Three modes of CALL communication

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Abstract
One aspect of CALL which has received little attention in both research into and design of multimedia language learning software is the mode of CALL communication. By this I mean who the software user is interacting with and how they are interacting. Most multimedia software is designed for a one learner – one computer mode of communication. However, modes where learners interact with each other either face-to-face with two learners sitting at one computer or over a network could be integrated relatively easily into most software. This study compares three modes of CALL communication, namely, one learner to one computer, competitive face-to-face pairs, and networked pairs. To conduct the comparison, a program involving a noughts-and-crosses (tic-tac-toe) game and multiple-choice questions on collocation was designed. Findings show that, in the two paired modes, learner-learner communication was impoverished, but that learners preferred these modes and were more involved in learning.

Historically, computer-assisted language learning (CALL) has passed through three stages (Warschauer, 2000). Initially, in the 1970s and 1980s, most CALL was structural and behaviouristic consisting largely of drill and mechanical practice exercises focusing on accuracy. This was followed by communicative CALL, which placed a greater stress on communicative activities and fluency. More recently, integrative CALL utilising multimedia and the Internet and featuring more authentic discourse has come to the fore. This last stage takes a socio-cognitive view of learning stressing the importance of social interaction for language development. Although this three-stage model provides a potentially helpful summary of CALL, the reality is much messier than this neat picture. Each succeeding stage has not replaced, but rather supplemented, previous stages, and frequently CALL exhibits features of more than one stage. For example, much multimedia software contains a mix of drills, communicative activities and authentic discourse.

More seriously for the three-stage model, a single CALL activity from one stage may have a theoretical base from another stage. For example, Roe (1985), discussing drill-based structural CALL, places a much heavier emphasis on social interaction than most recent work within an integrative CALL framework. In this paper, Roe compares different "layouts" (p. 73) for CALL, such as one-to-one, where a single learner interacts with a single computer; competitive pairs, where two learners compete against each other on a single computer; and collaborative pairs, collaborative groups, and multiple groups, where different groups communicate competitively or cooperatively over a network. These different layouts result in different patterns of social interaction with different potential impacts on learning.

From a speech act perspective, Roe is suggesting different modes and channels (Hymes, 1974; see also Coulthard, 1977; Munby, 1978) that can be used for

communication by learners engaged in CALL. In ethnographic theory, *mode* refers to the nature of the interaction and *channel* to the medium of communication. In the one-to-one CALL layout suggested by Roe, the learner is communicating with a computer as the only other participant; this involves a computer channel and pseudo-dialogic mode (with the exception of some artificial intelligence programs (see Watson Todd, 1999), learner-computer communication is rarely truly dialogic). In other layouts, learners are communicating with other learners in true dialogic mode as well as with a computer. The learner-learner communication can occur over three channels (face-to-face, via a single computer, and over a network) for purposes of either competition or cooperation. From an alternative viewpoint, the different layouts can be seen as using computers as tutors offering language drills, as stimuli for discussion, or as a combination of these (see Warschauer, 1996). In this paper, I will use the term *mode* to distinguish between the different layouts, methods of communication and uses of computers as this term is frequently used with a broad range of meanings as well as its specific meaning within ethnography.

The different modes of CALL have received relatively little attention in the literature. Most CALL work appears to assume one learner to one computer (albeit with network capabilities to other computers), despite the fact that in many situations it is still the norm for two or three learners to sit together at one computer (e.g. Mirescu, 1997). One reason for the lack of attention paid to pairwork or groupwork CALL may be that the seminal research in the area was not promising. Piper (1986), Windeatt (1986) and Mohan (1992) all found that learners working in CALL collaborative pairs produced less language, and that the language which was produced was more impoverished, than learners working in pairs with a paper-based version of the same task. In contrast, in recent years, networked modes of CALL enabling computer-mediated communication (CMC) have become a major research area. In such research, however, CMC is often contrasted with face-to-face non-CALL communication (e.g. Harrington & Levy, 2001) rather than with other modes of CALL communication.

Research into the modes of CALL communication could be of great value, particularly if applicable to multimedia software design. As the prime commercial application of CALL, multimedia software has the potential to lead the field, but frequently programs consist of tedious drills (Watts, 1997) and rely on a "wow" factor emphasising technical wizardry at the expense of language learning (Murray & Barnes, 1998). Given that multimedia software is almost exclusively designed for a one-to-one learner-computer mode of use, one relatively simple way to develop such programs is to incorporate other modes of communication into the software. Without a research base to work from, however, it is unclear whether such program development would be worth the effort.

In this paper, I intend to compare three different modes of CALL communication, namely, one-to-one learner-computer, competitive face-to-face pairs, and competitive networked pairs. These three modes will be compared using the same language learning activity, and I will investigate how the learners communicate and their reactions to the different modes.

The program
In order to be able to compare the different modes of CALL communication, we need a program in which the basic activity of the program remains the same irrespective of

mode, yet which also encourages users to exploit different modes where these are available. The program should also exhibit the criteria for effective CALL software design, such as those suggested in guidelines for CALL designers (e.g. Hemard, 1997; Otto, 1988) and software evaluation checklists (e.g. Bader, 2000; Murray & Barnes, 1998; Watts, 1997).

To meet these requirements, it was decided to design a program specifically to compare the different modes of CALL communication. For ease of design and to allow corrective feedback, the basic user activity in the program is to answer multiple-choice questions. To increase user interest and motivation, these questions are related to a noughts-and-crosses (tic-tac-toe) game, whereby the user can only insert a nought (0) or a cross (X) into a square of their choice on the noughts-and-crosses board if the multiple-choice question is answered correctly. Further aspects of the design aim to exhibit as many of the criteria for effective CALL software as is feasible:

- To maximise the match between language focus and activity type, the focus chosen is collocation which can be practised through multiple-choice.
- Collocation is also a language focus which matches the needs of the target users, Thai university students.
- To enable practice of collocations, multiple-choice gap-fill exercises are used.
- To promote learning, especially where incorrect distractors are chosen, corrective feedback is given.
- Where possible, the feedback should be generalisable (for some collocations, especially those in formulaic phrases, this is not possible).
- To enable some user control over the program, the 150 collocation items are classified into six categories (e.g. formulaic conversational phrases, collocations of verbs). Users can choose which categories to practise.

The basic activity then is a noughts-and-crosses game for which users must answer multiple-choice gap-fill questions correctly to fill in squares. Corrective feedback on the users' answers is given. This basic activity was then designed in three different versions for the three different modes of CALL communication being investigated.

Mode 1: One-to-one learner-computer
In this version, a single learner completes the activity alone playing against the computer. The learner and the computer take turns choosing squares on the noughts-and-crosses board and answering questions. The computer answers all questions correctly but chooses noughts-and-crosses squares at random to give the learner a chance. Figures 1 and 2 show the two main interfaces for this version. Figure 1 is the noughts-and-crosses board. When a square is chosen by either the computer or the learner, the interface changes to the question interface shown in Figure 2.
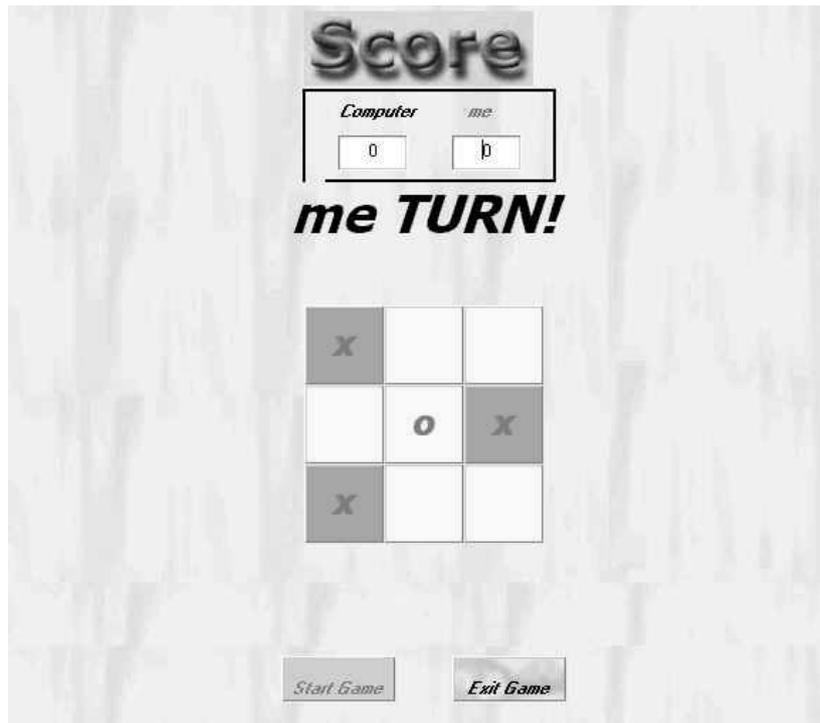
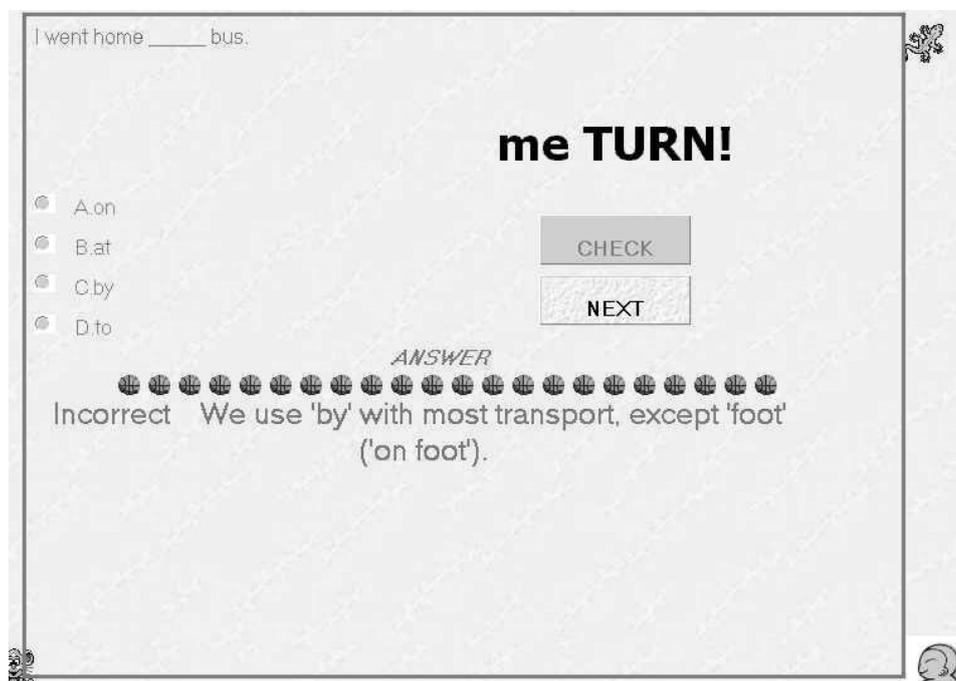**Figure 1: Noughts-and-crosses board in Modes 1 and 2**

Figure 2: Question interface for Modes 1 and 2

Mode 2: Competitive face-to-face pairs
Mode 2 is similar to Mode 1 except that two learners sit at one computer and play against each other. They take turns choosing squares and answering questions, and have the opportunity to communicate face-to-face with each other while playing. They are therefore communicating both via the computer screen in choosing squares

and answering questions and orally in face-to-face interaction. The interfaces are similar to those for Mode 1, shown in Figures 1 and 2.

Mode 3: Competitive networked pairs
Unlike Modes 1 and 2, Mode 3 requires two networked computers. Two learners each sit at a separate computer and play against each other over a network. In addition to choosing squares and answering questions, there is also a chat facility so that the learners can engage in real-time networked communication. This chat facility was designed to accept English characters only, meaning that the learners could not use their first language (in this study, Thai) to communicate. All aspects of the program – the noughts-and-crosses board, the chat facility, the questions, and the feedback – were included in a single interface. A screenshot of this interface is given in Figure 3.
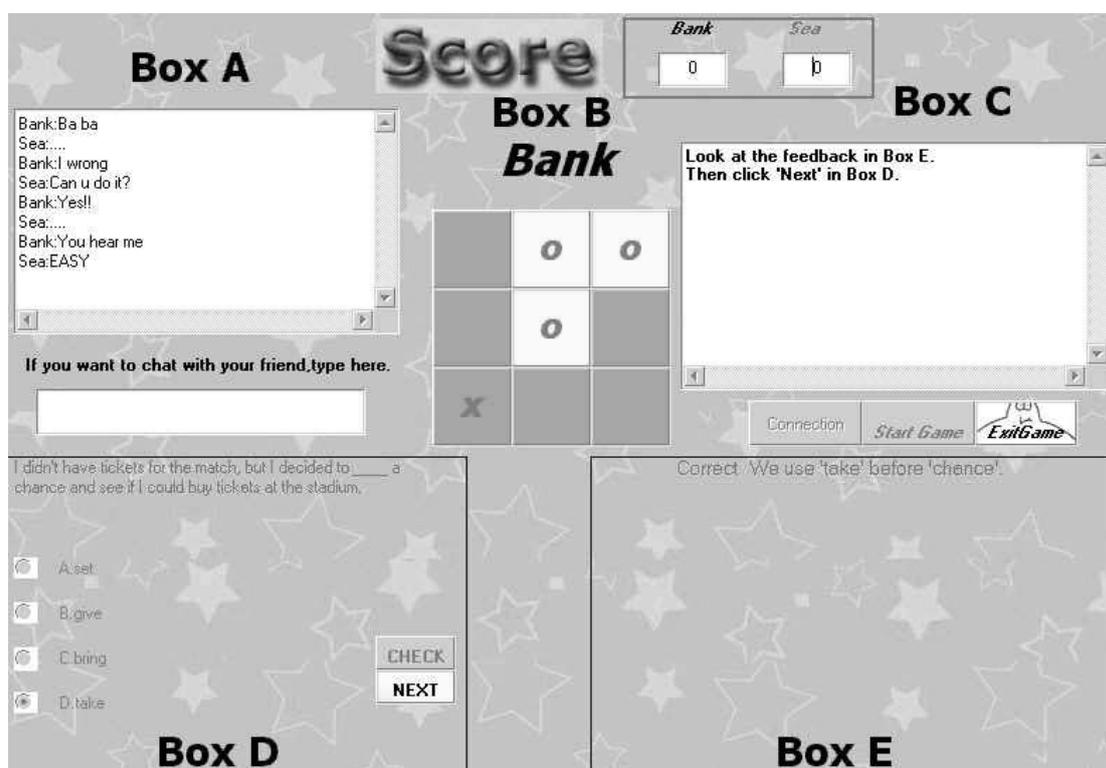

Figure 3: Interface for Mode 3

The three versions exhibiting the different modes were incorporated into a single program, allowing users to choose the mode they wished to use. The program was written using *Visual Basic 6.0*, and can be downloaded from http://arts.kmutt.ac.th/SLA/XOgame.html. (It should be noted that some basic technical knowledge is required to run the program, especially the Mode 3 version.)

The study
In order to compare the three modes of CALL communication, twelve learners were asked to use all three versions of the program. The subjects were all first-year computer engineering undergraduates at a respected Thai university (11 male, 1 female). They all volunteered to take part in the research.

The subjects were divided at random into three groups of four. Each group worked through the three versions of the program in a different sequence, since the sequence may affect the subjects' preferences for the modes. After experiencing all three modes, the subjects engaged in a free session where they used whichever version of the program they wished to play further.

Data concerning the three modes of CALL communication were collected in three ways:
1. After using the three versions and before the free session, the subjects were asked to fill in a form listing the advantages and disadvantages of each version.
2. The versions of the program chosen by the subjects in the free session were noted. It was assumed that these were the preferred versions.
3. For the third of the three versions used before the free session, *Lotus ScreenCam* was used to record how the subjects used the program and the subject-subject communication. *Lotus ScreenCam* is a program which, in effect, makes a video recording of what happens on the screen during the recording period. Thus it can record the whole of the noughts-and-crosses game with subjects' answers to the multiple-choice questions and the subjects' interaction through the chat facility. In addition, while recording using *Lotus ScreenCam*, subjects were asked to wear microphones to record any oral comments they might want to make for Modes 1 and 3 and to record the face-to-face communication between subjects in Mode 2. These recordings can be overlaid on the video recordings in the *ScreenCam* file. In this way, some subjects' reactions could be recorded and subject-subject communication could be related to the use of the program for Modes 2 and 3.

Reactions to the three modes

Before we look at how the subjects communicated through each of the three modes, we can examine their attitudes and reactions to the modes. The main source of data concerning these is the forms for listing advantages and disadvantages of each mode. Table 1 shows subjects' answers on the forms.

Table 1: Subjects' reactions to the three modes

Mode	Advantages	Disadvantages
1	- Challenging with computer - You can play it every time you want - Funny - Practice my English - I must be try to play carefully because I'm a living - Can play from one person - You must winner because the computer never wrong - Can play only one on my home - Practice grammar - The computer is correct all the answers, so the player can learn - I can play the game by myself	- The computer is stupid than me - Computer is clever in answering questions but it's not clever in playing game, it cannot think what box it want to select - Computer plays not so good but it's never answered incorrectly - Not enjoy - Because of computer never answers incorrectly, some player would get bored - It's easy to win

2	• More interesting than play with computer • Can talk together sometimes it made suitable for 2 friend or lover • You can prove your skill • It's very interesting • Funny • Practice my English • Don't worry about the answer and so fun while playing • It's more excited than playing with computer • Enjoy more than computer • Fast, use only one computer for playing • More exciting than playing with computer • Have very funny with my friend • You can look at his answer • The program is easy to use and it's very clear showing who have to play that turn • It's very fun because I can play the game with my friend and I can see everything while we played the game	• I can help my friend to answer the questions because I can see and click it or told him to answer the questions • The interface of the program is not interesting • No comfortable to change turn • Have competition • Two people must use the same mouse – sometimes unconvenient • It isn't individual enough • It isn't comfortable • 2 people can talk together so sometimes they will give an answers for one
3	• The most interesting if have many people • You can practice your English so much because you don't scare another side's view • Funny • Practice my English • I can play with other • Enjoy • I think this version it work, I like it • Each person have own computer • I can play with other without getting off my seat • Can play from other place • You can chatting and typing • It's fast and allows players to chat together • OK! It's very fun too because I can play the game with my friend and I can chat too	• Sometimes I think I can chat to my friend so I can ask him for the answers • Hard to join the game to server • Have many competition • There's connection problem • Slower than other versions • Network have many problem, can't talk to player if network slow • There is some connection problem • Feel lonely • Hard to connection with other computer

Overall, the subjects' reactions to all versions of the program were positive, with the number of advantages outweighing the disadvantages. Furthermore, most of the disadvantages identified concern practical problems rather than criticisms of the program concept. It may be that these positive reactions are due to a novelty factor (Clark, 1983) – a common source of bias in evaluating CALL – but the subjects' high computer familiarity (as students of computer engineering) suggests that novelty should not be as important a factor as for learners with low computer familiarity. The competitive and fun elements of the noughts-and-crosses game therefore seem to make what is essentially a multiple-choice test more palatable.

Comparing the three modes, although the one-to-one learner-computer mode is generally received well, this mode compares unfavourably with the other two more interactive modes. For example, four of the subjects explicitly compare the one-to-one learner-computer mode with the competitive face-to-face pairs mode, favouring the latter. It is difficult to tell which of the two more interactive versions of the program is preferred, especially considering the practical problems of the competitive networked pairs mode. Nevertheless, overall, the two competitive pairs modes are preferred to the one-to-one learner-computer mode.

This finding is confirmed by the choices of program versions of the subjects during the free session of computer use. Ten of the twelve subjects attempted to use the competitive networked pairs mode during the free session, with the other two subjects using the competitive face-to-face pairs mode. When four of the subjects could not successfully set up the networked mode because of connection problems, they elected to use the competitive face-to-face pairs mode. During the free session, then, there was an equal split of subjects using the two competitive pairs modes, although there was an initial preference for the networked version. None of the subjects elected to use the one-to-one learner-computer mode, strengthening the finding that competitive pairs modes are preferred.

Communication in the three modes
In recording the last of the three versions played, four subjects were recorded for each mode. Looking at both the screen and voice recordings should shed light on the extent and purposes of communication between learners in the three modes, especially in the two competitive pairs modes.

For the one-to-one learner-computer mode, as should be expected, there was no learner-learner communication. Indeed, two of the four subjects recorded using this mode said nothing while playing the game. The other two subjects voiced very occasional comments and complaints about the game, such as "Why the question is so difficult?" and, translated from Thai, "Sometimes I can't understand the explanations". Such occasional intrapersonal comments, however, cannot really be considered as communication and shed little light on the learners' reactions to the game.

For the second mode, competitive face-to-face pairs, the learners did talk to each other while playing the game. Extract 1 below is a typical example of such communication between two users, A and B, with translations from Thai indicated by italics and reading aloud from the computer screen in double quotation marks.

Extract 1: Communication in the competitive face-to-face pairs mode
A: "I think I'm bad ... English." Bad on, bad for, bad to, bad at. *I'm sure I'll get this wrong*. "Incorrect" *really*. "Bad is usually followed by at". *I said I'd get it wrong*.
B: "The train leaves ... ten minutes". I don't know. *Must be* leave in.
A: "I got a new computer ... my birthday". *Choose* on. "Correct".
B: *I've already answered this one. Got it wrong again.*
A: "Tom: What did you do last night? Jane: ... your own business." Keep *surely*. "Incorrect. You can say Mind your own business when you don't want to answer a personal question." *Wrong like normal*.

In extract 1, two worrying points are noticeable. Firstly, the two learners do not appear to be communicating with each other much. Secondly, the vast majority of their utterances are either in their first language or simply read aloud from the computer screen. The extract would therefore seem to confirm the early research into CALL pairwork, which found that pair interaction produced little language and that which was produced was impoverished.

Let us now turn to the third mode, competitive networked pairs. In this mode, learners used a chat facility to communicate with each other while playing. Extract 2 shows the chat-based communication between two learners, C and D.

Extract 2: Communication in the competitive networked pairs mode
C: Who are you?
D: Hello.
C: OK.
D: D [types own name]
C: He he he.
C: Ah!
C: You turn.
C: Now.
C: You got easy one.
D: Oh oh!
C: No my turn.
C: Oh!
C: Ah!!!
D: I think may be in this we can't find the winner.
C: Ha!
C: Yes, I can do it.
C: OK.
C: You turn first.
C: Ahhhhhhh!!!

As in extract 1, the language in extract 2, although in English given that the chat facility did not accept Thai characters, is clearly impoverished. Only one learner turn is longer than five words and most are simply exclamations.

The overall picture of communication is not promising. In all three modes, learner-learner communication is limited and impoverished. Arguments in favour of using

paired CALL because of the opportunities for learner-learner communication would therefore seem not to apply to programs similar to the one used here.

Process of using the competitive networked pairs mode
Somewhat unexpectedly, one of the learners recorded while using the competitive networked pairs mode (learner D in extract 2) spoke a lot while playing the game. Examining the recording, the learner's talk appears to be a concurrent think-aloud protocol (see Ericsson & Simon, 1993) while playing the game, despite the lack of training concerning introspection in this study. Although such introspection was not an aim of this study, the learner's think-aloud protocol may shed some light on the program and part of it is shown in extract 3 (using the same conventions as in extract 1).

Extract 3: Think-aloud protocol for the competitive networked pairs mode
D: *Start now* "version 3" *it says type in* "Box A chat with your friend" *and put in a* "username". *Not really sure what's happening. There's a square with nine boxes for putting in crosses. I'll need to choose a box but I don't know which one I want. It says I need to put in an* "IP Address" *and* "Please wait for your friend to respond" Who's that? "Click connect to server. OK Your turn. Did you look?" OK, after *means take care of.* OK. *Click* "Next". "You should try to ... a positive effect on society in your life". *Bloody difficult and so bad. I need to guess. I need to try or else I'll lose points. Too bad.* "Incorrect. We use have before effect." OK *Not good, D* [own name]. "Jane: I won my race. Tom: Good ... you." *Bad news, very bad news. What should I go for? This is hurting me. I'll have to guess. Ow, the answer gives you knowledge too. Hey, I got it right. He's going to win now, bad news, don't answer* "on" *please. We'll get some points. Bad, bad, he's answered correctly again.*

Although the think-aloud protocol in extract 3 does not explicitly state the learner's reactions to the program, it does show how immersed and involved he was in the game, especially how the competitive element against a peer motivated him. This provides support for the earlier finding that the competitive pairs modes may be preferable to the one-to-one learner-computer mode.

Conclusion
There are two possible rationales for using paired CALL modes. Firstly, it could be argued that paired CALL encourages learner-learner interaction while using CALL software. On the basis of the present study, this rationale does not hold water, as the language produced in the paired CALL modes was minimal and impoverished. If we want CALL software to encourage learner-learner interaction, we will need to consider assigning student roles and the other options available to classroom teachers wanting to stimulate interaction (James, 1996). Simply adding the opportunity to interact to a CALL activity is not enough.

The second possible rationale for paired CALL is that the learners may prefer it, and this appears to be the case in this study. The learners' reactions to the paired CALL modes were more positive than to the learner-computer mode, and knowing that you are competing against another person may lead to more learner involvement than competing against a machine. If one reason for using CALL is that it can be interesting and motivating (Mirescu, 1997), then the greater potential interest in

paired CALL suggests that multimedia software programs should utilise paired modes of CALL communication in addition to the default learner-computer mode.

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