to meet in order to complete their school curriculum: describe physical appearance and character, know when and how to give and receive basic greetings, talk about daily routines, use adequately selected adverbs of frequency, use appropriately selected “functional” language (e.g. “Can you repeat, please?”). Added to this were the linguistic and cognitive demands required for completing the sequenced tasks during the period of the project (e.g. recognition and production of specialized lexicon, comprehension and production of complex sentence structures that indicate cause and effect, receptive and productive skills required for presenting and receiving information, asking for clarification, and giving suggestions).

Social media resources were widely used during the project, as both a means of materials production and for in-class activities focused on communication. Principal among the resources were scientist avatars, which, along with other specially created personalities, were used to create *machinima*—short video clips filmed in a virtual world—in this case, Second Life (the article provides hotlinks to materials and videos (machinima clips) which can be accessed by going to the list of URLs in the [Appendix A](#)).

Through weekly online meetings between the EFL teachers and researchers, activities were conceived, discussed, and designed (note that the initial planning of the overall project began several months before first implementation; the meetings during implementation were generally for “fine-tuning”). In-class teaching strategies included role-playing and dialogic use of common resources such as flashcards (see [Figure 1](#)), posters, and worksheets, most of which were produced during the online meetings and often

with free, online platforms. These materials were “handmade” using the online cartoon strip creation tool [Bitstrips](#) because of the very specific nature of the required lexicon (*lice*, *bad teeth* and *spots* are not usually high on publishing houses’ list of “need-to-know” words that are included in course books).

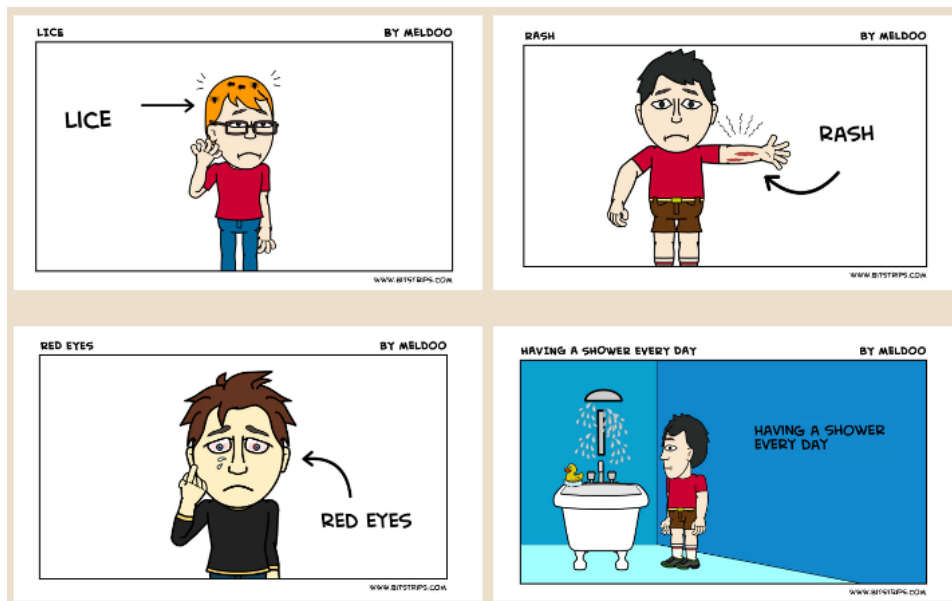


Figure 1. Examples of flashcards.

Voice Over Internet Protocol (VOIP) was another technology that was integrated into the learning process and which was especially important for promoting oral production by the students. In this case, free Skype™ software was employed for videoconferencing (see [Figure 2](#)), allowing the teachers to create periodic events that obliged students to engage with their online partners in authentic communication, whether introducing themselves or co-constructing knowledge through shared information about the target content between the two classes. The design of the project ensured that there was a real purpose for the students to use the target language (communicating real ideas) and also reinforced the use of English as a means of authentic communication with others who do not share the same language. The students soon came to realize that they had to use English as it was the only way to converse with their online peers. How all of these resources were integrated into the project is discussed in more detail in the next section.



Figure 2. Images of the first videoconference.

Project implementation

At the beginning of the project, students were introduced to the general concepts of what they would be doing during the 10 weeks through an initial “meeting” with two avatar scientists. In this first clip, the two scientist avatars (Dr. Stella and Dr. Albert) purposefully greeted the participating teachers by name, in order to engage the students on a personal level and to personalize the learning context (see [Figure 3](#)).



Figure 3. Healthy Habits introduction in machinima.

Next, the two avatars explained: who they were (their names), what they were (scientists who study healthy and unhealthy habits) and what they did in order to study these habits (observation of boys’ and girls’ different habits, both healthy and unhealthy). The scientist avatars then told the students that they needed assistance and asked the students in the two schools if they would be willing to help (videotapes of the students’ reactions show a resoundingly enthusiastic affirmation). The scientist avatars went on to outline the type of help they would need: the students were to help in “collecting data” through case study observation by becoming little scientists. As indicated in [Figure 4](#), the students in Spain and Austria viewed identical versions of this first machinima—the reasons for different versions of later machinima will be explained below.

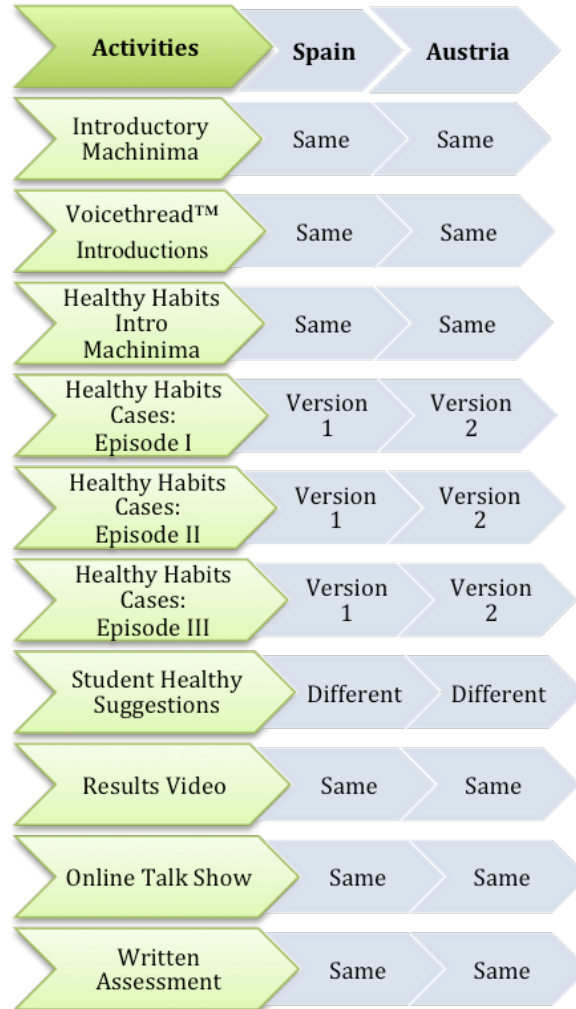


Figure 4. Spain-Austria machinima project collaboration stages.

In a nutshell, students were asked to become “little scientists” in order to help out Dr. Albert and Dr. Stella (the avatar scientists) in their observations of three case studies (other “teen” avatars created for the project). In order to do so, the crucial information that they would need to understand was introduced gradually through the aforementioned flashcard images, along with worksheets to provide a framework for required language structures. In subsequent machinima clips, the scientists and other avatars were used for interactive listening activities that focused the students’ attention on recognizing types of habits (healthy and unhealthy), categorizing those habits (e.g. smoking is an unhealthy habit), the symptoms or problems related to certain unhealthy habits, and the benefits related to certain healthy ones (see [Figure 5](#)).

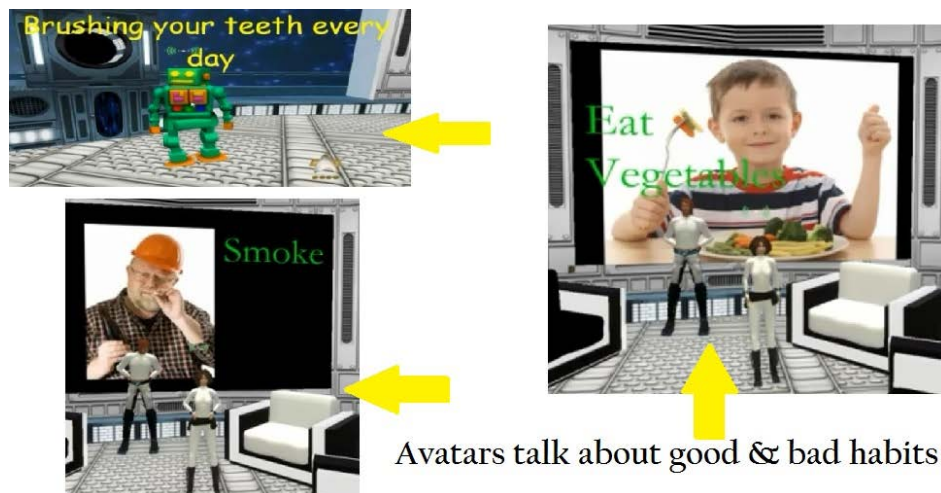


Figure 5. Scientist avatars discuss good and bad habits.

The *Healthy Habits* introduction machinima (produced with the help from future ESL/EFL teachers who were taking teacher education courses being taught by the researchers) helped the students to recognize, name, and classify different habits (e.g. smoking, eating lots of vegetables, etc.). It is important to note that this video (and the project in general) was introducing vocabulary, content materials, and ideas that their teachers might normally have considered as being beyond the L2 abilities of these students. As seen in the introductory machinima, the use of the virtual world allowed the teachers and researchers to introduce the vocabulary and complicated concepts in a contextualized manner that would be almost impossible to accomplish in a regular classroom setting. This was simultaneously complemented and supported by activities that used the flashcards, and students began making associations between different types of habits and possible consequences through the use of the worksheets and general classroom discussion.

Through iterative use of the materials, the students had continued exposure to target content (both linguistic and conceptual). For example, the flashcards had a recurrent role in the on-going activities: students used them to create posters, play games, and exchange information in videoconferences with their online partners. The images used in the flashcards also served as visual aids to facilitate students' comprehension of oral texts, as in the case studies (explained in more detail further on). These same figures were used in the supplementary handouts created for the lessons. For instance, students were required to reflect on cause and effect of the daily actions that were the focus of the project (e.g. brushing teeth, eating too many sweets, sleeping enough, etc.) by connecting the avatars' differences in appearance and health, due to changed behavior (as illustrated in Susan's case in [Figure 6](#)).



Figure 6. Handout of changes in Smelly Susan.

Next, working in small groups, students were given three “cases” to observe as “scientists” in order to gather data about the subjects’ good and bad habits. The case studies (again, using machinima) consisted of Dr. Stella and Dr. Albert “interviewing” three teen avatars about their habits. The avatars were designed as teens in order to represent slightly older, more prestigious role models for the younger students. In each case, the “subjects” (Gameboy Gary, Hungry Helga, and Smelly Susan) had a mixture of healthy and unhealthy habits, with one predominant unhealthy one. To give an example, Gameboy Gary (see Figure 7) was addicted to videogames and subsequently did not sleep enough, had a backache, red eyes, hand pain, and so forth. His problems grew worse over each interview.

Austria Version

Spain Version



Figure 7. Gameboy Gary interviews.

Each of the case study subjects was interviewed three times, with the dates given for each interview approximately one month apart. This was done to better illustrate the progression of the symptoms of each subject over time.

The three interviews for each subject were edited together into one movie for the students to watch at the same time in their classrooms so that they could more easily notice the changes in behavior and symptoms of the subjects, with title screens before each clip giving the date of that interview segment. This also gave their teachers the ability to stop the machinimas at any time for questions and discussion and to repeat segments as needed.

Two versions of each interview for each subject were created (one version for Austria and one for Spain), as shown for Gameboy Gary in Figure 8. This resulted in three interviews each for Gameboy Gary, Hungry Helga, and Smelly Susan (nine interviews total for the three case studies), with two variations of each of those interviews, resulting in 18 interview segments.

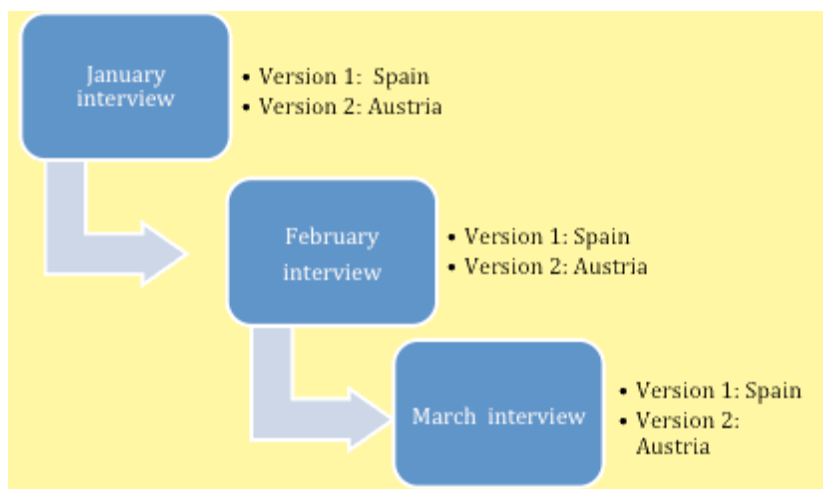


Figure 8. Gameboy Gary interview schedule.

All segments included sufficient repetition of similar phrasing for the students to become familiar with all of the key target structures. As partially detailed in Table 2, the basic context of the two versions is the same: Doctor Stella interviews Gameboy Gary three times over a three-month period, and Gary's main health issues relate to his spending too much time playing video games. The exact dates of the interviews, the questions asked, and Gary's responses, however, varied between the two versions.

Table 2. Gameboy Gary: Austria versus Spain Versions

Interview Detail	Austria	Spain
Interview 1 date	January 5 th	January 2 nd
Question 1	How are you today?	How are you today?
Question 1 response	I'm so-so.	I'm so-so.
Question 2	Do you have healthy habits?	Do you have healthy habits?
Question 2 response	Hmm, I don't know.	Hmm, I don't know.
Question 3	Do you eat fruit	Do you eat vegetables?
Question 3 response	Yes, I do.	Yes, I do.
Question 4	Do you have a shower every day?	Do you wash your hands?
Question 4 response	Yes, I do.	No, I don't.

The collaborative element of the project was brought into play by introducing the two classes to one another. This was done both asynchronously through individually produced online, voice-animated presentations (via the online platform VoiceThread™) along with photo “ID cards” with text descriptions; and synchronously through a whole-class videoconference (see Figure 2) via Skype. The impetus for oral production of the target language was reinforced by the need to think of unique features about themselves to be included in the VoiceThreads (no matter how short the oral texts, seventy slides that all repeat name, age, and where someone is from can become tedious, so students were asked to briefly explain something special about themselves). Once the students were more familiar with one other, the project moved on to focus on more content.

Because the students in each country watched a different variation of the interview, the case study data (coming from their “scientific” observations) were different for each group, resulting in an Information Gap activity. Thus, although language use in all of the cases was similar, in the end each group had gathered different information

Next, with the information gathered from their observations, the classes exchanged information about the cases in a Skype videoconference, filling each other in about missing information and then putting forth ideas for the “subjects” to improve detected bad habits. Following this, the students combined the information to make suggestions on how the subject avatars might improve their habits (see Figure 9).

<p>Name: <u>Sabina</u> Date: <u>Thursday 2n of Mai 2012</u></p> <p>HEALTHY HABITS SUGGESTIONS</p> <p>SUSAN</p> <p>Susan should...</p> <ol style="list-style-type: none"> 1. <u>brush your teeth</u> 2. <u>practices sports</u> 3. <u>have a shower every day</u> 4. <u>sleep 8 hours a day</u> 5. <u>eat fruits and vegetables</u> <u>Wash your face</u> <p>Susan shouldn't...</p> <ol style="list-style-type: none"> 1. <u>Drink lots of Coca-Cola</u> 2. <u>sleep 4 hours a day</u> 3. <u>have a bad posture</u> 4. _____ 5. _____ 	<p>Name: Sabina Date: Thursday 2n of Mai 2012 Healthy Habits Suggestions Susan</p> <p>Susan should...</p> <ol style="list-style-type: none"> 1. Brush your teeth 2. Practics [practice] sports 3. Hae [have] a shower every 4. Sleep 8 houers [hours] a day 5. Eat fruits and vetables [vegetables] Wash your face <p>Susan shouldn't...</p> <ol style="list-style-type: none"> 1. Drink lots of coca-cola 2. Sleep 4 houers [hours] a dai [day] 3. Have a bad poster [posture]
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Figure 9. Suggestions worksheet for Smelly Susan.

The results of their suggestions were communicated to the students by the avatar scientists during an “interview of the scientist” (again through machinima) to ensure that the learners were aware of the impact of their suggestions, thereby validating their learning (in both content and language—in this case, oral production). In the final step—and as a means of assessing the learning that had taken place—Drs.

Stella and Albert invited the two schools to participate in an online talk show (see Figure 10), during which, as experts, the students were asked increasingly difficult questions about the language and content that they had been exploring throughout the project. The students' answers to the interview questions were not included in the video to protect student identities; however, a sample answer to the question, "Can you explain a healthy habit?" is transcribed in Extract 2. A final individual, written evaluation (see Figure 11) was also given to the students, based on the vocabulary and concepts learned during the project.



Figure 10. Results video and talk show template.

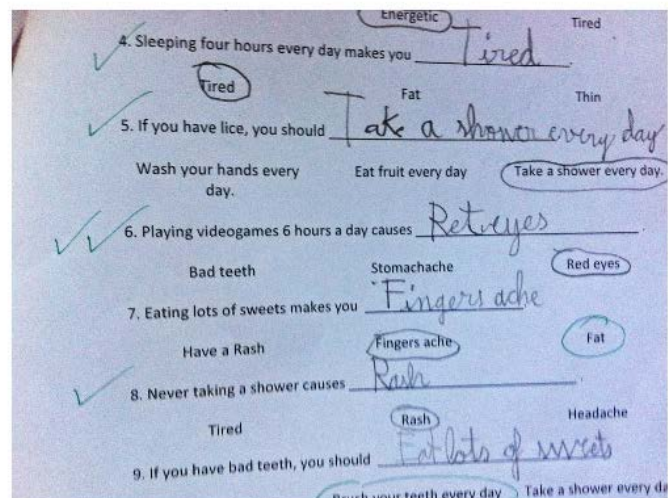
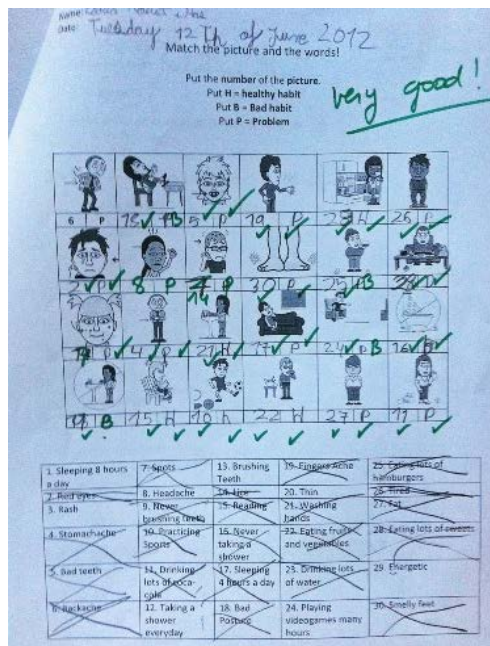


Figure 11. Examples of individual assessment.

RESULTS

The results show that the majority of the class participants not only assimilated the core curricular objectives set by the teachers but also that several students were able to produce target language structures far beyond the expected output of learners at this age and level (e.g. the use of modality and the creative "free-form" reproduction of language structures in other contexts). Although the focus of this study is on the interactional complexity of the integration of talk, gestures, and scaffolding resources, Table 3

provides a general overview of the levels of assimilation of the various objectives for each class at the initiation and end of the project. The percentages are based on recorded classes at the beginning of the project, teachers' evaluation marks, and the final written and oral assessment exercises. Admittedly, this type of data analysis is inconsistent with a qualitative, ethnographic approach focused on learning processes, but it is presented here as a reference for measuring the assimilated objectives and outcomes of the project.

Table 3. Comparison of Assimilation of Objectives Before and After Project for Catalonia (Classes 1 & 2) and Austria (Class 3)

General curriculum objectives	Start of the project			End of the project		
	C1	C2	C3	C1	C2	C3
Physical descriptions (understand, produce)	35%	30%	40%	95%	85%	100%
Personality traits (understand, produce)	None	None	20%	70%	60%	70%
Basic greetings (linguistic and sociopragmatic skills)	40%	30%	30%	100%	100%	100%
Daily routines (receptive and productive skills)	60%	55%	50%	100%	90%	85%
Recognition and use of formulaic chunks (e.g. <i>thank you, can you repeat please, etc.</i>)	10%	15%	25%	100%	95%	100%
Project Objectives	Start of the project			End of the project		
	C1	C2	C3	C1	C2	C3
Specialized lexicon (recognition, comprehension, and use in appropriate contexts)	None	None	None	85%	70%	90%
Formulaic language use for information exchange	None	None	None	60%	60%	55%
Giving suggestions	None	None	None	30%	25%	20%

Notes: Students in classes 1 and 2 had been introduced to descriptions in the previous academic year (Year 1 early childhood) but did not recall the information immediately.

We now turn to the different sequenced activities supporting the socially constructed learning process that led to the assimilation of the majority of the project objectives. Our focus is on the interaction between the students, the avatars, and the students' online partners (see [Figure 12](#)). In [Extract 1](#), students give their online peers information they have gained about their case studies (i.e. a jigsaw puzzle type activity).



Figure 12. Students exchange information about the case studies with their online partners.

Extract 1. Students exchange information with online partners (transcription key in [Appendix B](#)).

Participants: Maria (teacher), Manuela (onscreen), Priscilla, Marvin (Austrian student onscreen)

- 1 MAR: #####
- 2 TCH: priscila? ((signalling with her hand for a student to reply to marvin))
qué (.) [qué?] ((sound from videoconference is very distorted; priscila looks at teacher for help))
- 3 PRI: teacher for help))
- 4 ((trans.: is that (.) what?))
- 5 MAR: [#]
- 6 PRI: marvin, can you repeat?
- 7 TCH: °fantastic° ((compliments priscilla for her response))
- 8 MAN: #
- 9 MAR: #####
- 10 (.) ((students look confused))
- 11 TCH: can you show us the photo? marvin? can you show us the flashcard?
((holds up two hands to imitate holding something in front of the screen)) ok
what's this boys and girls? DRINKing lots: of:
- 12 SS: water=
- 13 TCH: water (.) ah: in the video: they observed (.) that gary has a healthy habit:
((pointing to students' handouts)) was drinking lots of water ((gesticulates with a thumbs up)) can you circle please? ((circles with hand then snaps fingers and points to a student who is not paying attention)) (...) ((students take time to find and circle answer on their handouts))
- 14 TCH: drinking lots of water
drinking lots of water ((student imitates teacher accent while repeating the answer))
- 15 ?:
- 16 TCH: what do you say?
- 17 PRI: thank you marvin ((others students join in))

In turns 6 and 17, Priscilla shows that she has the socio-pragmatic and linguistic competences to engage with others in the target language during a short, very guided videoconference. The students also demonstrate a growing recognition and use of lexicon associated with daily (healthy) habits such as drinking water (and frequency and amount). The individual final assessment (see [Figure 11](#)) showed that the majority (over 80%) of the students were able to associate the target lexicon with a picture of the activity and to then indicate whether it was a healthy habit, a bad habit, or a problem (conceptually quite difficult for seven year olds as they had to be able to differentiate between cause and effect; see Vander Zanden, Crandell, & Crandell, 2007).

In the final “online talk show”, all of the students (including recently arrived immigrant students and students with special learning needs) were able to name concepts that they had learnt when asked by Dr. Albert or Dr. Stella to “explain to the audience” a healthy habit, bad habit, or problem. In [Extract 2](#), Ruben is so excited about being requested to name some healthy habits that he refuses to give up the floor to the rest of his classmates.

Extract 2. Student responds to interview question.

Participants: Maria (teacher); Ruben

- 1 RUB: and: no no bad posture ↓ (.)
- 2 TCH: ##
- 3 RUB: having a shower every day
- 4 TCH: uh huh
- 5 RUB: drinking lots of water
- 6 TCH: uh huh uh huh
- 7 RUB: washing hands and: no never brushing teeth
- 8 TCH: uh huh ((students all turn to look at ruben))
- 9 RUB: em:: ((wanting to hold the floor)) no six hours pl- pl- play video games
and: fifty minutes of playing video games
- 10 TCH: uh huh
- 11 RUB: no drinking lots of coca-cola ↑
- 12 TCH: uh huh ((begins to imitate falling asleep; other students giggle))
- 13 RUB: NO no hamburgers of mcdonald's every day AND eating fruit and eating
vegetables every day ((gulps for air))

The questions gradually increased in difficulty. Some of the students were able provide recommendations for improving bad habits, while others gave answers that were results of re-creating input in a new construct and context: “Eating off the floor is a bad habit.” This was not a direct answer from any of the input (case studies, flashcards), but rather a re-construction of “Sit on the floor” (a common teacher instruction during many of the activities) and “eating fruits, vegetables, and so forth” which came from the machinima, flashcards, and handouts. Similarly, in [Extract 2](#) Ruben is able to creatively mediate the content he has learnt thus far to construct negative syntax in turns 9, 11, and 13 (the students had not been introduced to negative constructions since they require the use of auxiliary forms). Likewise, he re-invents the chunk linguistic forms that were available in the materials (flashcards, case studies, handouts) to provide alternatives to spending too much time with videogames. In turn 9 he stipulates that 50 minutes is sufficient time per day for playing by remediating an affirmative sentence into a negative one (“no six hours pl- pl- play video games”), followed by the contrastive information of what should be done: “and: fifty minutes of playing video games”.

Moreover, as [Extract 3](#) demonstrates, students were able to engage in conversation with all participants (including the avatars) as they worked together to negotiate the meaning of new words from the specially created contexts. In the extract, the students are just being introduced to the scientist avatars, Dr. Albert and Dr. Stella; the teacher makes it clear to the students that they are expected to respond to the avatars. The pupils were convinced of the veracity of the machinima characters (equating them with aliens, Star Wars, and other beings) and were willing to suspend belief to engage with them.

Extract 3. Students are introduced to “scientists”.

Participants: Maria (teacher), Stella (avatar), Carolina, Ruben

- 4 MAR: HELLO ↑
- 5 STE: [good] morning boys and girls
- 6 SS: [hello] ((carolina begins to wave, then stops, looking around at others))
- 7 (.)
- 8 MAR: °say hello° ((mock whisper voice))

- 9 SS: HELLO
- 10 MAR: she said how are you today? as- answer.
- 11 SS: HOW ARE YOU TODAY? ((ruben in the front row is especially enthusiastic, clapping hands as he shouts))
- 12 MAR: she said, how are YOU today boys and girls ↓
- 13 SS: i'm fine, tha:nk you: ((ruben is very engaged, making a strumming movement with his hands as he answers))
- 14 (.)
- 15 STE: ###
- 16 CAR: i'm- ((claps hand over mouth))
- 17 (.)
- 18 STE: my name is stella. (.) i am a scientist.
- 19 ?: Ah
- 20 MAR: oh?
- 21 RUB: doctora?
- 22 MAR: she said: (.) my name: is: (.)
- 23 RUB: Stella
- 24 MAR: My name is stella. i am_ did she say (.) i am a: i am a teacher?
- 25 RUB: no: i am alien
- 26 MAR: an alien? (.) no: i am a:
- 27 (. ((students look around at each other))
- 28 RUB: science ((pronounced *seance*))
- 29 MAR: scien: tist

Through the use of the materials (machinima, videoconferencing, cartoon flashcards) the teachers and researchers hoped to get their students to identify with their roles as scientists and experts in healthy habits. [Extract 4](#) demonstrates that not only did the students assimilate their roles, but that they were also aware of the scientists' responsibilities (i.e. observing boys and girls' behavior).

Extract 4. Students are introduced to “scientists” (2).

Participants: Maria (teacher), Neus, Arnold, Sara

- 1 TCH: are you scientists?
- 2 SS: YES ((nodding heads))
- 3 TCH: is albert and estella (.) a scientists?
- 4 SS: YES
- 5 TCH: Yes they are. (.) they are scientists. and what they observe. what do they observe? (.) neus?
- 6 ARN: ## ((shouts something just as the teacher calls on neus to answer))
- 7 TCH: thank you neus, thank you very much (.) neus do they observe dinosaurs?
- 8 NEU: no
- 9 TCH: cars?
- 10 NEU: no
- 11 TCH: monkeys?
- 12 SS: NO
- 13 TCH: arnolds?
- 14 SS: no

- 15 TCH: maybe (.) because arnold is having a horrible posture
((students giggle))
- 16 TCH: what do they observe sara?
- 17 SAR: °boys and girls?° (.) boys and girls?
- 18 TCH: yes or no?
- 19 SS: YES

The students also demonstrate recognition of the problematic behaviors discussed during the case studies by giggling when the teacher jokingly implies that, as scientists observing children's good and bad behavior, Arnold may well serve as a subject matter, given his bad posture (turn 15). Indeed, several occurrences were captured in the video-recorded data of students reprimanding each other for their bad posture. One student went so far as to scold Dr. Albert during the showing of one of the machinima clips (the avatar had gone into "default mode" of slouching in the chair).

Extract 5 not only displays more evidence of how the young language learners were motivated by their role as scientist but also the way in which the materials served as a means of mediating between the complex concepts and the target lexicon in order for the students to negotiate and take part in shared knowledge construction while providing them with purposeful moments to practice social language.

Extract 5. Students provide recommendations.

Participants: Maria (teacher), Rafael, Carla, Eduardo

- 1 TCH: in your groups: (.) the groups of the scientists (.) professional scientists (.) you were observing the same boy and girl (.) for example <susan, susan, susan> all together ((points at a group and circles hands to show inclusive group; students giggle; rafael imitates the teacher pointing)) you are a group: hello scientists observing susan (.) good morning ((paying attention to rafael's group))
- 2 RAF: GOOD MORNING ((others from his group join in; rafael imitates looking through a magnifying glass as if he were a scientist observing something))
- 3 TCH: and: the group: the group of helga helga helga ((pointing to another group)) and the group of <gary gary gary> ((using hands to show trio)) (.) YOU are going to THINK ((raises hands to head to indicate thinking)) (.) can you think? (.) can you think? yes or no?
- 4 SS: YES yes
- 5 TCH: yes. you have to think of GOOD ideas (.) good ideas (.) to HELP helga susan or: gary (.) to have a healthy life: to be healthy boys and girls. (.) for example susan never- ((holds hands over head to imitate water falling))
- 6 CAR: brushing her teeth
- 7 TCH: this is brushing your teeth? ((points to teeth then imitates shower again))
- 8 RAF: SHOWER shower every day ((standing up and raising hand))
- 9 TCH: susan never takes a shower never takes a shower everyday ((signals for rafael to sit down)) °sit down properly please° what is an idea? an idea? andrea? silvia? what is an idea for susan to have a healthy habit? (.) an idea (.) think
- 10 EDU: a healthy habit?
- 11 TCH: yes
- 12 RAF: SPOTS
- 13 TCH: spots? spots is a healthy habit?
- 14 RAF: ### ((stands up very eager to answer; teacher signals for him to sit down))
- 15 TCH: no but (.) SHE has a bad habit ↓ never taking a shower ((imitates shower)) (.) what is a

- solution?
- 16 EDU: °ducharse°
((trans. take a shower))
- 17 TCH: YES (.) and how do we say this in english? SUSAN you should:
- 18 RAF: a shower
- 19 TCH: susan: you should take:
- 20 RAF: a shower
- 21 TCH: EXACTLY. give me five
- 22 EDU: every every day
- 23 TCH: AH: yes ((moves next to eduardo)) i will give five to eduardo too because eduardo said:
- 24 EDU: every day
- 15 TCH: susan: you should take a shower every: single: day

CONCLUSIONS

While it has almost become a cliché to emphasize the necessity of integrating technology into language teaching in today’s society, how to do so still remains a pending issue. Even as interest and enthusiasm for the use of computer-mediated communication and social networking has grown, there is still concern that there is not enough research and practice on how to systematically and effectively integrate technology into language teaching (Egbert, Paulus, & Nakamichi, 2002; Hubbard, 2013) to meet “the need for grounding learning in context, and the greater efficacy—at least where ICT integration is concerned—with emergent and developmental rather than arbitrary or fixed and imposed learning objectives and processes” (C. Richards, 2005, p. 73).

There has been considerable research on telecollaborative task design (for recent work, see Brandl, 2012; Collentine, 2009, 2011; González-Lloret, 2003; Hampel & Pleines, 2013; Lund, 2013; O’Dowd & Waire, 2009) as well as well-founded calls for more expansive use of telecollaboration (Towndrow, 2003); however, there are fewer studies on project-based telecollaborative learning. Particularly rare are longitudinal studies that take into account the entire project design and its temporality; similarly, the number of studies on project-based telecollaboration between young language learners are scarce. Analysis of this project indicates that telecollaborative tasks with young learners are more productive when they are nested within a variety of pre- and post-telecollaboration tasks that introduce and repeat the target language through many different modes within the TEPBLL approach. It can also be seen that through the carefully scaffolded, meticulously planned TEPBLL task sequencing, the learners gradually developed more sociopragmatic competences in their use of formulaic chunks in contextualized “everyday” talk. Moreover, the appropriate use of targeted (and highly specialized) lexicon acquired to deal with content-related topics such as good and bad habits was predominant among the learners by the end of the project. This was achieved through the intricate weaving of appropriate resources (developed materials, technology for communication, and specially designed didactic support), teacher scaffolding, and iterative opportunities for language input and production through the TEPBLL design. Finally, by encouraging students to act as scientists, telecollaborate with others, and explore cause-and-effect relationships of different habits, this project helped students to acquire basic research habits that will serve them well later in life.

APPENDIX A. Machinima Names and URLs

Video Name	URL
Introduction Machinima	http://youtu.be/ivhYrM_yY3I
Healthy Habits Intro Machinima	http://youtu.be/LpXa6mIBdKM
Gameboy Gary Case Video: Austrian Version	http://youtu.be/hXEKGtOf3AM
Gameboy Gary Case Video: Spain Version	http://youtu.be/nf1Dles1dQo
Hungry Helga Case Video: Austrian Version	http://youtu.be/XqutrkeTnBg
Hungry Helga Case Video: Spain Version	http://youtu.be/2OhfHeLfkfl
Stinky Susan Case Video: Austrian Version	http://youtu.be/qRl8cSGrQQg
Stinky Susan Case Video: Spain Version	http://youtu.be/OHBjaCdEKtA
Results Video	http://youtu.be/ZSn7mPye7kI
Online Talk Show	http://youtu.be/MG6l9eoxdPM

APPENDIX B. Transcription Key

text:	elongated last sound
°text°	spoken softly
TEXT	spoken loudly
te:xt	dragging out word
[text]	
[text]	overlapping turns
word=	latching with next
text-	truncated word
(.)	Pause
↑	high pitch (top)
↓	low pitch (bottom)
Word	Stressed
<text text>	spoken more rapidly than usual
(...)	part of transcript has been left out
((text))	metanarrative comments
#	exact words cannot be determined (one symbol per apparent syllable)
TEX:	name of speaker
?:	unknown speaker
.	Terminative
,	Continuative
?	appeal or question (final)
?	appeal (continuative)

Note. Based on transcription symbols suggested by Jefferson (2002).

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