

Costello in Action: Reflections on a CALL-Based Course

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(Received October 26, 2007)

Introduction

As explained in an earlier paper (Hobbs, 2005), *Costello* is a text-based virtual reality computer game for language learners, originally developed by Adrian Cohen and used as a supplementary reading/writing resource at Iwate Prefectural University from 1998 to 2005 (Cohen, 2000; 2001). Perhaps best conceptualized as a virtual graded reader, the software engages learners in a series of interactive quests (i.e., adventure stories) at the pre-intermediate to intermediate level, with the development of each quest, or at least the route to the quest's conclusion, depending on how the player reacts to each development in the story. The software is the centerpiece of *Costello: Quest-based Learning* (Cohen & Hobbs, 2005), a package combining eight computer-based quests with a classroom textbook that focuses on the language featuring in each quest. Arguably this represents a radical and innovative approach to Computer-Assisted Language Learning (CALL). In *Costello: Quest-based Learning* the computer adds an exciting new interactive dimension to the learning experience, but lessons still feature healthy doses of the learner-learner and teacher-learner interaction that many regard as a vital ingredient in the language classroom.

In this paper we discuss the ongoing experience of one of the current authors (Unher) in using the package with a group of Japanese university students, and reflect on the results of a questionnaire given to the students at the mid-way point of the course. We note a range of issues, in particular that of class size, that may affect the success of the materials, and also identify flaws in the current questionnaire that will need to be addressed when compiling an end-of-course questionnaire. We conclude with an outline of plans for further research based on the current group of learners.

Context: The *Costello* Package, the Course, the Learners

Costello in a nutshell

The original *Costello* program is essentially a virtual fantasy world in which players acquire points and gain status by completing the various quests they encounter as they explore the *Costello* world. In the early stages of the game these consist mostly of simple errands, such as delivering something to

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someone, finding something, and so on. In the original software a typical text window looked like this: The text tells the player 1) where they are and what they can see, 2) which directions they can move in, and 3) what objects or people they can interact with at this location. In addition to reading the

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This old humpbacked bridge crosses over the river Cos flowing below. The
river is shallow here and makes you feel peaceful and relaxed as it flows
over the stones at the bottom. You can see a few fish sunning themselves in
the shallow water. Next to the river, to the north, is the village park.
    Obvious exits are east, north and west.
You see a small stack of gold coins and a brass lantern.
>
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description, the player can also hear it being read by a native speaker. The player then enters a suitable command in the text box at the bottom of the window. The player might choose to move to a new area (e.g., “Go east”), look more carefully at an object or character (e.g., “Look at the bridge”), or interact with a person or object (e.g., “Take the lantern”). The typed commands appear on the screen, followed by the computer’s responses:

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> Look at the bridge
The bridge looks very old, but it is safe enough.
> Look at the lantern
An ordinary-looking lantern, of good quality that will help you to see in
dark places. You can light it and extinguish it. There is also a hole so
that you can refuel it from a flask of oil. It is not lit. It is full.
> Take the coins and lantern
You pick up ten coins.
You take the brass lantern.
>
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The player might then move on to explore a new area, but now with the added ability to see in dark places (by lighting the lantern), or to buy items for sale (using the gold coins).

The same core software was used in the development of *Costello: Quest-based Learning* (Cohen & Hobbs, 2005), but significant changes were made to produce a package that meets the needs of teachers who want a core teaching package for a one- or two-semester course:

- The web-based format was replaced with a stand-alone Mac/Windows CD-Rom.
- The single, vast Costello world (with over 50 quests and some 10,000 places to visit) was replaced with eight completely new, self-enclosed quest areas. Each quest was designed to be completed in roughly 30-90 minutes, depending on the language ability of the learner and the speed at which they adapt to the system of commands.
- An accompanying textbook was written to present learners with a range of tasks to be performed before, during, and after each quest, allowing for a balance between “computer time”, during which learners’ attention is focused entirely on meaning, and “textbook time”, consisting mostly of discussion and language-focus activities.

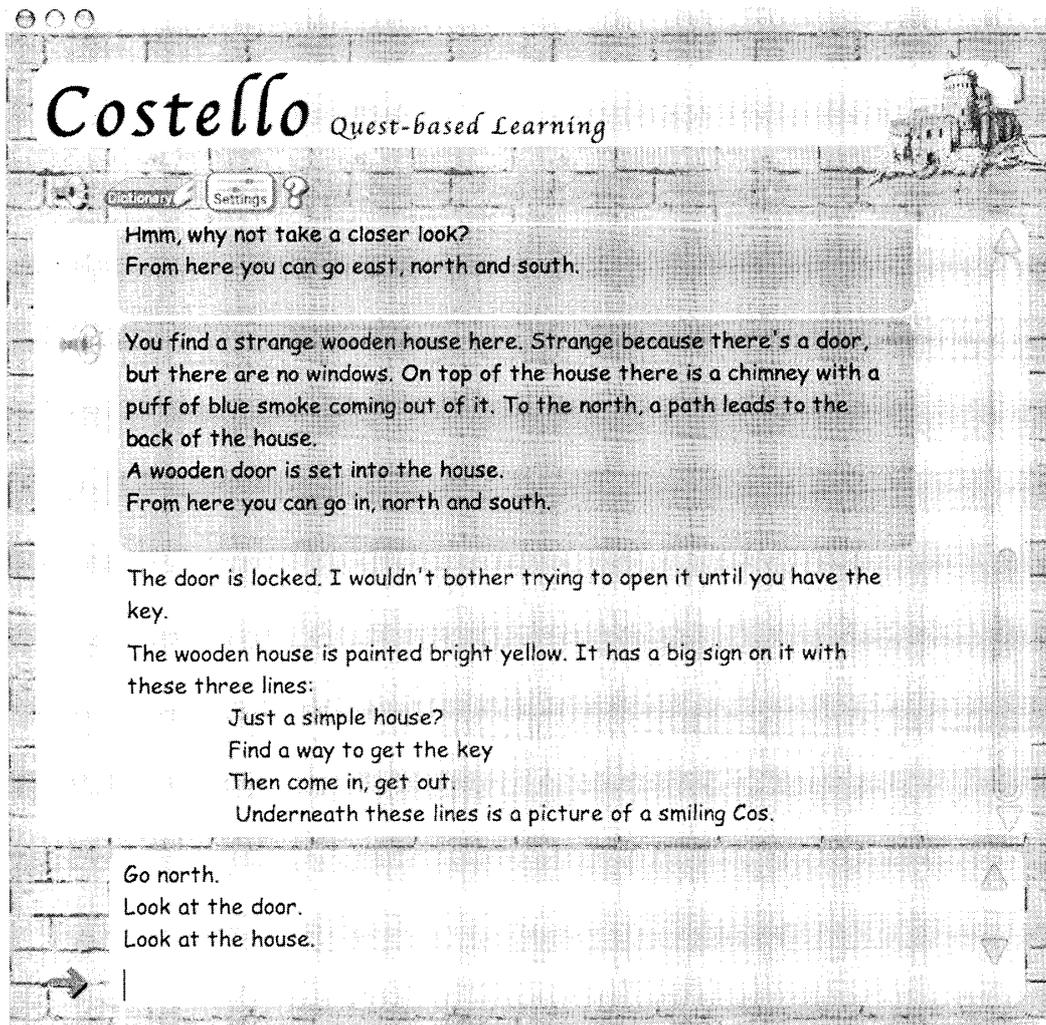
- The quest areas were located in practical everyday settings associated with a range of common expressions and vocabulary: a college campus, a busy shopping street, an office, and so on.
- Whereas the language in the original game roams wherever the game takes it—often into the fantasy realm of castles, dragons, and knights in shining armour—the CD-Rom version is based on a more tightly controlled syllabus that provides extensive exposure to common and readily teachable structures, phrases, collocations, and vocabulary.

Recent developments

In 2006 *Costello* was given a major update, with improvements including the following :

- Vastly improved appearance incorporating a graphic user interface (i.e., clickable on-screen buttons).
- The choice of US or UK English, with the option of switching from one to the other at any time.
- The option of saving progress on a quest and continuing from the same point in a later session.
- Dual US/UK English audio to accompany area descriptions.
- Greater customization, with control over whether or not commands must be punctuated with capital letters and full stops, whether key information is highlighted in coloured text, etc.

Following this update a game window now looks like this (actual interface in full colour) :



The screenshot above is from the early stages of Quest 4, in which the player must locate and retrieve a key to enter the house described in the text.

August 2007 saw the release of a further improved CD-Rom, now offering online access to the original *Costello* game, with the same improved interface; fixes of known bugs in the software; and corrections of errors and ambiguities in the game text.

The course and learners

One of the authors (Unher) has been using the *Costello* package since April 2006, embedded in a more traditional LL 2-semester course. It is now used in conjunction with another textbook in a freshmen-level course entitled LL I and LL II Seminar, with students able to take either or both parts, as they choose. In the first semester *Costello* starts from the Tutorial, the absolute beginning. The second semester continues from where *Costello* left off in the first semester, although up to one-fifth of the students may be new students who also require basic instruction in using the software. Although most of the students are 1st-graders at the basic level, there have also been some 2nd-graders registered, and English proficiencies have varied among students and between semester sessions. Class size has varied from 15–35 students, and as the size of the class has varied so has the personality of the class as a whole, with smaller classes tending to progress faster in *Costello* in general.

The purpose of the course is to promote fluency in the language, particularly in the receptive areas of listening and reading. The focus is on teaching the learners to listen and read by attending to specific details, by scanning or listening for any salient clues in the text or aural material, and by drawing out meaning through whatever clues they can find. The class is conducted entirely in English and the use of a bilingual dictionary is strictly forbidden in class. There is one 90-minute class session per week, continuing for a total of 16 weeks per semester. *Costello* is used on average every other class meeting, with one quest and the accompanying textbook tasks spanning up to 4 class periods.

The pre-quest activity section in the textbook has typically been assigned for homework and then checked in class, at which point the students log-on and begin the quest. It is always necessary to remind them to refer to the book during the quest for quest-related information and accompanying tasks. Students then continue at their own pace for 1-2 periods, the slower ones being requested to catch up at home, and the early finishers being asked to go and help a slower student. After most have completed the quest the post-quest activities are studied in class. Tests created by the teacher, remedial in nature and designed to direct attention to problem areas or to details students may have missed, are also sometimes given.

Though it is a gradual process, the majority of the students come to feel at home with *Costello* by Quest 4. For some, *Costello* becomes somewhat easier beginning with Quest 2, and this frees the teacher up to work with those whose progress is slower. Use of pair work helps free the teacher up even more. As the success rate in learning improves for the remaining class members, the class begins to more closely resemble an independent student-centered lab.

Reflections of the Teacher

Why use Costello?

Costello offers an alternative to traditional teaching and the standard use of the computer as a teaching tool. Though the student basically works alone on his computer, he is kept in contact with others both via the textbook activities and by working on quests together with other students. As the main purpose of the class is communication and interaction, Costello works well, establishing a framework whereby individual reading is then shared orally with others. Although reading is a receptive skill, it is not a passive one: The reader must interact with the text in order for comprehension to take place. Likewise, each *Costello* quest is not a passive activity, but an interactive game that requires a large amount of reading. (Students can use the listening component in their own time, to reinforce pronunciation and intonation, but given that reading is central to this course they are not allowed to use the audio component while doing quests in class.)

The learning curve: Costello commands and the Tutorial

Costello begins with a Tutorial that teaches students how to use the software. However, although designed for independent use, the Tutorial itself has not proved to be sufficient for the current group of learners. Teacher guidance has been absolutely essential in the early stages. While repetition of the Tutorial might be expected to help learners overcome initial difficulties, the nature of the Tutorial—it is in essence just a set of instructions—means that it cannot engage the interest of the student for extended periods of time. One way to overcome this is to present the Tutorial on a large screen to the entire class, and have the teacher perform the tasks for everyone to view, eliciting opinions and suggestions from students along the way.

Although initial progress can be slow, most students acquire the ability to use the commands fluently somewhere between Quests 3 and 4, at which point the course can become an independent vehicle for the student. As observed by the teacher, this has a two-fold effect on the students. Firstly, students find the quests more satisfying, and so begin to do them in their own time. In addition, they become more interactive in class. It is as though they are now both enjoying it and learning from it.

Class size: The key factor?

In the traditional classroom, it is generally agreed, a low teacher-student ratio is the most desirable. The size of a language class usually correlates well with the amount of attention a teacher can focus on each student and most teachers will opt for the smaller size class given the choice. One might expect that an interactive, self-instructional course such as *Costello* would offer the teacher the freedom to have any size class. Surprisingly, that has not proved to be the case, and class management has turned out to be very difficult with larger groups, in particular in the early stages. Since students did not progress beyond Quest 6 last year, it is perhaps premature to state that class size may be less influential in the later quests, but this appears to be a reasonable assumption. As the students become more

familiar with the world of *Costello* and its rules, as is evident by around the time they enter Quests 3-4, they become more independent, and the need for teacher intervention decreases; at this point it may be safe to venture that class size becomes a negligible factor in classroom management.

The pros and cons

In summary, experience with *Costello* in the classroom suggests that it has both pros and cons. On the plus side :

- Mixed levels in the one-room schoolhouse: *Costello* has served as a unifying force by allowing successful pair work between a high level English-user and a lower level language learner. Pairing off has also been of assistance in cases where a student is struggling to grasp the key elements of the quest or the commands. Students who are good at computers and like computer games often come to the rescue of those having trouble, and all truly appear to enjoy working together.
- Peer guidance: Although pairing off slows down the progress of the faster-paced students, most of them have shown eagerness and even pleasure in tutoring others, in a way that would be hard to envisage in a typical reading class. The atmosphere becomes a lot like a one-room schoolhouse where all school graders work under one roof and the older children help the younger, much akin to the sempai-kohai relationships formed in Japan.
- Motivation: The computer-based quests seem to be motivating to the majority of students who regularly work with computers or want to learn to use them. The quests are an entertaining way of increasing familiarity with keyboards and basic functions of computers. Even students who do not particularly like computers tend to appreciate *Costello* by virtue of its puzzle-like nature. Quite simply, it is fun.

On the negative side :

- Learning rate: Once the students have acclimated themselves to the game and its commands and strategies, there appears to be a relatively fast rate of progress. Until that is achieved, however, progress is slow, and the experience can be frustrating for some.
- Guidance level: This course is designed to be self-instructional and by all appearances, one would expect just that. Unfortunately, this is not always the case. Many students require teacher or peer guidance continuing for several quests. This is a problem if the class is large because the teacher may be unable to respond to all the appeals for help. Experience at this institution suggests that the ideal student-teacher ratio is no more than 15:1, and that lower is better.

First-semester Questionnaire

Outline of the questionnaire

Towards the end of the first semester students were given a questionnaire intended to elicit

information about their attitudes to various aspects of the course (Appendix A). The questionnaire was constructed to obtain maximum information from basic level English users, thereby compelling the authors to use simple structures and vocabulary. Although the questions were written in English, the students were given the option to respond in either English or Japanese. There were two parts to the questionnaire: a set of multiple-choice questions based on the Likert scale of 6 levels of agreement/disagreement, and a set of short-answer questions to which a student could give a more detailed response. For simplicity, the first question in part one is identified below as simply *item 1.1*, the fifth item in part two as *item 2.5*, and so on.

Flaws in the making

However good the intentions of the composer, the perfect questionnaire is difficult to design, and ours was no exception. There appear to be two basic problems with the questions. One problem is founded in vocabulary or meaning and the other in structure or form. In some cases the authors are clearly at fault, but in others students misinterpret questions in ways that would have been difficult to anticipate. A brief look at some examples will reflect the problems more clearly.

(i) Vocabulary and meaning

In items 2.2 and 2.3 the phrase “How long does/did it take ?” is used. We had hoped to learn how many minutes students required to complete a quest, but responses included general comments such as *too long*, together with the more specific, but equally unhelpful, *3-4 weeks or twice*. The poor choice of words was clearly to blame; the question should have been more precisely phrased to ask how many *classes* or how many *minutes/ hours*.

Another type of problem is evident in items 2.8 and 2.9, which ask students about their favourite/least favourite parts of *each quest lesson*. This crucial final part of the question was ignored by virtually all respondents, so responses identified the number of a specific quest rather than a part of that quest chapter. It is somewhat unclear what to do to avoid this problem in future, although the use of bolded type for key words may help convey the meaning to low level non-native speakers of English. Simply giving the questionnaire in Japanese is obviously another alternative.

(ii) Structural

Item 2.14 is an example of a multiple-task question, with two parts designed in the space of one. However, there were no corresponding answer spaces, making it difficult to identify which of the two questions a given response referred to. This is a clear design flaw. Similarly, in items 2.6 and 2.7 the either/or question was generally interpreted as a yes/no question. Perhaps such questions should be avoided with basic-level English learners. Instead, the use of a multiple choice question, whereby the student selects *a, b, or c*, would be more suitable in future questionnaire construction. Some other inconsistencies are discussed in the analysis of student responses that follows.

Analysis of student responses

Despite the design flaws discussed above, the questionnaire yielded valuable insights into students' opinions regarding the use of computers in class, the *Costello* quests, and the textbook. A summary of responses to the Likert scale questions is given in Appendix B, and the responses to the questionnaire as a whole are discussed below. In total 30 students completed the questionnaire, but responses that could not be understood have been omitted from the data: For example, regarding whether or not the quest storylines are interesting, one incomplete response read "I think storylines", a reply that is difficult to interpret either way. As a consequence, the number of respondents referred to in respect of a particular question is sometimes as low as 25.

i) Overall trends

From the results at least three clear trends can be identified: positive attitudes to computers and the course, the perceived difficulty of the materials, and a preference for working with classmates rather than alone.

- Attitudes to computers/ the course: It was clear that students approached the course with generally positive attitudes towards computers, 20 of 30 respondents reporting that they *strongly agree or agree* that they like computers (item 1.1), and only 4 expressing a negative opinion. Students were less sure that they liked computer games, fewer than half agreeing to any extent, none agreeing strongly, and a significant minority (9) expressing a dislike of computer games by answering *disagree or disagree strongly* (item 1.3). But there was still a strong sense of satisfaction with the course as a whole, only 3 respondents expressing any regret at having chosen this course (item 1.15), and 18 of 29 respondents signalling a clear intention to continue the course in the second semester (item 2.11). (This is not to say that there were no reservations: For example, several students expressed to the teacher the opinion that the class was too large, an issue that the questionnaire did not address directly.) There also appears to be a general sense of agreement that the pairing of a computer game with a textbook was a good idea (item 1.6), and encouragement can be taken from the fact that 20 of 25 respondents thought that the quest storylines were interesting (item 2.5).
- Perceived difficulty of the materials: Most students report that they sometimes get stuck (item 1.12), and find it difficult to complete quests without help (item 1.13), hence the low number of students who express a preference for doing quests alone (item 1.9). Clearly part of the problem lies in understanding how to use the commands, as a majority disagree that the commands are "clear and easy to understand" (item 1.10) and agree that the software is "difficult to use" (item 1.5). It may be that the English level of the materials is difficult for many learners (as responses to 1.7 appear to suggest), or it may be that the system of commands, or at least the way it is taught in the textbook, needs to be improved. Indeed, the teacher of this course had particular difficulty mastering the Say command (e.g., "Say hello"). When speech is required, most people's natural instinct is to type "Hello" rather than "Say hello", but this problem does not arise with commands such as *look at* and *take*: If a player wants to look at a door, they instinctively type "Look at the door", as required.
- Working with classmates vs. working along: There is a clear preference for doing quests during class rather than at home (item 1.8), and this seems to be confirmed by the part two responses, with 20 of

28 respondents expressing a preference for doing quests together with a friend and only 3 a preference for doing them alone (item 2.1), and 22 of 30 respondents reporting that they perform better when working with a friend (item 2.10). While perhaps partly a simple reflection of limited access to computers outside class, this is probably more closely connected with the perceived difficulty of the materials, discussed above.

ii) Reading between the lines: Interpreting responses

Although much can be learned from analyzing the students' responses, there are also many questions that remain unanswered. As mentioned earlier, the question *What are your favourite parts of each quest lesson?* was misinterpreted. For question 2.7 (*Is Costello interesting, challenging, and/or enjoyable to do?*) over half the respondents reported that Costello was interesting, but it seemed that many had mistakenly thought that they were required to simply choose one of the three words rather than (as was our wish) express an opinion about the whole statement. Indeed, what at first glance appears to be a strong feeling that Costello is interesting, does not gel with the somewhat lukewarm reaction to the statement *Learning by Costello is fun* (item 1.4). Likewise, the discouraging thought that the textbook activities do not do much to make the quests any easier, as is implied by responses to item 1.14, simply cannot be reconciled with the overwhelming agreement (23/30 responses) that *the tasks in the book help with the quest* (item 2.14). We can only speculate, but it is possible that the use of the word easier in 1.14 prompted many students to misinterpret the statement as saying simply *the textbook activities are easy*, in which case a trend towards slightly negative responses would make a lot more sense, and would be considerably less of an indictment of the materials themselves. We certainly introduced an element of confusion by inadvertently referring to *activities* instead of *tasks* in item 1.14, and this may have also been a factor.

Looking at individual students' responses, answer patterns are sometimes hard to identify. In most cases there is a fairly close correlation regarding liking/disliking computers, liking/disliking computer games, and finding Costello fun/not fun, but it is hard to know what causal relationships, if any, are at work: Do people like Costello because they like computers, or vice-versa, or is there no direct connection? Most likely it depends on the student. Greater problems regarding getting stuck during quests (item 1.12) are generally associated with greater difficulty in completing a quest without help (item 1.13), as would be expected, but the expected inverse correlations between understanding the commands and often getting stuck (1.11 and 1.12), and between often getting stuck and finding Costello fun (1.12 and 1.4), were not observed: Strangely, students tended to respond similarly to all three items, all three responses typically falling into either the *agree* (4~6) or *disagree* (1~3) range. Concerning the length of quests, only 2 students reported that quests were too short, the rest being equally divided on whether they are too long or just right (item 2.4), with the answer *just right* typically given by those who gave positive opinions throughout the questionnaire. It will be interesting to see if opinions about the length of quests change later in the course.

Reflections and Plans for Future Research

The first-semester survey revealed a range of trends in student opinions, some fully expected,

some less so, and it will be interesting to see how students fare with the materials, and how attitudes change, during the second semester. As mentioned earlier, it seems that most students come to feel comfortable with the commands system by around Quest 3 or 4, which is also roughly where the students reach by the end of the first semester. It is felt that they make faster progress in the second semester, and it will be interesting to investigate this more closely, together with if and how this influences attitudes towards the course and towards the software in particular. As most people who use computers would probably agree, when computers fail to respond as we expect them to it can be absolutely infuriating, and can leave one feeling utterly helpless. But once a program has been tamed, and its system of commands mastered, all those negative thoughts quickly evaporate and are replaced with the glow of satisfaction that comes with the feeling of being in total control.

Meeting the needs of the learners on this course is and will remain more important than answering the various research questions that interest us, and the teacher will not hesitate to try new approaches in the second semester, even if they limit the scope for scientific comparison of progress during each of the two halves of the course. For example, one idea under consideration for the second semester is to make more effective use of the classroom's video projector and give students a jump start on quests by beginning them as a whole class, and eliciting the first few actions/commands from students. Moreover, our scope for rigorous scientific enquiry is obviously restricted by the fact that *Costello* is only one part of this course: Progress is necessarily slower than it would be if *Costello* was the focus of the entire course, and at present there is no telling how this affects learning outcomes and attitudes to the course. However, it is certainly our intention to implement another detailed questionnaire at the end of the course, with the hope that this will provide some insights into how attitudes change during the course of the year, provide more details about *why* students like or dislike specific aspects of the course, and go some of the way towards answering the most important question of all: Does *Costello* encourage reading, and are learning outcomes superior to those that could be achieved using traditional printed materials alone? We look forward to reporting our findings at a later date.

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Appendix A : First-semester questionnaire

Part One : Read the following statements and write the number that best represents how you feel.

6=Agree strongly, 5=Agree, 4=Agree slightly, 3=Disagree slightly, 2=Disagree, 1=Disagree strongly

1. 1. I like using computers. ____
1. 2. I am good at using computers. ____
1. 3. I like computer games. ____
1. 4. Learning English by the Costello quests is fun. ____
1. 5. The Costello software is difficult to use. ____
1. 6. Using a computer together with a textbook is a good idea. ____
1. 7. The English in the quests is a good level for me. ____
1. 8. I prefer to do the quests during class. ____
1. 9. I prefer to do the quests on my own. ____
- 1.10. I think the instructions for doing Costello are clear and easy to understand. ____
- 1.11. I understand how to use the commands. ____
- 1.12. I often get stuck when doing a quest. ____
- 1.13. I can complete a quest without anyone's help. ____
- 1.14. The textbook activities make the quest easier. ____
- 1.15. I am glad I chose this class. ____

Part Two : Please answer the following questions in either English or Japanese.

2. 1. Do you like to do a quest alone, with a partner or friend, or as a class?
2. 2. How long did it take you to get to understand the commands and how to use them?
2. 3. How long does it take you to finish a quest?
2. 4. Are the quests too long, too short or just right?
2. 5. Do you think the quest storylines are interesting?
2. 6. Have you learned more or less from the Costello course than from classes with just textbooks?
2. 7. Is Costello interesting, challenging, and/or enjoyable to do?
2. 8. What are your favorite parts of each quest lesson?
2. 9. What parts do you least like?
- 2.10. Do you do better when you do a quest alone, with a friend, or in class? Why?
- 2.11. Do you want to continue with the quests next semester? Why or why not?
- 2.12. Have you tried the on-line version yet?
- 2.13. Do you ever want to try a quest that may not be done in class?
- 2.14. Do the tasks in the book help with the quest? In particular, which ones : the pre-exercises, the picture and related questions to use during the quest or the post quest activities?
- 2.15. Were the class tests hard? Did they help you understand more?

Appendix B : Summary of Part One responses						
Statement	Number of responses for each score					
	6	5	4	3	2	1
1. I like using computers	8	12	6	2	2	0
2. I am good at using computers	0	5	9	7	7	2
3. I like computer games	6	8	6	8	2	0
4. Learning by Costello is fun	3	6	11	7	2	1
5. The Costello software difficult to use	9	7	6	5	2	1
6. Using a computer together with a textbook is a good idea.	9	6	12	2	1	0
7. The English in the quests is a good level for me.	0	6	11	5	6	2
8. I prefer to do the quests during class	1	11	9	7	2	0
9. Prefer to do the quests on my own	0	6	7	11	6	0
10. I think the instructions [...] clear and easy to understand	2	0	9	8	5	6
11. I understand how to use the commands	3	5	8	8	3	3
12. I often get stuck when doing a quest	5	6	13	4	2	0
13. I can complete a quest without anyone's help	0	4	5	7	7	7
14. The textbook activities make the quest easier	2	5	6	12	5	1
15. I am glad I chose this class.	12	10	5	1	2	0