

## NOISE AND ECHO: LISTENING TASK IN TAMHIDI CENTRE, USIM

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### Abstract

*One of the elements in Malaysian University English Test (MUET) is listening skill. Whilst preparing for the exam, USIM's foundation students experienced noise disturbance (outside and inside noises) when listening task were carried out in tutorial classroom (removable board-like walls), then, they move to lecture halls (well-built cemented walls) for appropriate venue. Nevertheless, it is identified that students still struggle to focus because of other distraction which is echo. It is a concern because the exam will be held at Dewan Tuanku Canselor (DTC). Sound intensity of the listening material was measured using a digital sound meter, then, echo was calculated by Institute of Physics method. Echo was detected to be  $37 \text{ ms}^{-1}$  (lecture halls) in comparison to  $8.67 \text{ ms}^{-1}$  (DTC). From the situation, it was suggested to the university that in order to reduce echo, installment of removable carpets and soft boards at certain setting can assist students in answering their listening task. Further study should be done to determine the suitable action towards this matter since MUET is one of the pre-requisites for students to enroll and to graduate.*

*Keywords: Echo, Listening Assessment, MUET, Tamhidi.*

## INTRODUCTION

Listening is a process, whereby a person hears a sound and the brain process the sound into meaningful context (Kline, 1996). Listening is an integral part of the total communication process, but it's a part often ignored. Hence it will become a very significant part in learning a second language. Listening to sounds are difficult to discriminate in a second language (Kathleen, 2002). Students are proven to have difficulties to listen effectively in a language they are not using every day. Acquiring good listening and speaking skills in English is the main concern of many second and foreign language learners. University entrance exam and school leaving tests have begun to include a listening component, an acknowledgement that listening ability is an important aspect of second language (Flowerdew & Miller, 2005).

Tamhidi Centre is a pre-university (foundation) programme offered by USIM, located in Bandar Baru Nilai, a feeder for undergraduate studies in the faculty [Mohamed et al, 2015]. After a 2-semester course in Tamhidi Centre, having full-filled all requirements, students will enroll to the Faculty of Science and Technology (FST), Faculty of Medicine and Health Sciences, (FPSK), Faculty of Dentistry (FPg), Faculty of Engineering and Built Environment (FKAB), Faculty of Shariah and Law (FSU) and Faculty of Economy and Muamalat (FEM) (Pusat Tamhidi, 2017). Starting from 2016, Tamhidi also feeds a new faculty, the Faculty of Engineering and Built Environment (FKAB).

Sounds are identified by their frequency spectrum, in which a healthy young person should be able to hear frequencies ranging from 0 dB to 130 dB (Smith, 1997). Human perception by the ear analyses sounds in the cochlea by a spectral analysis (McDermott & Oxenham, 2008) ranging from leaves rustling, quiet residential community, average speaking voice, express subway train, propeller train at takeoff to spacecraft launch at close range. Noise is defined as unwanted, loud, unexpected, and disturbing sound. A sound loudness is measured in decibels (dB). In the context of teaching and learning, the sound should be around 75-85 dB (Healthlink BC, 2020). The range of amplitude for sound waves to reach human hearing is in between 20 Hz to 20000 Hz (Ivy & Portman 2004). Echoes are known in nature to be used by bats and whale to estimate distance. Submarines use the same concept. Echoes are also used outdoors to estimate the speed of sound.

An echo is a sound that is repeated as the sound waves from a surface bounced back to the listeners (Smith, 2002). It also happens in a classroom, where Tamhidi students are having difficulties in listening skill's activities in preparing for their Malaysian University English Test (MUET). In language studies, especially for second language, speaking and listening skill must be conducted in echo-free environment. Today's English instructor needs to be well versed in current approaches to the teaching of the oral skill. This includes sensitive observation on the set up or conditions of the environment. Being in a large room with high ceiling, bare walls and hard surfaced floor, one will notice a distinctive ringing sound when speaking. The sound is called flutter echo. When sound waves bounce back and forth between the ceilings, walls and floors, this phenomenon occurs. In Tamhidi Centre of Universiti Sains Islam Malaysia (USIM), MUET examinations are carried out in a large exam hall (Dewan Tuanku Canselor, DTC) whereby about a thousand students have to listen to one source of sound at the same time. The occurrence of echo is evident.

Consequently, Tamhidi students will have difficulties in answering their listening component of the Malaysian University English Test (MUET). MUET has been implemented by the Ministry of Education to prepare tertiary students with the necessary English language skills. These skills are significant not just for the sake of

passing the examination but also to train the students with English medium instructions in the classrooms at the tertiary level. MUET is made compulsory for tertiary students to pass according to the required Bands (1-6) and programmes registered under universities. In its Listening Test, students are required to listen attentively to five individual recordings in order to answer comprehension questions which are distributed beforehand. The test consists of three parts where the level of comprehension and critical thinking skills increase in each. Listening skills may be deemed as an easy task to conduct but without proper environment, strategies and attention, it could undoubtedly be the hardest skill in a second language acquisition process.

The purpose of this study are;

1. (a) To identify the types of noise (b) and intensity of echo occurred at the venues
2. To detect and measure echo in lecture hall and MUET exam hall (Dewan Tuanku Canselor, DTC). Since there would be no potential noise during MUET in exam hall, the intensity of echo only will be explored.
3. To recommend any appropriate action to reduce echo in order to achieve its holistic assessment environment.

## **METHODOLOGY**

60 students from Tamhidi of Syariah and Law was selected selective purpose sampling for detecting noise for classes carried out in tutorial rooms. Instrument used at this stage is observation from the English teachers and survey (5-scale Likert questionnaire).

Next, in a quantitative quasi-experimental study, a different set of 50 students were given a listening test using two settings of venue. Setting A was at the designated lecture hall that has bare tiled floor and concrete walls. While, Setting B was at the same lecture hall but we have installed removable carpets and white boards, and posters in the room. The papers were marked and recorded and analyzed. It was discovered that students perform better for the listening test at the latter venue because it was done in its holistic environment.

Then, the students were given a set of questionnaires to be answered regarding the lecture hall characteristics and listening environment while answering the exercise. A series of questions were listed online, using google form. The students gave feedbacks and comments based on each question, mostly open-ended questions. Teachers conducting these activities recorded their answers as data. All their answers

will give a general idea on the students' perception regarding noise during their sessions of listening teaching and learning in Tamhidi Centre.

Then, the magnitude of sound was measured and intensity of echo was calculated in the lecture hall and in the exam hall (DTC) during the real MUET listening component; conducted on the 4th November 2018. Intensity of the sound was measured using a digital sound meter (Dr. Meter JTS 1357). It was done by determining the amplitude of the spectral components or by detecting the sound pressure through the microphone attached to the meter. The total sound level of a signal is a root-sums-of-squares of the amplitude of all the spectral components. Calculating echo were done using a method described by Institute of Physics (2006); in the procedure of estimating the speed of sound using echoes. Three points in the hall @ class were selected in the classroom and then echo was determined.

## **RESULTS AND DISCUSSION**

### **Detection of Noise Disrupting Listening Task in Ordinary Tutorial Venues**

Intake of students to the faculty will have to abide certain minimum entry band for MUET, so as soon as the Tamhidi students registered, they were taught and guided on how to answer MUET exam in English classes. MUET consists of 4 components which is Reading, Writing, Listening and Speaking. Lesson on listening components were carried out in classrooms in which noise disturbance exists. Initial response from students listed that they have difficulty listening to the audio aid because of noise coming from outside of the classroom, the sound of air-conditioning system and echo. Due to this reason, they cannot answer to listening exercise well.

Regular English classes are carried out in tutorial rooms (BT1-BT16). Materials used for the walls is made up of cardboard-like (cheap wood) material, making the condition is not sound-proof. Figure 1 shows the type of walls in BT1-16; whereby it is designed to be folded to make a long exam hall if needed. The problem faced by students is that while doing listening exercise, they can also hear a teacher talking from the class on the right, and students laughing from the class on the left. This will make the audio aid cannot be heard properly, so they cannot answer the question from the listening exercise comfortably.



Figure 1: BT3; Left wall can be seen slightly tilted due to the weak structure of boards. The sound of loud air-cond is also one of the noise interfering while doing listening assessments.

Noise is an unwanted, loud, unexpected, and disturbing sound. For teaching and learning, the sound should be around 75-85 dB (Healthlink BC, 2020). Apart from outside noise (students voice from the hall way, teacher's voice from the next room), there is also noise coming from air-conditioning system of the room, noises from other students in the class, and sounds coming from mobile phones. In a situation whereby students need to focus during listening activity, noise disturbance need to be identified. Other factors affecting students' performance in answering during exam also must be taken into consideration.

52% students agreed that the space they are in, which is the classroom is not suitable for listening task because it is not soundproof. BT1-16 is a small classroom separated by adjustable cardboard walls which makes the sounds from classes nearby can be heard clearly. Table 1 shows how students felt about the classrooms. They need to choose the most suitable way to explain the condition they are in when having lesson in the room. Only 28.6% students said they are comfortable, but the other 19.1% said they are confused with what they are hearing. 10.6% said there are echo in the room, whereas 2.5% said they are disturbed by loud noise. 14.7% stated that they can hear but it was not comfortable. Out of the total 60 students, only 17.3% said they are in peace and at ease. As a whole, 60.6% students stated they can hear and comfortable with the class. These findings cannot be taken lightly, considering the fact that students must focus and listen well during listening activity.

Table 1: Students' Perception on tutorial rooms BT1-BT16

Students' condition	Comfortable	Confused	Has echo	Noise from outside	Can hear well	Uncomfortable	Feel calm, at ease
%	28.6	19.6	10.6	2.5	14.7	6.6	17.3

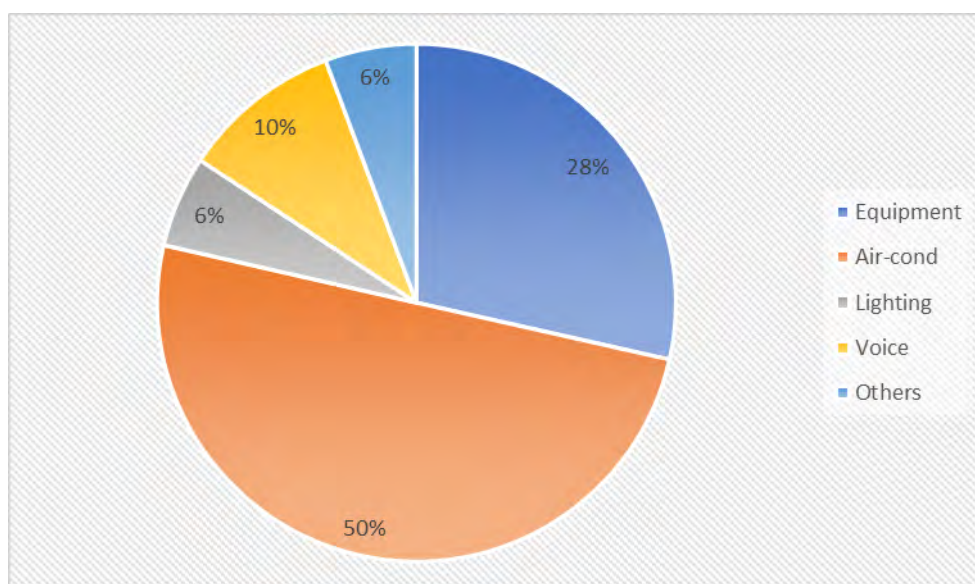


Figure 2: Sources of noise from inside the classroom.

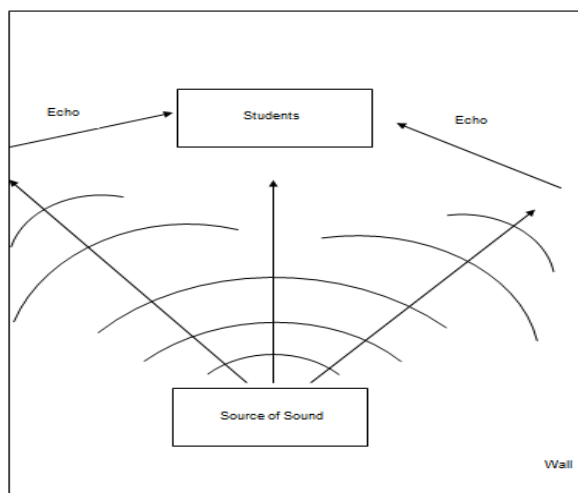
Since noise from outside is also in the list (2.5%), we asked the students what kind of noise they are referring to, and they said the loud voice of students on the corridor in between classes can be heard clearly. As shown in Figure 2, 50% of students said that loud noise is coming from the air-conditioning system of the classroom. Other noises came from students' mobile phones, small USB fan and students talking.

Based on the observation and survey done, it was found that tutorial classrooms of BT1-BT16 are not suitable to be used as venue for conducting listening task. Therefore, it was suggested that English classes should use only lecture halls (DKS1-6) because of its hard, solid wall instead of using classroom on the third floor (BT1-BT16) which is not sound-proof. Instructors also have to choose a suitable time for doing the listening task, not near to the transition times when students are switching class and venues. English classes take 2 hours, but other core courses are using only one-hour time. By doing this, students should be able to focus in listening task, and perform excellently.

## Detection of Echo During in Listening Assessment

Echo is a sound or series of sound caused by the reflection of sound waves from a surface back to the listeners. If the reflected sound from one syllable is still heard when the next syllable is spoken, it may be difficult to understand what was said (Mc Squared, 2016). "Cat", "Cab" and "Cap" may all sound very familiar. In examination halls, echo often disrupt students hearing hence leading to lack of comprehension of the exam questions.

In teaching and learning activities; especially during listening assessment, echo is detected in the lecture halls of DKS1 - DKS6. The lecture halls are big (14 m × 22 m), and the walls are as high as 6 meters. The original capacity of this lecture hall is for 60 pupils but for various administrative reasons a group of as small as 19 students is occupying this space. Due to this reason, the empty space enhances the occurrence of echo during listening classes making the intensity of echo is high. Hence, students are not able to listen well. It is proposed by one of the Tamhidi Centre language teachers to investigate this problem. Figure 3 shows how echo is produced by sound reflection through the walls.



**Figure 3 Echo effect on listening in language studies.**

MUET exam was carried out in Dewan Tuanku Canselor (DTC). The exam hall is big (120 m × 80 m), and the walls are as high as 20 meters. The capacity of this hall is for roughly around 1000 pupils. Figure 1 is the layout of part of the exam hall where the MUET exam took place. Figure 2 shows the floor plan of students' position when taking the exam. On the date where the echo measurement was carried out (4 November 2017); as much as 925 students are in the exam hall. The ceiling of the exam hall is high (20 meters). The audio for listening components were played at the centre of the stage heading to the entrance. Hence, students are not able to listen well.

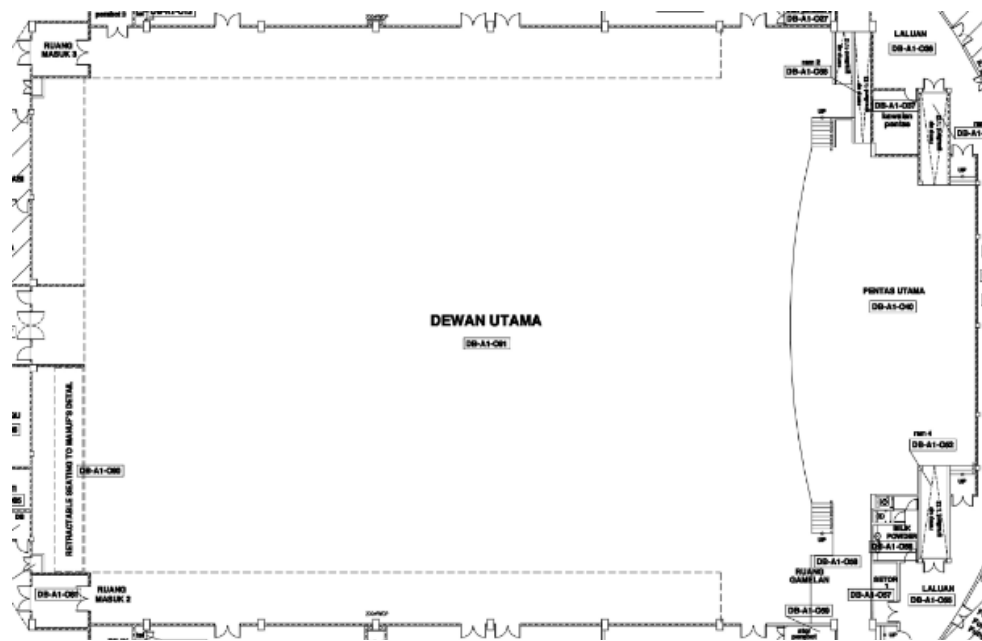


Figure 4: The layout of the exam hall where the students took the MUET exam (1:200).

PERTAS																									
MH0167		MH0166				MH0165				MH0164				MH0163											
46	45	187	186	111	110	35	34	176	175	100	99	24	23	165	164	89	88	13	12	153	152	77	76	1	
47	44	188	185	112	109	36	33	177	174	101	98	25	22	166	163	90	87	14	11	157	151	78	75	2	
48	43	189	184	113	108	37	32	178	173	102	97	26	21	167	162	91	86	15	10	155	150	79	74	3	
49	42	190	183	114	107	38	31	179	172	103	96	27	20	168	161	92	85	16	9	157	149	80	73	4	
50	41	191	182	115	106	39	30	180	171	104	95	28	19	169	160	93	84	17	8	158	148	81	72	5	
51	40	192	181	116	105	40	29	181	170	105	94	29	18	170	159	94	83	18	7	159	147	82	71	6	
52	39	193	180	117	104	41	28	182	169	106	93	30	17	171	158	95	82	19	6	160	146	83	70	7	
53	38	194	179	118	103	42	27	183	168	107	92	31	16	172	157	96	81	20	5	161	145	84	69	8	
54	37	195	178	119	102	43	26	184	167	108	91	32	15	173	156	97	80	21	4	162	144	85	68	9	
55	36	196	177	120	101	44	25	185	166	109	90	33	14	174	155	98	79	22	3	163	143	86	67	10	
56	35	197	176	121	100	45	24	186	165	110	89	34	13	175	154	99	78	23	2	164	142	87	66	11	
57	34	198	175	122	99	46	23	187	164	111	88	35	12	176	153	100	77	24	1	165	141	88	65	12	
58	33	199	174	123	98	47	22	188	163	112	87	36	11	177	152	101	76	25		166	140	89	64	13	
59	32	200	173	124	97	48	21	189	162	113	86	37	10	178	151	102	75	26	216	167	139	90	63	14	
60	31	201	172	125	96	49	20	190	161	114	85	38	9	179	150	103	74	27	215	168	138	91	62	15	
61	30	202	171	126	95	50	19	191	160	115	84	39	8	180	149	104	73	28	214	169	137	92	61	16	
29	28	170	127	94	51	18	192	159	116	83	40	7	181	148	105	72	29	213	170	136	93	60	17		
28	28	169	128	93	52	17	193	158	117	82	41	6	182	147	106	71	30	212	171	135	94	59	18		
27	28	168	129	92	53	16	194	157	118	81	42	5	183	146	107	70	31	211	172	134	95	58	19		
26	28	167	130	91	54	15	195	156	119	80	43	4	184	145	108	69	32	210	173	133	96	57	20		
25	28	166	131	90	55	14	196	155	120	79	44	3	185	144	109	68	33	209	174	132	97	56	21		
24	28	165	132	89	56	13	197	154	121	78	45	2	186	143	110	67	34	208	175	131	98	55	22		
23	28	164	133	88	57	12	198	153	122	77	46	1	187	142	111	66	35	207	176	130	99	54	23		
22	210	163	134	87	58	11	199	152	123	76	47		188	141	112	65	36	206	177	129	100	53	24		
21	211	162	135	86	59	10	200	151	124	75	48	216	189	140	113	64	37	205	178	128	101	52	25		
20	212	161	136	85	60	9	201	150	125	74	49	215	190	139	114	63	38	204	179	127	102	51	26		
19	213	160	137	84	61	8	202	149	126	73	50	214	191	138	115	62	39	203	180	126	103	50	27		
18	214	159	138	83	62	7	203	148	127	72	51	213	192	137	116	61	40	202	181	125	104	49	28		
17	215	158	139	82	63	6	204	147	128	71	52	212	193	136	117	60	41	201	182	124	105	48	29		
16	216	157	140	81	64	5	205	146	129	70	53	211	194	135	118	59	42	200	183	123	106	47	30		
15		156	141	80	65	4	206	145	130	69	54	210	195	134	119	58	43	199	184	122	107	46	31		
14	1	155	142	79	66	3	207	144	131	68	55	209	196	133	120	57	44	198	185	121	108	45	32		
13	2	154	143	78	67	2	208	143	132	67	56	208	197	132	121	56	45	197	186	120	109	44	33		
12	3	153	144	77	68	1	209	142	133	66	57	207	198	131	122	55	46	196	187	119	110	43	34		
11	4	152	145	76	69		210	141	134	65	58	206	199	130	123	54	47	195	188	118	111	42	35		
10	5	151	146	75	70	216	211	140	135	64	59	205	200	129	124	53	48	194	189	117	112	41	36		
9	6	150	147	74	71	215	212	139	136	63	60	204	201	128	125	52	49	193	190	116	113	40	37		
8	7	149	148	73	72	214	213	138	137	62	61	203	202	127	126	51	50	192	191	115	114	39	38		

Figure 5: The flow plan shows the position of students taking the MUET exam.

Table 2 lists intensity of certain type of sound involved in the lecture halls of Tamhidi Centre.



**Table 2 Sound intensity**

<b>Type of</b>	<b>Strength (dB)</b>
Whisper	20
Soothing music	30
Conversation	40
Shouting	60
Listening material	75-85

All building materials have acoustical properties in that they will all absorb, reflect or transmit sound striking them. The surface materials that reflect sound are hard, bare floors and walls. In order to conduct an efficient listening lessons or tests, echo need to be eliminated. The teaching environment itself has to be echo-free.

Echo disrupts communication, but a reverb helps enhance absorption of sound. Reverberation happen when sound is reflected causing a large number of reflections to build up, and then decay as the sound is absorbed by the surfaces of the room. In this case, this sound needs to be absorbed by the students in the classroom. However, reverberation is frequency dependent (Apartment Therapy, 2016). For listening task carried out using the DVD player, the sound intensity must be at least 60 dB.

According to Smith (2002), choosing suitable material will help in reducing echo. To increase absorption of sound, these are several things that can be done to combat echo in language classes, as below:

- a. Hanging wall arts, preferably pieces of textile. In the context of the lecture halls in Tamhidi Centre, we might be able to hang curtains at the back wall consisting 4 window panels.
- b. Adding bookcase or tall furniture in the classroom. This includes whiteboards that can be used for teaching and learning purposes.
- c. Installing carpets on the floors. This will help reduce echo a lot.

In order to reduce the echo, we might be able to hang curtains at the back wall consisting 4 window panels. More notice boards or even extra additional whiteboards can be placed at the back of the big classroom.

The intensity of echo measured at DKS is determined using a formula described by the Institute of Physics (2006) since no device is developed for the purpose of detecting or measure the echo directly. However, in physics, echo is used to predict the width of a material in the field of material engineering. Table 3 lists the intensity of echo calculated using the time lapsed recorded by the sound meter.

**Table 3 Echo measurement for lecture hall of Tamhidi Centre for Setting A and Setting B; and Point A, B and C of the exam hall.**

Point	Distance, s, (m) (from the source)	Time lapse, t (s)	Sound Intensity (min)	Sound Intensity (max)	Echo (V=2s/t)
Setting A	10	0.61	45.1	65.2	32.8
		0.54	46.1	68.2	37.0
Setting B	10	0	45.1	65.2	0
		0	46.1	68.2	0
A	21	0.37	42.2	70.2	113.5
		0.4	43.2	69.2	105.0
B	11	0.45	44.5	71.1	48.9
		0.5	45.4	70.1	44.0
C	3	0.6	46.1	60.2	10.0
		0.65	49.1	67.2	8.67

The results shown in Table 3 listed the intensity of sound and the echo calculated from the time lapse recorded during the listening lessons / tests conducted in Setting A and Setting B; and during the MUET exam. In the lecture hall, echo was calculated to be 32.8 ms<sup>-1</sup> and 37 ms<sup>-1</sup> in Setting A. Echo was not detected after the installment of removable carpets, hanging of curtains and poster, and placement of additional whiteboards (Setting B). It was found that in the exam hall, the echo is the highest when the distance between the source of sound and the students is far. At 21 m distance, the echo is calculated to be 113.5 ms<sup>-1</sup>. However, at the distance of 3 meters from the source, the echo calculated was only 8.67 ms<sup>-1</sup>.

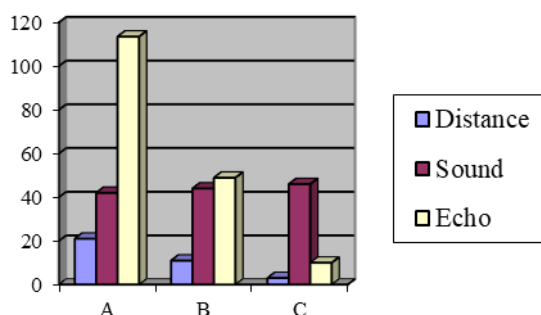


Figure 6: In the exam hall, echo is decreased by distance from the source of sound.

As sound is a type of wave travelling in amplitudes, when using a lower amplitude, the bouncing waves off from the walls will also be lowered. The maximum sound intensity used in this measurement is 70.2 db. For listening task to be carried out using the DVD player, the sound intensity must be at least 60 dB for everybody to hear. So, decreasing the strength of the sound is not a good way to reduce the echo.

When doing a listening test in the classroom, students feel the listening audio is not comfortable. According to the survey, 52% of the students think that acoustics of the classroom is the most important factor for comfort during the lesson. During the exercise carried out, only 28% students are comfortable and 17% are relaxed but the others were confused, heard echoes and irritated. In terms of listening environment, they said they can hear too much noise from the outside of the room, too much echo in the room, the sounds are not clear enough and the audio is too fast.

Table 4: Result of listening exercise before and after echo was eliminated.

Listening result	Percentage (n=50)	
	Setting A (with echo)	Setting B (without echo)
3.5	4	0
4.0	6	2
4.5	4	8
5.0	12	6
5.5	4	10
6.0	14	6
6.5	8	12
7.0	10	10
7.5	18	10
8.0	14	18
8.5	4	14
9.0	2	4

Half (52%) students have no problem with noise created from inside the class. When asked, what kind of noise came from inside, they said it came from the equipment from the audio, the air-conditioning, the lights and the students themselves. The students said that the teachers are speaking in normal tone. Elevation of teacher's voice only needed sometime (46%). Finally, the best location for the audio and instruction to be heard in in the centre of the class (37.9%), compared to near the teacher (29.3%).

While reducing the strength of the sound is not an option to reduce echo in the classroom, we decided to use portable notice boards and carpets in the same classroom to improve the sound of the audio. Table 4 shows the result of the listening test conducted under the influence of echo (Setting A); compare to the condition when echo is reduced or eliminated (Setting B).

As shown in Table 4; the results for students are better after the removal of echo from the audio environment. Having 3.5 as lowest mark, in the classroom with echo,

2 students got this result. This number dropped to zero for the second time of exercise in different audio environment. Four students got 8.5 marks under the influence of echo, but this number increased drastically to 14 students. This shows that students can listen well when sound environment is improved.

## CONCLUSION

As a conclusion, it is imperative in providing suitable material in forming an appropriate environment that could reduce echo in preparing Tamhidi students in their listening MUET test. The condition of the classroom is vital as to let the students perceive better sound quality; as it is the core of understanding listening's activity. When echo is removed, the students perform better in listening task. It is recommended that the classroom where the listening test is carried out is echo-proofed.

In Tamhidi Centre, the computer laboratory is carpeted, so we would like to suggest the test, together with the teaching and learning sessions of the listening component is held at Level 1, MPG building. The competency of the students in coping with the test as well as making them to manipulate the listening component content by these recommendations would hopefully assist them in performing their listening abilities.

While doing the MUET exam itself, being in a big exam hall, echo has to be eliminated. May we suggest to the university to overcome echo in the Dewan Tuanku Canselor by installing removable carpets where suitable along with soft boards at certain points of the hall. Further study should be done to determine the suitable action towards this matter since MUET has been an obstacle for USIM students to graduate lately. The study should include personnel from JPPF and finance officer of the university.

It is hoped that the teaching and learning lesson of Tamhidi students can be carried out in the best environment, so that students can excel, not only in MUET but in all subjects. Synergized by the efforts by the teachers and administrators, great achievements can be materialized by Tamhidi students.

## ACKNOWLEDGEMENTS

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