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On the Effects of Help Options in MCALL Programs on the Listening Comprehension of EFL Learners

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Abstract

This research compared the effects of two types of help options (subtitles and transcripts) in a multimedia listening unit on EFL learners' comprehension of an academic lecture. To this end, the two experimental groups under study listened to an academic lecture on "e-waste" under two multimedia conditions. The first group used the multimedia program comprising the video of the lecture coupled with subtitles and the second group used the multimedia program comprising the same video clip coupled with transcripts. The help options would be offered to learners in case of communication breakdown. The experiment revealed that those students who used video and transcripts obtained a higher mean score on the comprehension test than did those who used video and subtitles.

Key Words: MCALL programs, Interactionist Theory, subtitles, transcripts, listening comprehension.

1. Introduction

The Interactionist Theory of SLA contends that interaction plays a key role in language acquisition, as it may enhance negotiation of meaning (Pica 1994; Long 1996, Van den Branden 1997; Mackey & Philp 1998; Lantolf 2000). The major difference between the interactionist and nativist theories of SLA is that while scholars

such as Krashen consider comprehensible target language input to be a unidirectional input, interactionists acknowledge the significance of a reciprocal communication in the target language (Ariza & Hancock 2003). While interactionists concur that comprehensible input is essential for language acquisition, they believe that Krashen is not specific as to how one can make the input comprehensible for learners (Lyster, Lightbown & Spada 1999). Long argues that "modified interaction" or "negotiation of meaning" is what makes input comprehensible. In Krashen's input hypothesis, comprehensible input per se remains the main factor. Long, on the other hand, claims that a crucial element for language acquisition is the modified input learners are exposed to, as well as the way in which other speakers interact with learners in conversations (Ariza & Hancock 2003). He believes that negotiation of meaning leads to modified interaction comprising various types of modifications that teachers, native speakers, or other interlocutors make so as to render a comprehensible input to learners. In other words, the interactional adjustments made by interlocutors make input comprehensible, and comprehensible input promotes acquisition; hence, interactional adjustments may enhance effective acquisition of input (Lightbown & Spada 1993).

Since input modification may prove beneficial for an effective second language acquisition, attempts should be made to design instructional materials containing features that enhance input through modifications, such as added redundancy and change of the input mode (Chapelle 2003, 2005). With the recent advancement in computer technology, it may be intriguing to author multimedia programs providing input modifications through interaction with learners. Studies (Hsu 1994; Liou 1997, 2000; Hegelheimer & Tower 2004) corroborated the view that various types of input modifications through computer-human interaction made it more likely for learners to acquire input effectively.

Hsu's experiment (1994) was one of the first studies examining ESL learners' use of help options (audio repetition, textual repetition, and the dictionary) while listening to a story delivered on the computer. Textual repetition was in the form of a transcript,

which was displayed on the screen when students requested help after being unable to comprehend the spoken input. Frequencies of help function use revealed that the transcript was the most often used tool followed by aural repetition and the dictionary.
The participants also mentioned in questionnaires that the transcript was the most effective tool. Consequently, Hsu (1994) found that the amount of requests for textual help positively correlated with participants' listening comprehension scores.

Liou (1997) also studied the frequency and effectiveness of help use. She investigated how 20 college students at a Taiwanese university interacted with eight online help functions in a self-paced multimedia video disc. The textual help options included English and Chinese scripts in addition to the video control functions (pause and rewind) and five other options. Liou (1997) divided the participants into an "effective" and an "ineffective" group based on three factors: listening proficiency, direct student observation, and instructors' records. Frequency of help access showed that the ineffective group requested twice as much help as the effective group and used the replay of aural input more than the English and Chinese scripts. The effective group, on the other hand, used the English script most, followed by the replay function and the Chinese script. As can be seen from Hsu's and Liou's results, the transcript was among the most frequently used forms of help. Moreover, in another article about the same study, Liou (2000) reported that 80% of participants found the English script useful in helping them better interact with the multimedia program.

Another study that explored the use of textual help in multimedia courseware was Hegelheimer and Tower (2004). The participants were 94 beginner EFL students at a university in the Middle East who used a CALL program for self-study over a period of eight weeks. The use of the software was a required part of the course and students worked with it at their own pace. Options of the program included the "Repeat" button, which repeated the previous sentence aurally, and the "ABC" button, which repeated the previous sentence aurally together with its

transcript. The teachers introduced the Repeat button to the participants, but not the ABC button, which might have been a reason why, overall, the Repeat button was used more than the ABC button. The results showed that the concurrent display of audiovisual and textual input (ABC button) was negatively correlated with comprehension scores. The ABC button was the most frequently used help option for the 30 lowest-performing participants. The thirty highest-performing participants used the Repeat button most frequently, showing a great variation in the participants' use of the help options. For example, half of the participants did not use the ABC button at all. More research is necessary to explain why that was the case. Liou (1997) hinted at this issue when wondering whether there were students who did not use the environment to their advantage or CALL designers who offer more help than necessary.

Due to sparseness of research on the contribution of multimedia help options to listening comprehension, it seems necessary to author interactive courseware to enhance aural inputs through such devices and to explore their likely effects on the comprehension of the inputs. Of particular interest is the investigation of the effects of the different types of help options in multimedia environments on the acquisition of the input, which is the focus of the present study.

2. Purpose of the Study

Inspired by the Interactionist SLA Theory, this research explored the effects of two types of input modifications (subtitles and transcripts) in a multimedia listening unit centering on the video of an academic lecture on the EFL learners' comprehension of the lecture. It aimed to ascertain which of the two types of input modifications in the form of textual help options would help learners better comprehend the academic lecture. In case of comprehension failure, these two types of textual help options purported to add redundancy to the aural input by changing the input mode from its aural form in the video into the textual forms of subtitles and transcripts.

3. Research Question

This study sought to find an empirically justified answer to the following question:

Q: Is there any significant difference between the use of the multimedia program drawing on the video of an academic lecture and subtitles and the multimedia program using the video of the same lecture and transcripts in aiding in EFL learners' comprehension of the lecture?

4. Participants, Instruments, and Method of Research

At the beginning of the experiment, a proficiency test of receptive skills based on UCLES IELTS examination papers was administered to 200 seniors majoring in English Translation at Islamic Azad University, Rasht Branch. The test comprised two modules, each of which consisted of 40 items.

To standardize the test, the researcher drew on SIMSTAT, an item analyzer developed by Provalis Research: http://www.provalisresearch .com/Download/download.html

The result of the analysis showed that all items had desirable IF and ID indices ($0.37 \leq IF \leq 0.63$ & $ID > 0.40$). Accordingly, the researcher kept all the items and calculated the reliability index of the test using Cronbach's Alpha, which turned out to be 0.84.

To determine the extent to which the items on the test modules correlated with the latent constructs, an exploratory factor analysis was used. Using the Principal Components Extraction technique, the program extracted all hypothetical factors whose eigenvalues were above unity. The result of the analysis revealed that for each module, only one factor was extracted, as only one component had an eigenvalue well above unity, and it accounted for a large amount of variance accordingly. Additionally, one can look at the screes on a plot of eigenvalues against the number of factors (Figures 1 & 2):

Fig. 1 (Listening Module)

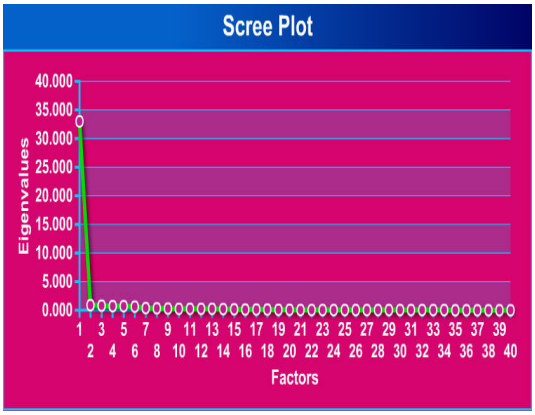
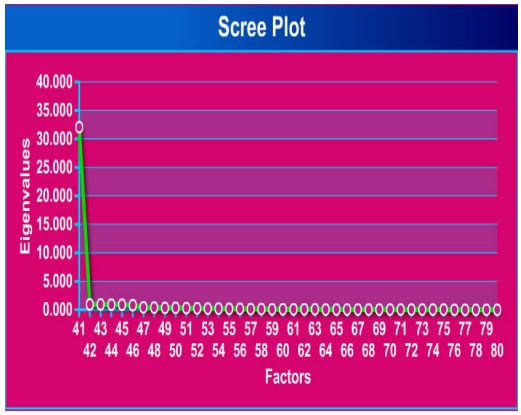


Fig. 2 (Reading Module)



The point at which the screes begin to level off can be deemed as a cut-off point. As shown in the figures, only one factor (scree) is on the line with a steep slope, while the other screes are almost on the same line. This further corroborates the view that a good many items highly correlated with the underlying factors, i.e., listening and reading abilities.

Next, from among the 200 participants, 90 subjects who got 6 (out of 9) on the proficiency test were chosen as upper-intermediate-level students and randomly divided into three equivalent groups of subjects: a pilot group and two experimental groups. The subjects were identified as upper-intermediate learners using the rating scale provided by the UCLES.

To randomly assign the subjects to the groups, the researcher drew on SuperCool Random Number Generator, a randomizer featuring the calibre to generate sets of random numbers from a specified range: http://www.supercoolbookmark.com/download/supercoolrandom104.zip

To this end, each of the participants was first assigned a number from 1 to 90, and the program then randomized the subjects by generating random sets of numbers from within this range. These random sets of numbers fell under three columns; accordingly, the researcher put the first 30 subjects whose numbers fell under the first column in the pilot group and the second and the

third 30 subjects in the experimental groups. It should be noted that the participants comprised mixed groups of males and females.

The next step involved designing a MCALL (Multimedia Computer-Assisted Language Learning) pre-test and administering it to the experimental groups under study. The purpose of pre-testing was twofold: a) to ascertain the homogeneity of the groups at the beginning of the experiment; and b) to provide a criterion against which the effects of the help options on listening comprehension could be appraised.

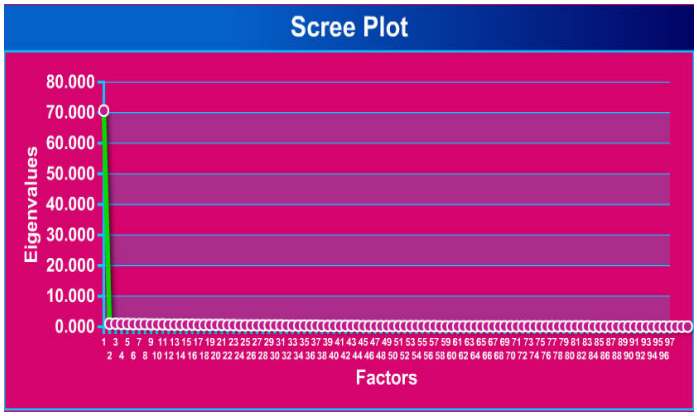
To determine the reliability index of the pre-test and to establish the construct validity of the test, it was first administered to the pilot group who did not participate in the study. The listening comprehension pre-test followed a multimedia listening unit comprising the video of an academic lecture on "diabetes" (Appendix A). The video of the lecture was trimmed into 10 two-minute segments, and each segment would be followed by 10 comprehension questions. The subjects were required to sit at computer terminals and wear headphones. Afterwards, they were to double-click on the program icon, and it would then show the video of Dr. Snay lecturing on diabetes. The pre-test, thus, comprised 100 items, and the total possible would be 100. The pre-test session lasted for 70 minutes, with each segment lasting for two minutes, and the students would spend five minutes to answer 10 comprehension questions following each segment.

It should be noted, however, that the multimedia pre-test would not provide any help option to modify the input for the learners. The multimedia unit was authored in such a way that it would automatically record each learner's right and wrong answers in a profile. Each item correctly answered would receive a score of one mark, and the program would then save the learner's total score in his or her own profile.

Having analyzed the learners' profiles, the researcher computed the reliability index of the test, which turned out to be 0.84. He then ran an exploratory factor analysis to determine the number of

factors involved. The result of the analysis revealed that items had a high loading on the latent construct (Figure 3):

Fig. 3 (Pre-test)



In the next step, the pre-test was administered to the two target groups (experimental groups) under study. Here, like the pilot group, the students were required to sit at computer terminals and launch the program. After the pre-test session, the learners' profiles were analyzed, and the mean score for each group was obtained (Table 1):

Table 1: Experimental Groups' Scores on Pre-test

Group Statistics

	Target Groups	N	Mean	Std. Deviation	Std. Error Mean
Target Groups' Scores on the Pre-test	A	30	49.3000	12.20274	2.22791
	B	30	45.0333	10.36068	1.89159

A = first experimental group, B = second experimental group

A glimpse at the mean scores reveals that the students in both groups did not perform well on the pre-test. To ascertain the homogeneity of the groups, the difference between the means was subjected to a test of statistical significance (Table 2):

Table 2: Pre-test Results

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Target Groups' Scores on the Pre-test	Equal variances assumed	.491	.486	1.460	58	.150	4.26667	2.92262	-1.58359	10.11692
	Equal variances not assumed			1.460	56.513	.150	4.26667	2.92262	-1.58686	10.12020

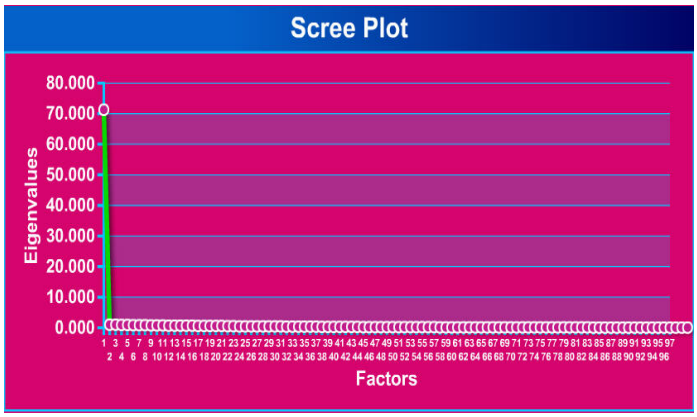
The Sig. value for the t-test is greater than 0.05 and the confidence interval contains zero; the difference between the means is not statistically significant; the groups belong to the same population.

As shown in the table, the Sig. value for the t-test was greater than 0.05, and the confidence intervals contained zero, showing that the groups were homogeneous at the beginning of the experiment.

Once the homogeneity of the groups had been determined, the two experimental groups were to listen to an academic lecture on a different topic, i.e., "e-waste". Since the post-test items (the questions following the segments) were different from those of the pre-test, the post-test was first administered to the pilot group. Here again, the video of the lecture was divided into 10 two-minute segments, and each segment was followed by 10 comprehension questions. Again, the MCALL program did not provide any help option in case the learners failed to answer the questions.

Once the learners had taken the post-test, their profiles were analyzed. The reliability index of the test turned out to be 0.92, and the result of the exploratory factor analysis revealed that items highly correlated with the underlying factor (Figure 4):

Fig. 4 (Post-test)



In the next step, the students in the experimental groups listened to the lecture on e-waste under two multimedia conditions: the first experimental group used the MCALL program comprising the video of the lecture coupled with subtitles, and the second group used the one consisting of the same video clip coupled with transcripts. At the beginning, the instruction screen informed the learners of how they would progress. Afterwards, the students answered the comprehension questions following the video segments. The help options (transcripts or subtitles) would be offered to learners only in case of comprehension breakdown; nonetheless, the students could get help only once. When the students failed to answer the questions, they could simply click on the "Get help" button, and the program would automatically rewind the movie including the help options. The two types of help options differed in that subtitles were quite synchronous with the segments (Appendixes B & C). In other words, while the subtitles would soon disappear as the speaker went on talking, the transcripts of what had been said would remain.

Once the learners interacted with the help options, they could then click on the Go back button to answer the question again. At this time, whether or not the students got the item right, the program would move on to the next question. Therefore, there were three possibilities: a) the students correctly answered the

questions without getting help; b) the students answered the questions incorrectly, thus interacted with the help options and got the items right; and c) the students answered the questions incorrectly, thus interacted with the help options but still got the items wrong.

The treatment, together with post-test session, lasted for 170 minutes (the students spent two minutes watching each video segment, 30 seconds answering each question, and 1 minute for getting help in case of comprehension failure). A the end of the experiment, the students' profiles in both groups (including their names, the number of times they got the items right without getting help, the number of times they interacted with the help options and got the items right, and the number of times they interacted with the help options and got the items wrong, as well as their overall scores on the post-test) were analyzed, and the difference between their mean scores was subjected to a test of statistical significance (Table 3):

Table 3: Experimental Groups' Scores on Post-test

Group Statistics

	Target Groups	N	Mean	Std. Deviation	Std. Error Mean
Target Groups' Scores on the Post-test	B	30	86.9333	5.86005	1.06989
	A	30	71.8667	10.27798	1.87649

A = first experimental group, B = second experimental group

As shown in the table, in antithesis to the pre-test scores, the mean scores on the post-test show a great amelioration in the learners' comprehension of the lecture. To ascertain whether or not this improvement can be attributable to the effects of the help options, one can look at the Frequency Tables A and B (Tables 4 & 5) below comprising the number of times each student got the items right without getting help, and the number of times he/she interacted with the help options and got the items right or wrong:

Table 4: Frequency Table (A)

Frequency Table (A) (Help Option = Subtitles)					
Frequencies / Students	Number of times student got the items right without getting help	Number of times student interacted with the help option and got the items wrong	Number of times student interacted with the help option and got the items right	Score	SUM
1) [redacted]	32	14	54	86	100
2) N[redacted]ad	36	15	49	85	100
3) [redacted]a	25	17	58	83	100
4) S[redacted]	27	19	54	81	100
5) [redacted]	30	20	50	80	100
6) S[redacted]	34	20	46	80	100
7) [redacted]	30	20	50	80	100
8) [redacted]	34	17	49	79	100
9) S[redacted]nvie	28	21	51	79	100
10) [redacted]	21	34	45	78	100
11) [redacted]	31	22	47	78	100
12) N[redacted]gh	39	23	38	77	100
13) [redacted]	24	23	53	77	100
14) [redacted]r	20	24	56	76	100
15) [redacted]	25	26	49	74	100
16) N[redacted]	19	22	59	74	100
17) [redacted]	16	26	58	74	100
18) [redacted]	24	28	48	72	100
19) [redacted]	18	30	52	70	100
20) T[redacted]e	12	31	57	69	100
21) [redacted]	17	31	52	69	100
22) [redacted]	14	32	54	68	100
23) Z[redacted]d	19	33	48	67	100
24) [redacted]	20	33	47	67	100
25) [redacted]	14	34	52	66	100
26) [redacted]	10	41	49	59	100
27) [redacted]	12	41	47	59	100
28) [redacted]	5	43	52	57	100
29) [redacted]	10	51	39	49	100
30) [redacted]	3	57	40	43	100
Mean	21.633	28.267	50.100	71.867	

Table 5: Frequency Table (B)

Frequency Table (B) (Help Option = Transcripts)					
Frequencies / Students	Number of times student got the items right without getting help	Number of times student interacted with the help option and got the items wrong	Number of times student interacted with the help option and got the items right	Score	SUM
1) [redacted]oftar	30	1	69	99	100
2) [redacted]	25	2	73	98	100
3) [redacted]	41	4	55	96	100
4) [redacted]	33	4	63	96	100
5) [redacted]	45	5	50	95	100
6) [redacted]man	33	10	57	90	100
7) [redacted]	35	10	55	90	100
8) [redacted]	40	10	50	90	100
9) [redacted]	24	11	65	89	100
10) [redacted]	20	11	69	89	100
11) [redacted]	36	11	53	89	100
12) [redacted]	41	12	47	88	100
13) [redacted]	21	12	67	88	100
14) [redacted]sh	17	12	71	88	100
15) [redacted]	22	13	65	87	100
16) [redacted]	19	14	67	86	100
17) [redacted]i	34	14	52	86	100
18) [redacted]	28	15	57	85	100
19) [redacted]hr	30	15	55	85	100
20) [redacted]deh	14	15	71	85	100
21) [redacted]	16	16	68	84	100
22) [redacted]	14	16	70	84	100
23) [redacted]or	14	17	69	83	100
24) [redacted]	32	17	51	83	100
25) [redacted]or	10	18	72	82	100
26) [redacted]	24	19	57	81	100
27) [redacted]	14	20	66	80	100
28) [redacted]	16	21	63	79	100
29) [redacted]	10	22	68	78	100
30) [redacted]	6	25	69	75	100
Mean	24.800	13.067	62.133	86.933	

It should be noted that the first table of frequency was produced through analyzing the learners' profiles in the first experimental group (those who received subtitles as help options), while the second frequency table was produced through the analysis of the learners' profiles in the second group (those who received transcripts as help option). A glimpse at the tables reveals that both types of help options significantly aided in the comprehension of the lecture, as the mean of the times the learners

interacted with the help option (subtitle or transcript) and got the items right ($\overline{X}_A$ subtitles ➔ correct answer = 50.10 & $\overline{X}_B$ transcripts ➔ correct answer = 62.13) exceeded the mean of the times they interacted with the help option and got the items wrong ($\overline{X}_A$ subtitles ➔ wrong answer = 28.26 & $\overline{X}_B$ transcripts ➔ wrong answer = 13.06), as well as the mean of the times they got the items right without getting help ($\overline{X}_A$ no help ➔ correct answer = 21.63 & $\overline{X}_B$ no help ➔ correct answer = 24.80).

It was not, however, the main purpose of this research to substantiate the claim that input modification would lead to an effective acquisition of language. As mentioned earlier, the major aim of the present study was to determine which of the two types of help options (subtitles or transcripts) would more effectively aid in the comprehension of the academic lecture. To this end, the difference between the mean scores on the post-test was subjected to a test of statistical significance (Table 6):

Table 6: Post-test Results

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Target Groups' Scores on the Post-test	Equal variances assumed	6.625	.013	6.975	58	.000	15.06667	2.16007	10.74282	19.39052
	Equal variances not assumed			6.975	46.053	.000	15.06667	2.16007	10.71881	19.41453

The Sig. value for the t-test is smaller than 0.05 and the confidence interval contains no zero; the difference between the means is statistically significant; the groups belong to different populations.

As shown in table, the probability value for the t-test was much smaller than 0.05, and the confidence intervals contained no zero. This shows that there was a significant difference between the use

of the multimedia program drawing on transcripts and the one drawing on subtitles in enhancing EFL learners' listening comprehension.

If we pay attention to the mean scores (Table 3), we notice that the second experimental group (receiving transcripts as help options) outperformed the first group (receiving subtitles as help options) on the comprehension test. Additionally, one can look at the frequency tables and notice that in the second experimental group, the mean of the times the students interacted with transcripts and got the items right is quite higher than the mean of the times the second group interacted with subtitles and got the items right. This reveals that transcripts, as one type of help options in multimedia environments, might have helped the learners comprehend the aural inputs more effectively than might subtitles ($\overline{X}_A$ subtitles ➔ correct answer = 50.10 & $\overline{X}_B$ transcripts ➔ correct answer = 62.13).

5. Conclusion and Pedagogical Implications

This research sought to find an empirically justified answer to the following question:

Q: Is there any significant difference between the use of the multimedia program drawing on the video of an academic lecture and subtitles and the multimedia program using the video of the same lecture and transcripts in aiding in EFL learners' comprehension of the lecture?

The result of the experiment reveals that input modification through help options in multimedia environments might enhance the input for learners, and thus, increase the likelihood of an effective acquisition of the input. The study further shows that the two types of help options differ in their effectiveness to modify aural inputs for learners. This provides an empirically justified answer to the aforementioned question, showing that different types of help options may modify inputs to varying degrees, and accordingly, they may lead to varying degrees of learning success.

As far as listening comprehension is concerned, this study reveals that modifying an aural input through transcripts may lead

to a more effective comprehension of the input. One justification is that since transcripts are asynchronous with streaming video, students may spend more time focusing on what speaker has just mentioned, and thus, may better comprehend the message. In this experiment, both types of help options were used to add redundancy to the aural inputs by providing textual pieces of information about the topic. Consequently, in case of comprehension breakdown, the subjects might have simply followed the texts appearing on the screen. In case of transcripts, since they were asynchronous with video, they would remain on the screen as the lecturer went on talking. Accordingly, the learners might have first decoded the aural input and then the textual input.

On the other hand, since subtitles were quite synchronous with the streaming video, they would soon disappear as the speaker went on talking, and consequently, the brain might have failed to decode the textual input effectively. Apparently, human brain fails to handle simultaneous decoding of information presented in a multimedia courseware as far as listening comprehension is concerned, and thus, learners are less likely to benefit from subtitles so as to effectively comprehend the aural input. Such a view is underpinned by Moreno and Mayer's (1999, 2002) Cognitive Overload Theory contending that presenting multimedia contents in synchrony with each other will lead to cognitive overload, resulting in a slow, deficient processing of information. They argue that since multimedia information is largely processed in visual memory, presenting the pieces of information simultaneously might place a high demand on the memory module, leaving no chance for the learner's brain to handle the contents efficiently. Since, on the other hand, transcripts in MCALL environments are in asynchrony with other multimedia materials, they may help reduce cognitive overload and hence, their use as effective input modifiers should be promoted.

6. Suggestions for Further Research

This research focused on the effects of help options on the listening comprehension of upper-intermediate-level EFL learners.

It might be intriguing if follow-up studies investigate the effects of help options on the listening comprehension of learners of other proficiency levels. Besides, the present study was a one-shot experiment, and hence, it is not clear whether or not transcripts always prove more useful than subtitles in aiding in listening comprehension, given a longitudinal experiment. Accordingly, future studies should be longitudinal so that they can provide grounds for more accurate judgments to be made on the efficacy of help options in improving language learning, in general, and listening comprehension, in particular.

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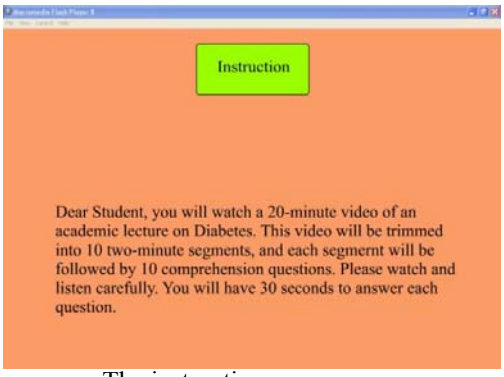
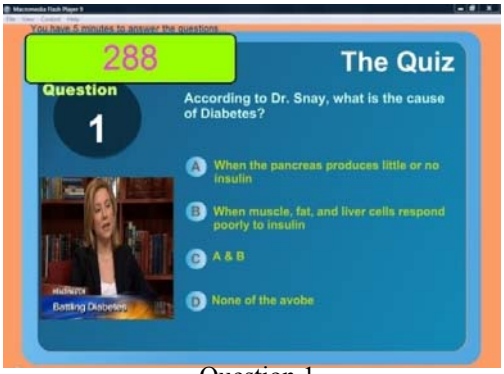
Appendixes

(Appendix A: Sample Pre-test Items**)**

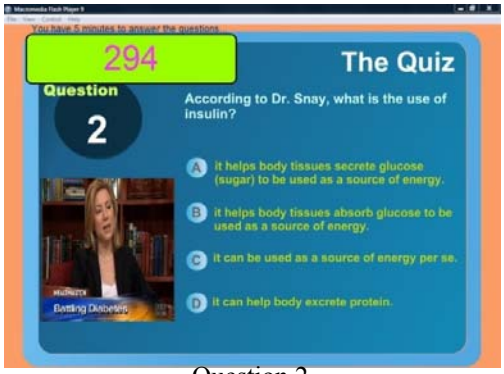


The instruction screen...

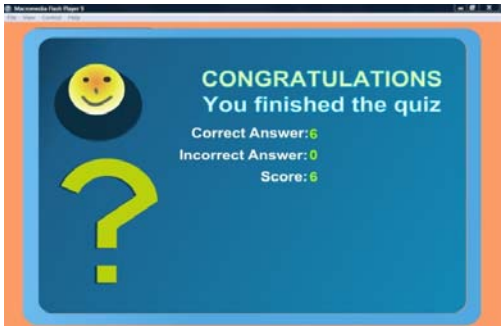
Dr. Snay is lecturing on diabetes…



Question 1



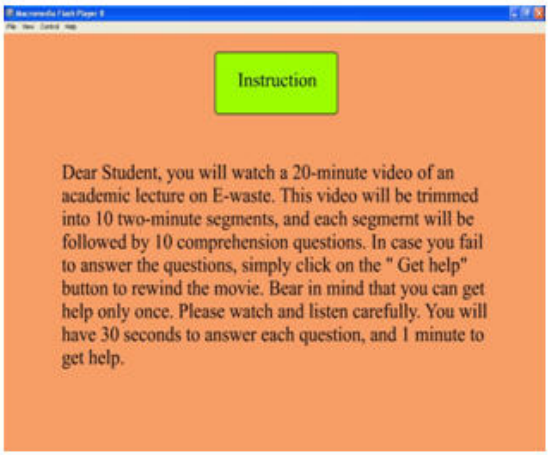
Question 2



The score-reporting screen…

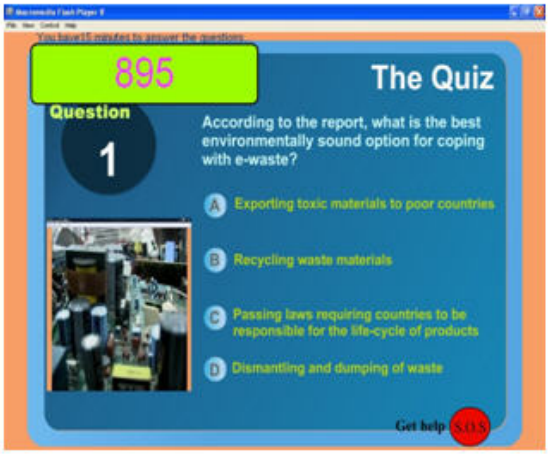
(Appendix B: Sample Post-test Items**)**

(Help Options = Subtitles**)**



The instruction screen...

A lecture on e-waste…

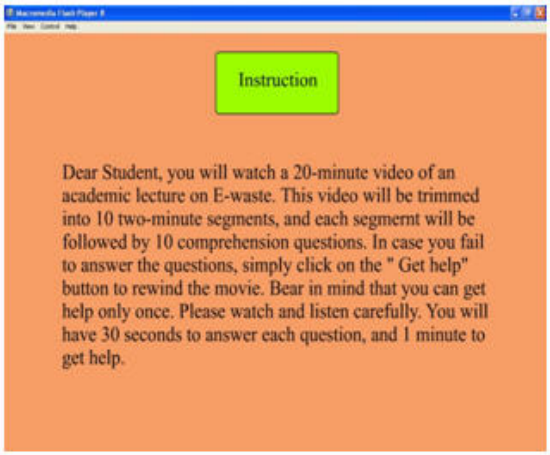


The question screen. If the learners got the items wrong, the 'Get help' button would pop up.

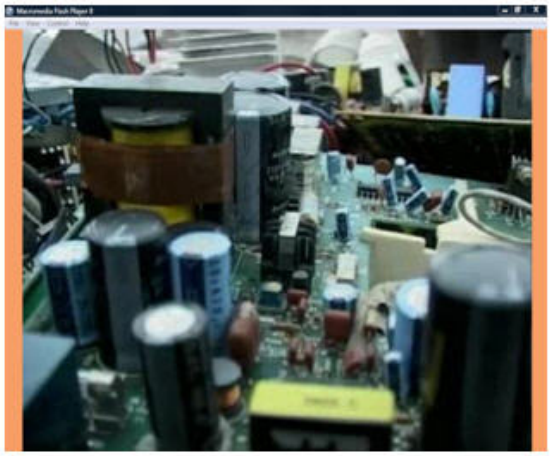
Once the learners pressed the 'Get help' button, the help screen would pop up, letting the subjects play the video coupled with subtitles. Afterwards, the students would press the 'Go back' button to answer the question again.

(Appendix C: Sample Post-test Items**)**

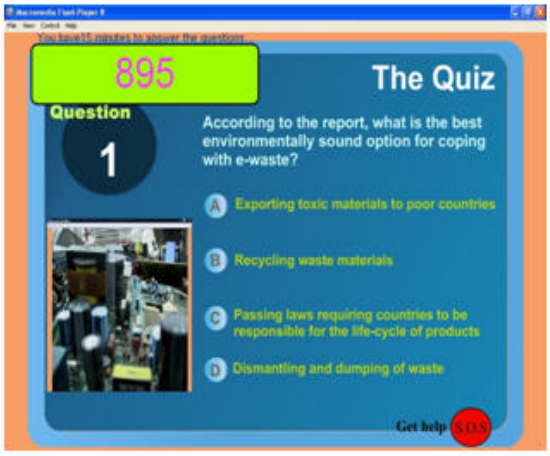
(Help Options = Transcripts**)**



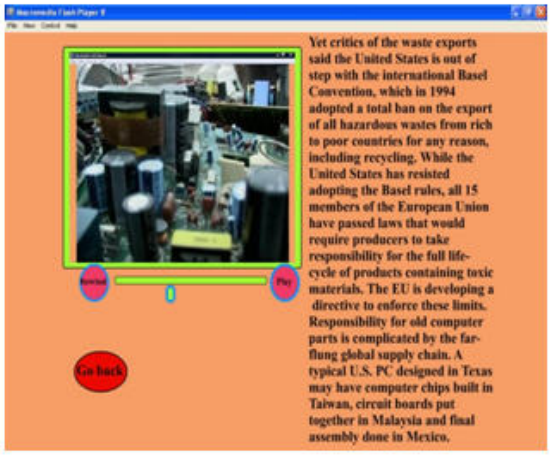
The instruction screen...



A lecture on e-waste…



The question screen. If the learners got the items wrong, the 'Get help' button would pop up.



Once the learners pressed the 'Get help' button, the help screen would pop up, letting the subjects play the video coupled with transcripts. Afterwards, the students would press the 'Go back' button to answer the question again.