

Beyond Code-Switching: Problem Solving Mechanisms in Student Interactions in a Japanese EFL Classroom

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Abstract

This study used a taxonomy of problem-solving mechanisms (PSMs) by Dornyei and Kormos (1998) to categorize recorded samples of student-student interactions on classroom tasks over the duration of a semester. In this relatively high-level class, students were encouraged to negotiate meaning as much as possible in L2, including challenging tasks involving summaries and discussions of TED Talk videos. On the TED Talk task, 496 examples of PSMs were found. With some adaptations, the taxonomy was useful in categorizing the PSMs, although some categories were either not found (approximation, complete omission, grammatical substitution and reduction) or very rare (substitution plus, use of all-purpose words, feigning understanding, other repair). Several categories were added to the taxonomy to account for the data: non-verbal strategies such as gestures and drawing/showing pictures, two subcategories of circumlocution, elaboration and example, as well as a new substitution category, spelling aloud. This research is a step towards a taxonomy of PSMs that more adequately reflects the PSMs used in interactions in the EFL classroom.

Keywords: problem solving mechanisms; communication strategies; negotiating meaning; student-student interactions; code-switching

The EFL classroom is an artificial construct where participants, with varying degrees of willingness and persistence, constrain interactions to a language where linguistic gaps make communication more problematic. The challenge of the EFL classroom is to encourage persistence and meaning negotiation in L2 where there are communicative and social incentives for learners who share an L1 to revert to the mother tongue. The use of L1 in the language classroom has also been called code-switching, code-mixing, or interlanguage and is recognized as a useful phenomenon worthy of its own field of study. (Astrero, 2021; Daulay et al, 2021; Elashhab, 2020; Tien, 2012; Wei & Lin, 2019) The fact remains that, at some point in a learner's educational career, the target language needs to be the primary medium of interactions in the EFL classroom if learners are to develop the linguistic and communicative skills that L2 interactions will demand outside the classroom. The strategies that students employ to solve the communication gaps that arise are a crucial part of this skill development. These strategies have been called Communication Strategies (CSs) or Problem-Solving Mechanisms (PSMs) and a number of taxonomies have been developed to categorize the strategies that learners use, such as that on PSMs by Dornyei and Kormos (1998). Yet limited research has been done on how adequately the taxonomy describes the actual PSMs used in student-student interactions in EFL classrooms. This study used and adapted a taxonomy of PSMs by Dornyei and Kormos (1998) to categorize the problem-solving behaviors of students in interactions in a 5-month EFL course at a university in Japan. The taxonomy was revised to better categorize the PSMs used in student-student interactions on a small group task over the duration of one semester.

Communication strategies and problem-solving mechanisms

Researchers first raised awareness of the importance of communication strategies (CS) in the 1970s, and in 1980 Canale and Swain included CS in their influential model of communicative competence under the broader

category of strategic competence (Canale & Swain, 1980). A number of taxonomies which attempted to describe and categorize these CSs were also developed (Faerch & Kasper, 1983; Bialystok, 1983; Paribakht, 1985; Poulise, 1990; Dornyei & Scott 1997).

Conceptualizations of CSs tended to break down under two broad areas of focus: psycholinguistic approaches and interactional approaches. The former approaches focused on the cognitive processes of the speaker, particularly with regards to conscious problem-solving behaviors (Faerch and Kasper, 1983; Dornyei & Scott, 1997). The latter, interactional view, focused on CSs from an interactional perspective (Tarone, 1981; Canale, 1983). Different approaches have had an impact on the definition of CS as noted by Ahvenainen (2005).

(1) ...potentially conscious plans for solving what to an individual presents itself as a problem in reaching a particular goal (Faerch and Kasper, 1983, p. 36)

(2) ...mutual attempt of two interlocutors to agree on a meaning in situations where requisite meaning structures do not seem to be shared (Tarone, 1981, p. 420).

Perhaps one of the broadest definitions was by Dornyei and Scott (1997) who defined CSs as “a plan of action to achieve a communication goal.” (p. 179). Despite the variety of definitions, a closer look at the taxonomies can reveal broad layers of overlap as Dornyei & Scott noted, all describing the strategies learners employ to deal with the mismatch between language resources and intended message.

Dornyei and Kormos (1998) used the term ‘problem-solving mechanisms’ (PSMs) to describe phenomena very much like the CSs already discussed. The purpose of their taxonomy was to “bring together several lines of research and provide a comprehensive overview of problem management in L2

communication” (p. 350). The deliberate focus on PSMs rather than CSs recognized the fact that “even a brief analysis of any spontaneous piece of L2 oral discourse will reveal that L2 speakers tend to spend a great deal of time and effort negotiating meaning and struggling to cope with the various problems they encounter during the course of communication” (p. 350). They organized their taxonomy into three broad categories, the problem type, the relevant phase of speech production, and the actual PSMs as shown in Table 1 below.

Table 1.

Main Components of Dornyei & Kormos’ (1998) Taxonomy of PSMs

Problem Type	Relevant phase of speech production	Problem-solving mechanisms
Resource Deficit	Planning and encoding the preverbal message	Lexical PSMs Grammatical PSMs Phonological PSMs
Processing time pressure	Planning and encoding the preverbal message	Stalling mechanisms
Perceived deficiency in one’s own language output	Monitoring the phonetic plan and the articulate plan	Self-corrections Check questions
Perceived deficiency in the interlocutor’s performance	Post-articulatory monitoring	Meaning negotiation mechanisms

The first problem type, resource deficit, is related to deficiencies in the lexical, grammatical, and phonological/articulatory knowledge and ability of

the L2 learner. When planning and encoding the message the learner can choose from among six options to compensate for the deficiency. The first option is *content reduction* which can mean reducing, replacing, or even abandoning the message. The second option is *substitution* where the learner changes the way the message is encoded through code-switching, word approximation or even leaving a gap for the problematic lexical item and carrying on with the message. The *substitution plus* strategies can be applied in addition to substitution options at a later stage in the encoding process and include four subcategories: *foreignizing* (the use of L1 words by adjusting their phonology or morphology), *grammatical word coinage* (creating a new L2 word by creatively applying L2 rules to an existing L2 word such as 'dejunktion' for street cleaning) and literal translation from L1 to L2. The fourth and fifth options for dealing with lexical PSMs are *macro reconceptualization*, where a verbal plan is abandoned for an alternative preverbal plan, and *micro reconceptualization*, where the learner can use *circumlocution* to explain/exemplify the target message or combine two or more L2 words to create a new word in *semantic coinage* (i.e., snowsculpture for snowman). The sixth, and final option for dealing with lexical deficits is interactional: *appeals for help*, either *direct* or *indirect*.

Grammatical knowledge deficits occurring at the sentential, clausal, and phrasal level can also be dealt with by avoiding the problematic encoding and resorting to lexical PSMs already outlined. Two other options for dealing with grammatical encoding gaps include *grammatical substitution*, overgeneralizing or transferring grammatical encoding (put a mouse to the table) or *grammatical reduction*, where the learner uses simplified grammar under the expectation the interlocutor will be able to decode the meaning from context.

The third type of resource deficit outlined in the taxonomy occur at the phonological and articulatory level and Dornyei and Kormos outline four types of PSMs to deal with these problems. Once again, learners can choose

to avoid the word(s) they cannot verbalize and resort to lexical PSMs. Alternatively, learners can choose *phonological retrieval*, where the learner tries to retrieve the target item in a “tip-of-the-tongue” phenomena (‘it’s some kind of co...cop...copper’), or *phonological and articulatory substitution*, where learners compensate by using words that sound like the target item. A more extreme learner option is *phonological and articulatory reduction*, “swallowing or muttering inaudibly a word (or part of a word) whose correct form the speaker is uncertain about.” (Dornyei & Kormos, 1998, p. 362).

Table 2.

PSMs for dealing with Resource Deficit (Dornyei & Kormos, 1998)

Lexical PSM	Content reduction	Message abandonment Message reduction Message replacement
	Substitution	Code switching Approximation Use of all-purpose words
	Substitution Plus	Complete omission
	Macro reconceptualization	Foreignizing Grammatical word coinage
	Micro reconceptualization	Literal translation
	Appeals for help	Restructuring Circumlocution Semantic coinage
		Direct appeals for help Indirect appeals for help

Grammatical PSM	Grammatical substitution Grammatical reduction	
Phonological and articulatory PSM	Phonological retrieval	Tip-of-the-tongue phenomenon
	Phonological and articulatory substitution	Use of similar sounding words
	Phonological and articulatory reduction	Mumbling

One common characteristic of L2 speech production is the relative lack of automaticity, leading to strategies to gain processing time and avoid lengthy, and problematic, silences. These problems can occur at four stages of L2 speech production, at the message planning stage, when the preverbal message is being processed to be articulated, in the monitoring stage, and during processing and comprehension of the interlocutor's speech. When the learner perceives that planning will take more time than the communicative situation allows for, they may choose to reduce the message, abandon the message, or employ the resource deficit PSMs previously outlined. Conversely, they can also opt for *stalling mechanisms* "in order to keep the communication channel open and provide more time and attentional resources" (p. 368). These stalling mechanisms can take the form of *non-lexicalized pauses* (unfilled pauses, umming and erring, and sound lengthening) or *lexicalize pauses* (fillers such as *well, you know* etc.). Another stalling mechanism is *repetitions*, either *self-repetition* or *other repetitions* of the interlocutor's speech.

Table 3.

Taxonomy of PSMs related to time pressure problems (Dornyei & Kormos, 1998)

Pauses	Non-lexicalized pauses	Unfilled pauses Umiming and erring Sound lengthening (drawing)
	Lexicalized pauses	Fillers
Repetitions	Self-repetition Other-repetition	

A third problem type, *perceived deficiencies in one’s own output*, occurs at the learner monitoring stage and PSMs can address perceived problems in meaning as well as form. There are two major categories of PSMs, *self-correction* and *asking check questions*. Self-correction includes *error repair* (“corrections of accidental lapses in one’s own speech”), *appropriacy repair* (“correcting inappropriate or inadequate information”), *different-repair* (“changing the original speech plan by encoding different information”), or *rephrasing repair*, (“repeating the slightly modified version of a word or phrase...because of uncertainty about its correctness”) (Dornyei & Kormos, 1998, p. 372). *Asking check questions*, as the name implies, is transactional: “checking that what you said was correct by asking a concrete question or repeating a work with a question intonation” (p. 373) These questions can be focused on the listener’s understanding (*comprehension checks*) or the correctness of one’s own speech (*own-accuracy checks*).

Table 4.

Taxonomy of PSMs related to perceived deficiencies in one’s own output.

Self-correction	Error repair Appropriacy repair Different repair Rephrasing repair
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Asking check questions

Comprehension checks
Own-accuracy checks

The final problem area, *PSMs related to other-performance*, is explicitly interactional, focused not on the speaker's own production but on the performance problems of the interlocutor. The PSMs include eight different types of meaning negotiation that include *asking for repetition* (i.e., "Pardon?"), *asking for clarification* (i.e., What do you mean?), *expressing non-understanding* either verbally or visually (i.e., puzzled facial expressions), or *asking for confirmation* ("requesting confirmation that one heard or understood something correctly"). PSMs also could include interpretive summary and guessing, the former distinguished from the latter by the fact that it "implies a greater degree of certainty regarding the key word, whereas guessing involves real indecision" (p. 375). The final two types of PSMs include *other-repair*, correcting the interlocutor's speech, and *feigning understanding*, "making an attempt to carry on the conversation in spite of not understanding something by pretending to understand".

Table 5.

Taxonomy of problem-solving mechanisms related to perceived deficiencies in other-performance problems

Meaning Negotiation

Asking for repetition
Asking for clarification
Expressing non-understanding
Asking for confirmation
Interpretive summary
Guessing
Other-repair
Feigning understanding

Research on CSs and PSMs in the EFL classroom

While a number of studies have focused on the teachability of CSs (Dornyei, 1995; Rost, 1996; Nakatani, 2005; Naughton, 2006; Maleki, 2007; Teng, 2012), fewer studies have attempted to describe the PSMs EFL students employ when encountering communication difficulties without teacher intervention. Russell & Loschky (1998) presented Japanese university students with hypothetical situations “in which they lacked, in L2, a certain low frequency noun (p. 104).” The strategies used were categorized into a modified typology of ‘recommended’ and ‘non-recommended’ strategies, in which L1 based and non-linguistic strategies (i.e., mime) were classified as non-recommended. They found a relatively even breakdown between recommended and non-recommended strategies except on a telephone task, where students were more likely to employ verbal ‘recommended’ strategies because non-verbal options were limited. Nakatani (2006) conducted a survey of Japanese university students to develop an inventory of Oral Communication Strategies (OCSI) used to cope with speaking and listening problems. They noted that higher proficiency students reported more frequent use of negotiation of meaning strategies than the low proficiency group. Sato et al (2019) conducted research on the CSs used by “low level students” to “cope with communication breakdown, promote message conveyance, and co-construct a meaningful interaction with their interlocutors (p. 9).” In interactions with English native speaking instructors, students most frequently used code switching amongst themselves to interpret what the instructor said. Students also frequently used a ‘let it pass’ strategy as well as expressing non-understanding. On the other hand, “there were a number of cases where instructors indicated non-understanding of students’ utterances, confirmed students’ message, and requested further explanation (p. 21)”, indicating more sophisticated strategies on the part of the instructors than students. Similarly, where students had difficulty expressing thoughts due to limited linguistic knowledge a typical response

was code-switching, often soliciting help for English vocabulary from fellow student participants.

While taxonomies might be useful in describing potential PSM options, the degree to which those taxonomies adequately capture and describe larger samples of classroom interactions among EFL learners is debatable. The research by Sato et al and Nakatani (2006) would seem to indicate that the taxonomy by Dornyei and Kormos and others is less applicable to beginner levels than advanced speakers. This paper seeks to address this gap in the research by investigating the PSMs used in student-student interactions in the classroom among relatively advanced Japanese students of English where there are overt and interactional encouragements to avoid code-switching. The focus on PSMs, rather than CSs, reflects a focus on interactions that have become problematic, requiring extra effort to communicate meaning. It is precisely these points at which speakers sharing an L1 would naturally employ code-switching strategies. Do the PSMs employed by students at these points reflect the range of strategies described by Dornyei and Kormos? Are there other PSMs students employ that are not included in the taxonomy? The research questions are:

RQ1: To what extent does the taxonomy of Dornyei and Kormos adequately describe the PSMs employed by students in student-to-student interactions in an EFL task? How can the taxonomy be revised to better reflect the sample of PSMs obtained?

RQ2: How prominent a role does code-switching play in PSM choices made by students in these interactions? What form does code-switching take (i.e., whole sentence interactions or the selected targeting of problematic vocabulary and lexis)?

Method

Participants & Task

Audio recordings of student interactions were taken in a 3rd-year class of English majors at a national university of education over the duration of a semester. There were 14 students in the class including a visiting exchange student from China. In addition, the co-researcher, a Chinese research student, was an active observer and participant in classroom activities. While there were limited standardized scores for the year of the study (2020), and no standardized test scores regarding oral communicative ability, TOEIC scores obtained for the Japanese participants are shown in Table 6 below as well as the Chinese exchange student.

Table 6.

TOEIC Scores of participants (na= not available)

Participant (S1-S14)	Gender	Nationality	2018 TOEIC IP	Post 2018 TOEIC result
S1	Female	JP	550	na
S2	Male	JP	585	na
S3	Female	JP	650	na
S4	Male	JP	525	na
S5	Female	JP	655	680
S6	Female	JP	475	550
S7	Female	JP	na	na
S8	Female	JP	545	na
S9	Male	JP	610	820
S10	Male	JP	560	na
S11	Female	JP	565	850
S12	Female	JP	675	730
S13	Male	JP	600	na
S14	Male	CH	na	TOEFL iBT79

Not too much can be inferred from standardized test scores that are often not current nor include any objective evaluation of speaking ability (the TOEIC tests included only listening and reading scores). Still, some of the lower

scores (S1, 550; S6, 550; S13, 600) confirm teacher impressions of students who demonstrated lower speaking abilities in the course.

In many ways the class was an optimal one to encourage negotiation of meaning in English. The 13 Japanese students were all in the English education course, and the majority were planning to become English teachers at an elementary or junior high school upon graduating. In addition, the course was an elective which helped to screen out students who might have been less motivated. The relatively small number of students also helped to encourage persistence and effort in negotiating meaning in English since interactions were more visible to the whole class and teacher. The participation of two international students (including the co-researcher), and the visible use of audio recordings, also probably helped to encourage students to rely less on code-switching and more on other means of PSMs when problems did arise. Finally, the students were asked to self-monitor their effort in communicating exclusively in English during class time in an 'All-English contract' (see appendix 1).

Student participation on two kinds of tasks were recorded over the duration of one semester. In the first task, students were asked to come prepared each week to share an experience, story, or some news in small groups of 3 or 4 students. Once each student in the group had the chance to share their story or experience one student was selected at random to relay a story or experience share in their group with the whole class. In the language of 'cooperative learning' positive interdependence (learners were dependent on each other to share stories) and individual accountability (students took it in turns to share stories and were randomly selected to report what they heard to the whole class) were built into the task to encourage real meaning negotiation (Johnson & Johnson, 2018). In the second task students shared a summary of a self-selected TED Talk every second week (half the class each week) and led a post-summary discussion regarding the same TED Talk. Due to an over reliance on written handouts in the first recordings of the TED

Talk task, students were subsequently asked to not share prints of their summaries to encourage oral negotiation of meaning. Upon completion of the presentations and discussions, non-presenting students from each group were asked to briefly share what they had learned with the whole class, again adding some positive interdependence and individual accountability to the task.

The Recordings

A total of 15 audio recordings for a total of 349 minutes of student participation on two tasks were obtained throughout the semester as follows.

- Seven audio recordings of the ‘sharing task’ (ST) for a total of 72 minutes.
- Eight audio recordings of 18 Ted Talk Tasks (TTT) for a total of 277 minutes over the whole course. (The first recording was excluded from the data analyzed since students were relying extensively on handouts, which encouraged little oral negotiation of meaning.)

The co-researcher was an active participant in all the tasks recorded, not only recording the tasks but taking notes and, at times, negotiating meaning. The recordings were screened for evidence of problem-solving negotiations or examples of extra effort on the part of either the speaker or interlocutor in achieving communication. Selected examples were transcribed using the transcription code employed by Deterding (2013) in his research on misunderstandings in English as a lingua franca. Selected samples of interactions were categorized using the taxonomy of Dornyei and Kormos previously outlined. Both the selection and categorization of PSMs were, to some extent, subjective, involving inferences regarding the psycho-linguistic basis for interaction choices based on a conversation analysis of recordings and participant observer notes. To limit the subjectivity as much as possible,

both researchers spent time analyzing samples selected as PSMs to reach an agreement on both the selection of problematic exchanges and the categorizations of the PSMs employed. In addition, student input on the samples selected were solicited in pre-class lunch meetings the week immediately following the recordings. While not all students participated all the time, this student input was a means to confirm and correct the interpretations made. Examples that were selected for inclusion in the categorization of PSMs, and those that were excluded can highlight the decision-making process. The following sample was at first counted as circumlocution but was later discarded after some discussion.

S10: And the (.) third of (.) third is adaptability (.) adaptability, which is the ability to adapt to any situation you encounter...

It was discarded on the assumption that the speaker was speaking from a preplanned script, not responding to perceived interactional difficulties. The example below was categorized as circumlocution as the student presenter elaborated on a description of a reporting website that tried to make complex issues more accessible to its readers.

S2: The website want to tell the complex issues (.) as easier, sorry.er: They try to er: exchange the complex issues comPLEX issues to the easy information. And er: So...

Results

Early in the research, it became clear that the TTT task was eliciting far more PSMs than the relatively unstructured ST, and the data analyzed here is limited to PSMs on the TTT task. Given the relative freedom of the ST, students appeared to select and self-edit the content they chose to share for

both brevity and relative simplicity, and the use of PSMs was very rare. It also quickly became clear that processing time pressure PSMs were evident throughout the recordings of interactions. Lexicalized and non-lexicalized pauses, as well as repetitions, were present in the majority of presenter utterances during the TTT. Three examples can be seen below.

- (1) *S5: So "burnout" is like erm(.) givers are tired(.) tired, because they're busy helping people...er: have no energy. er: protect givers from out burned out.*
- (2) *S4: The reason is er: area of (.) area of (.) Africa (1) out of area of (.) out of area (0.5) er (.) Ebola er: not exist, er: the reason is (.) Ebola can't exist the air. So people to people infection er: not through the air...*
- (3) *S11: er... what should I say (.) like pla·place there're are many autisms.*

For expedience's sake, that data, which would have been by far the highest percentage of the data, was excluded from the analysis. Beyond processing time pressure, a total of 496 examples of PSMs were found and categorized: 202 examples of L2 resource deficit, 122 examples of own-output problem, and 172 examples of other performance PSMs. While the taxonomy was able to account for most of the data, several different L2 resource deficit categories were added to the taxonomy and can be seen in Table 7 below. This included a whole new category and subcategory of PSMs related to resource deficit problems (non-lexicalized PSMS, show/draw pictures, gestures) that were evident in the interactions. In addition, subcategories of a very common PSM, circumlocution, were added to the taxonomy to better describe the data, elaboration and example.

Table 7.

Expanded taxonomy of problem-solving mechanisms related to resource deficit problems (new categories underlined)

Lexical PSM	Content reduction	Message abandonment Message reduction Message replacement	
	Substitution		
		<u>Spelling</u> Code switching Approximation Use of all-purpose words Complete omission	
	Substitution Plus		
	Macro reconceptualization	Foreignizing Grammatical word coinage Literal translation	<u>Elaboration</u>
	Micro reconceptualization	Restructuring	<u>Example</u>
		Circumlocution	
	Appeals for help	Semantic coinage	
		Direct appeals for help Indirect appeals for help	
<u>Non-lexicalized PSM</u>	<u>Visual aids</u>	<u>Show/draw pictures</u> <u>Gestures</u>	
Grammatical PSM	Grammatical substitution Grammatical reduction		
Phonological and	Phonological retrieval	Tip-of-the-tongue phenomenon	

articulatory PSM	Phonological and articulatory substitution	Use of similar sounding words
	Phonological and articulatory reduction	Mumbling

Further breakdowns of the 3 major categories of PSMs can be seen in Figures 1, 2, and 3 below.

Figure 1.

PSMS related to L2 resource deficits

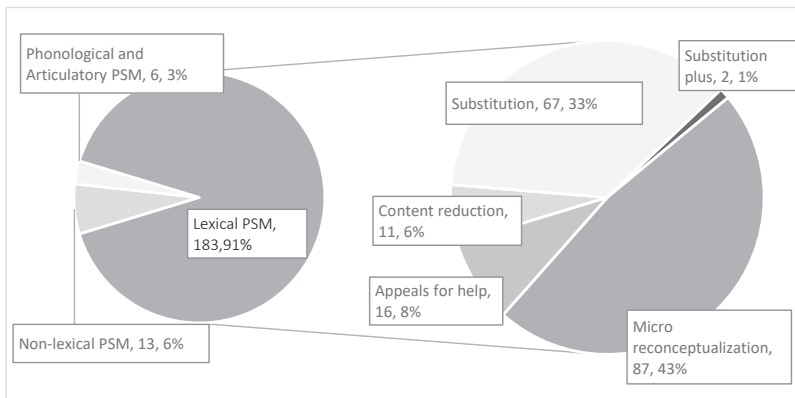


Figure 2.

PSMS related to own-output problems

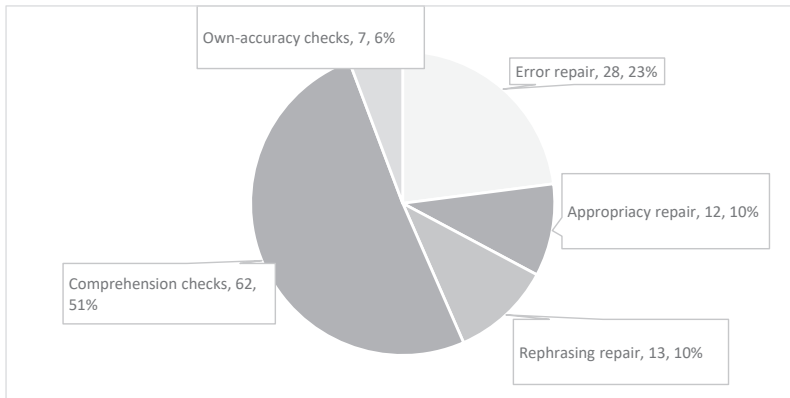
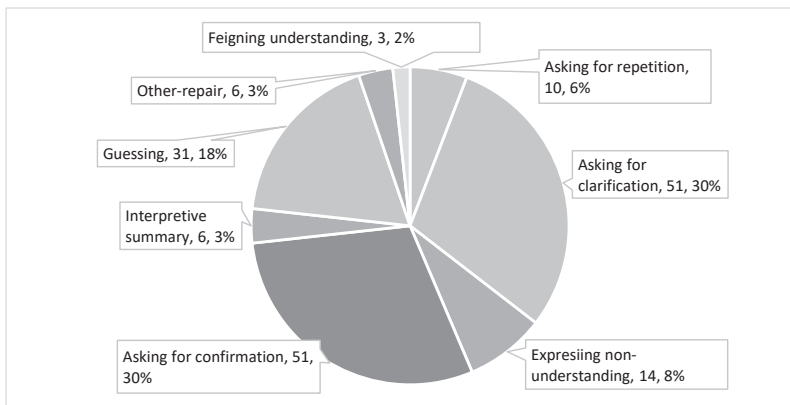


Figure 3.
PSMS related to other-performance problems



Since the groupings in the TTT were student selected, not all students appear as both interlocutor (non-presenting participant) and presenter in the data. A breakdown of individual samples in the data can be seen in table 8 below.

Table 8.

Number of recording samples as both interlocutor and presenter.

Participant (S1-S14)	Gender	Recording samples (Presenter)	Nationality	Recording samples (Interlocutor)	Recording samples (Total:18)
S1	Female	1	JP	1	2
S2	Male	3	JP	7	10
S3	Female	1	JP	4	5
S4	Male	2	JP	7	9
S5	Female	2	JP	2	4
S6	Female	1	JP	4	5
S7	Female	1	JP	1	2
S8	Female	2	JP	5	7
S9	Male	1	JP	1	2
S10	Male	2	JP	7	9
S11	Female	1	JP	2	3
S12	Female	1	JP	5	6
S13	Male	0	JP	2	2
S14	Male	0	CH	6	6

A number of PSMS were either not found (approximation, complete omission, grammatical substitution and reduction) or very rare (use of all-purpose words, feigning understanding, other repair). There was wide variation on the kinds of PSMS used by individuals, particularly in their participation as both presenter and interlocutor, as can be seen in Figures 4 and 5.

Figure 4.

Average frequency of PSMS per task as presenter

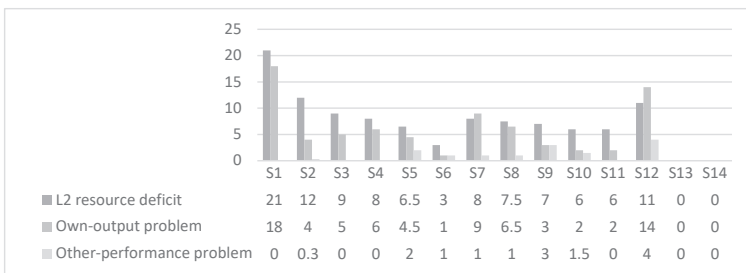
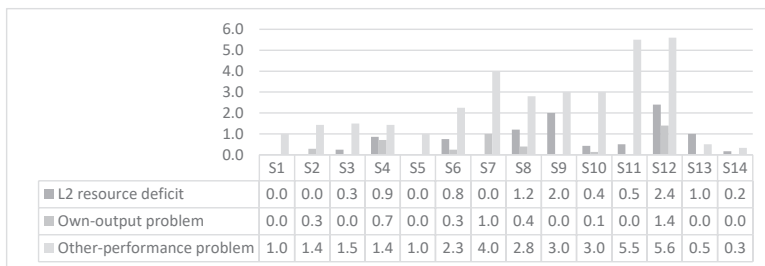


Figure 5.

Average frequency of PSMs per task as interlocutor.



Immediately apparent is the effect the task role had on the data. As presenters and discussion leaders, participants demonstrated relatively frequent problems communicating complex ideas and issues from the TED Talks they chose to speak on, despite the ability to self-select those talks. To compensate for these difficulties, L2 resource deficit and own-output problem PSMs were employed. On the other hand, ‘listeners’ were far more likely to employ other other-performance PSMs as they attempted to negotiate understanding of the ideas the presenter was communicating. Still, one third of participants (5 out of 14) demonstrated no examples of PSMs as interlocutors. Also, standing out from the data is the fact that participant 1 accounted for the greatest number of L2 resource deficit and own-output PSMs as presenter while failing to register a single other-performance PSM as interlocutor. It is no doubt also significant that this participant had lower TOEIC scores and was noted as one of the lower-level students by the teacher. Participant 1 clearly struggled as presenter, relying relatively heavily on PSMs. It would seem logical to assume that a lower speaking level, and perhaps a resultant lack of confidence, also resulted in her curtailing contributions as interlocutor.

Code-switching accounted for a relatively small percentage of the total PSMs categorized, for a total of 60 instances in a total of 496 examples of

PSMs. Broken down into examples of code-switching at the sentential (1 example), phrase/clausal (10 examples), and word level (49 examples) it became clear that the majority of the instances of code-switching involved negotiation of meaning at the word level resulting in negotiations that were carried out primarily in English. (See appendix 2 for examples of code switching at each level.) This is probably, in part, due to the fact the All-English contract, as explained by the teacher, encouraged translations of vocabulary in English rather than relying on code-switching of entire sentences. (*How do you say Japanese word in English?* was explicitly included as an English rather than a Japanese interaction.)

Conclusion

By and large, the taxonomy of PSMs proposed by Dornyei and Kormos was able to account for the data. However, the focus on lexical PSMs overlooked relatively common, and important, non-lexical strategies such as gestures and drawing pictures. The spelling of words, where pronunciation issues arose, was also a useful substitution PSM that resulted in successful communication. The fact that some PSMs were either not found (complete omission and reduction) or very rare (feigning understanding, phonological and articulatory substitution/reduction) could be a result of the primarily conversation analysis approach taken. Without consistent and open input from participants these strategies would be very difficult to impossible to count. This would particularly apply to content reduction strategies. To adequately count the number of instances of message abandonment or reduction would require consistent and in-depth feedback from participants, which was not practical in the current study. Similarly, without consistent participant input it is difficult to impossible to distinguish between errors and PSMs such as grammatical substitution and reduction. The absence

(approximation, grammatical substitution and reduction) or rarity (use of all-purpose words, other repair) of other PSMs may be also indicative of a more general scarcity, either in the Japanese EFL context or more globally. Cultural constraints on saving face could make the use of PSMs such as other repair less likely. Similarly, a Japanese cultural emphasis on avoiding errors could make conscious strategies such as grammatical substitution/reduction and use of all-purpose words less common. In fact, distinguishing between conscious and unconscious errors is problematic at best, and the willingness to make errors in the pursuit of communicative success would probably be more practically categorized as a general CS rather than counted as individual instances of PSMs. To account for the data, table 9 below shows an adapted taxonomy of PSMs related to resource deficit problems which more accurately and parsimoniously categorized the PSMs evident.

Table 9.

Adapted taxonomy of problem-solving mechanisms related to resource deficit problems

Lexical PSM	Content reduction	Message abandonment Message reduction Message replacement	
	Substitution	Spelling Code switching Approximation	
	Macro reconceptualization	Use of all-purpose words	Elaboration
	Micro reconceptualization	Restructuring Circumlocution	Example
	Appeals for help		

		Direct appeals for help Indirect appeals for help
Non-lexicalized PSM	Visual aids	Show/draw pictures Gestures
Phonological and articulatory PSM	Phonological retrieval	Tip-of-the-tongue phenomenon

By and large, the taxonomy of categories of PSMs related to perceived deficiencies in one's own output and other performance problems adequately described the PSMs found in student-student interactions. Comprehension checks accounted for just over 50% of the total number of PSMs related to own output problems while the least encountered PSM, own-accuracy checks, still accounted for 7.6% of the PSMs in this category. Feigning understanding was relatively rare (only 3 examples were found) but, for reasons already discussed, was probably under-represented in the data.

There were some indicators of an inverse relation between the use of PSMs and language levels and confidence. It would seem fair to speculate that certain linguistic PSMs demand a minimum level of grammatical and discourse competence. Additionally, where a learner concludes, consciously or not, that negotiation of meaning would be unduly problematic or unlikely to succeed, 'let it pass' negative strategies would display some degree of social competence. This would imply that an inflexible focus on positive CSs and PSMs could be unprofitable in the EFL classroom.

In a relatively ideal EFL classroom, with small numbers of relatively advanced and motivated students in an environment that encourages negotiation of meaning in English, it seems apparent that students in an EFL context can negotiate complex ideas and content without a heavy reliance on code-switching. Still, the extent to which individual students chose to use PSMs to negotiate meaning varied widely, apparently influenced by language level, confidence, and by other factors such as personality. The primarily conversation analysis approach taken in this research, makes it difficult to speculate in detail about levels of comprehension, but it seems safe to assume that students were sometimes electing to remain silent despite a lack of comprehension, employing 'let it pass' strategies. Further research could investigate the extent that overt instruction of CSs, including PSMs, has on the extent to which students displayed the willingness to negotiate meaning.

The almost complete absence of PSMs on the ST (sharing a story or experience) raises questions regarding the interplay between task design, task difficulty, student level, and the use of PSMs. Both tasks had elements of positive interdependence and individual accountability that should encourage negotiation toward the successful communication of meaning. Does task freedom, in either content selection or task design, typically mean students self-select content to avoid problematic exchanges? The fact that the report stage of the task, where a randomly selected student would relay information about what they had learned about their partners to the teacher, typically involved PSMs initiated by the teacher to achieve communicative success might suggest that the lack of PSMs indicates choices at the meaning negotiation stage as well as the message selection stage. Would a more rigorous structure of accountability, such as written reports, lead to more meaning negotiation? Conversely, this could also lead to less risk taking in the content the participants elected to share in order to avoid problematic exchanges. Would the overt teaching of CSs and PSMs encourage students towards more risk-taking in the selection of linguistic content, and their

willingness to negotiate meaning? Is the relative prevalence of PSMs in the TTT indicative of a productively challenging task, or a sign that participants may be linguistically overwhelmed? While admittedly a subjective opinion, the author (and teacher) believes it is more likely to be the former than the latter, particularly where students are aware of the complexities of L2 meaning negotiation. It would be interesting to further research student impressions of the same. Do interactions involving the use of PSMs, even where successful communication is achieved, result in less positive reactions from the participants themselves than interactions that require fewer or no PSMs?

In an EFL environment, where classroom interactions account for the majority of L2 interactions, the use CSs and PSMs to negotiate meaning would seem to have important implications for the development of communicative competence that prepares students for real world L2 use. As argued at the outset of this paper, at some point in a learning career it is critical that students develop the skills and confidence to employ PSMs beyond code-switching. In relatively ideal contexts this research provides some support for the conclusion that this is certainly an achievable goal. This research has also taken tentative steps toward an adapted taxonomy of PSMs that might be more descriptive of the problem-solving behaviors of student-student interactions in these contexts.

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Appendix 1.

All English Contract

Name _____ Student Number _____

Class 1: ***I spoke only in English from the beginning of class to the end of***

class. (Circle one) YES NO

(If yes) Your signature _____ co-

signature _____

Class 2: ***I spoke only in English from the beginning of class to the end of***

class. (Circle one) YES NO

(If yes) Your signature _____ co-

signature _____

Class 3: ***I spoke only in English from the beginning of class to the end of***

class. (Circle one) YES NO

(If yes) Your signature _____ co-

signature _____

Class 4: ***I spoke only in English from the beginning of class to the end of***

class. (Circle one) YES NO

(If yes) Your signature _____ co-

signature _____

Class 5: *I spoke only in English from the beginning of class to the end of class.* (Circle one) YES NO

(If yes) Your signature_____ co-
signature_____

Class 6: *I spoke only in English from the beginning of class to the end of class.* (Circle one) YES NO

(If yes) Your signature_____ co-
signature_____

Class 7: *I spoke only in English from the beginning of class to the end of class.* (Circle one) YES NO

(If yes) Your signature_____ co-
signature_____

Class 8: *I spoke only in English from the beginning of class to the end of class.* (Circle one) YES NO

(If yes) Your signature_____ co-
signature_____

Class 9: *I spoke only in English from the beginning of class to the end of class.* (Circle one) YES NO

(If yes) Your signature_____ co-
signature_____

Class 10: *I spoke only in English from the beginning of class to the end of class.* (Circle one) YES NO

(If yes) Your signature_____ co-
signature_____

Class 11: *I spoke only in English from the beginning of class to the end of class.* (Circle one) YES NO

(If yes) Your signature_____ co-
signature_____

Class 12: *I spoke only in English from the beginning of class to the end of class.* (Circle one) YES NO

(If yes) Your signature_____ co-
signature_____

Class 13: *I spoke only in English from the beginning of class to the end of class.* (Circle one) YES NO

(If yes) Your signature_____ co-
signature_____

Class 14: *I spoke only in English from the beginning of class to the end of class.* (Circle one) YES NO

(If yes) Your signature_____ co-
signature_____

Total number times you spoke only English in class: _____/13

Appendix 2.

Examples of code switching at the word, phrase/clausal, and sentential level

Word Level Code Switching

S2: *how do I say hikenshi hikensya in English?*

S4: *<1> hikensya ? </1>*

S14: *<1> hikensya ? </1>*

S2: *people who join in the experiment*

Bao: *yeah*

S4: *co-experiment*

S2: *uh maybe. So people who join in the experiment to see one of the ...*

S4: *(seconds later.) Sorry subject.*

S2: subjects. uh: I think so alright.

Phrase/clausal level code switching

(1) S5: If you're a giver, maybe you're all givers. DO you want to try five-minute favor? gofunkannoshinsetsu in Japanese.

(2) S12: Yes, like throwing (a) waste? throw a waste? gomihirou? <@>

Ah @@@ Yes. <@>

S5: <@> five minutes. <@>

Sentential level code switching

S3: Each moment of joy is very small, yeah. Bu:t over time, they added up to more than er(.) the sum of the joy. Yeah. In Japanese, it is chiri mo tsumoreba yama to naru?@@@@