Education Bureau
The Government of the Hong Kong Special Administrative Region

AS-12E

FM System

FM system is an effective assistive listening system, which can be used in conjunction with other hearing devices such as hearing aids and cochlear implants for better overall listening effect.

Reasons for using FM system

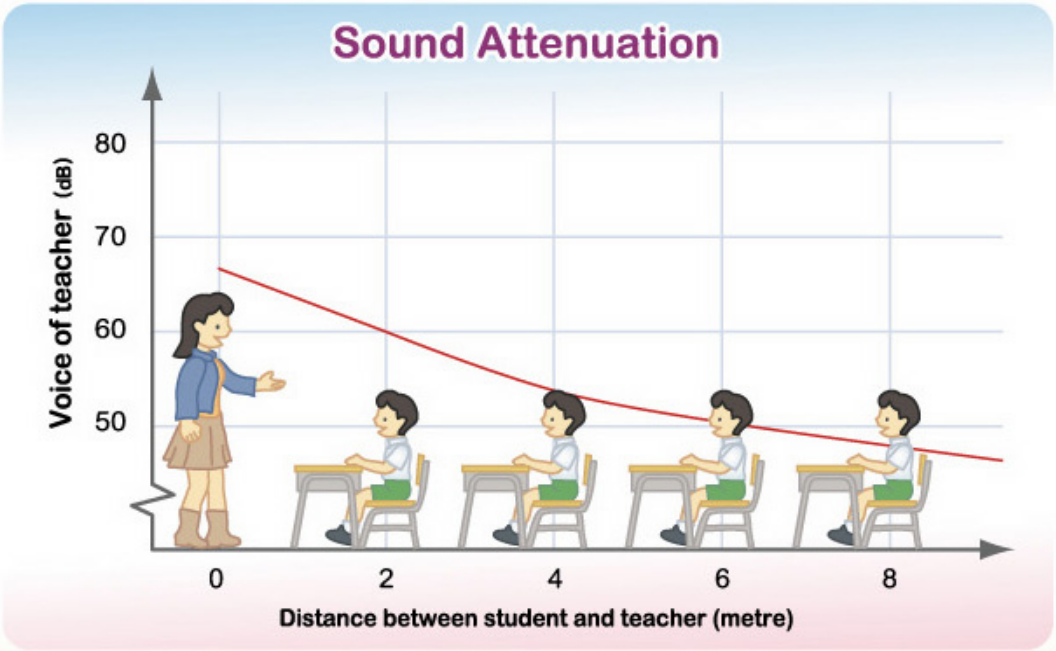
Listening ability is crucial to learning in school. Many schools, unfortunately, are unable to provide a desirable listening environment for hearing-impaired students. The most common hearing obstacles they encounter in the classroom are:

Environmental (background) noise

The voice level of a teacher teaching in class normally reaches 65 decibel (dB) but the background noise of some classrooms may be as high as 60 dB, which means the signal-to-noise ratio of the teacher's voice will be reduced to as low as 5 dB (65 dB – 60 dB = 5 dB). Surveys show that the remaining signal-to-noise ratio should reach at least 15 dB for a hearing-impaired student to hear the teacher's voice clearly. The environmental noise therefore greatly reduces receptive abilities of hearing-impaired students since they have to concentrate persistently on lip reading. This can be very tiring and annoying.

Distance between student and teacher

In brief, the greater the distance between a student and his teacher, the lower the sound volume received by the student. The reception distance of a hearing aid should be no more than 6 feet for it to function effectively. In a classroom setting, however, the distance between students and their teacher may be as far as 12 feet. Although hearing-impaired students usually sit in the front rows, they are still quite far away from their teacher. Also, the teacher may walk around in the classroom, making it more difficult for the hearing impaired students to listen to their teacher and understand the lecture.



Reverberation

The walls of a classroom are usually hard surfaces which reflect sound waves, and create a lot of reverberations (repeated sounds). These reverberations reduce speech clarity and hinder hearing-impaired students' understanding of class teaching.

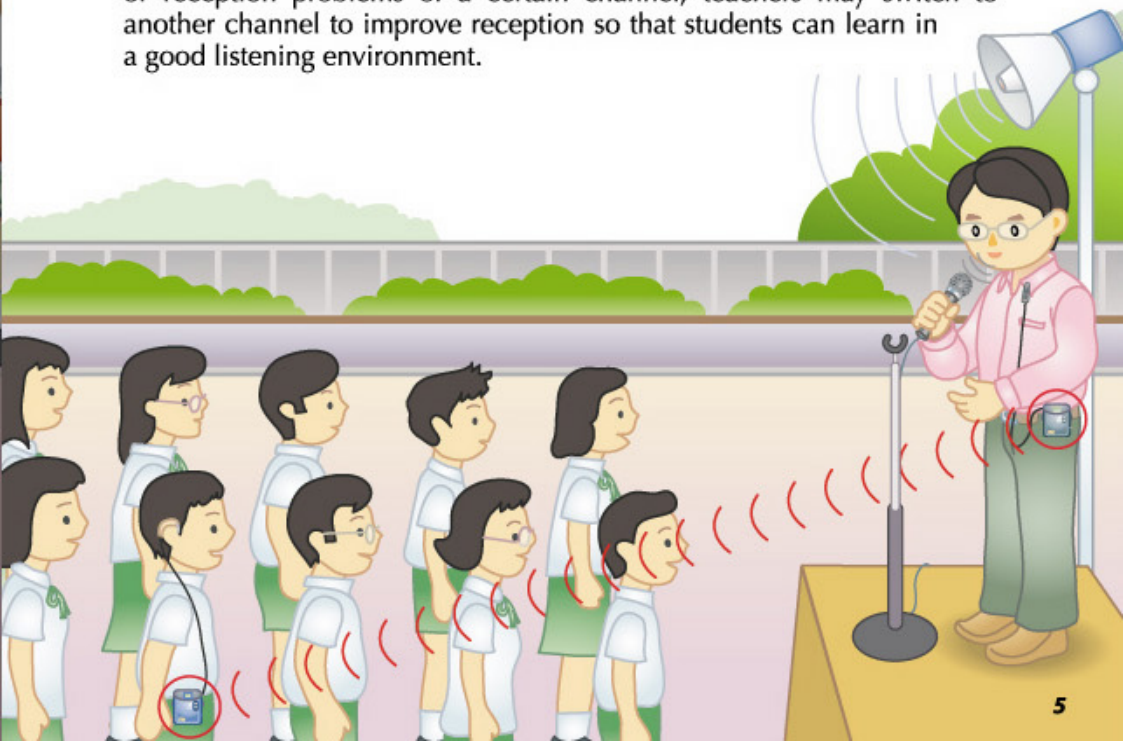
Although a hearing aid can amplify sound, it cannot solve the above three problems effectively. The FM system is thus primarily designed to overcome these hearing obstacles. The system aims at providing hearing-impaired students with a better listening environment and facilitating their participation in class learning activities.

Operation of FM system

The FM system directly transmits the teacher's utterance, in the form of radio waves, via a transmitter to the student's receiver. The signal will then reach the ear through a hearing aid or cochlear implant.

Functions of FM system

- If the distance between the microphone and the teacher's mouth is 6 inches, the hearing-impaired student, no matter where he sits in the classroom, can hear his teacher like he is 6 inches away from him and the listening effect is just as good as they are sitting next to each other.
- The reception range is larger. It can be used outdoor.
- The sound is clear and the receptivity stable.
- Each FM system has its specific channel and will not be interfered by another system used nearby.
- Most FM systems can switch to different channels. Audiologists usually pre-select two commonly-used channels for students:
  - **a. Classroom channel:** For learning in class.
  - **b. Assembly channel:** If there is more than one student using the FM system in school, they can tune to the same channel during an assembly. In that case, teachers / speakers need only to wear one transmitter and these students can receive their messages clearly at the same time.
- Under certain circumstances, such as external interference to the FM system or reception problems of a certain channel, teachers may switch to another channel to improve reception so that students can learn in a good listening environment.



How to use FM system

1. A FM system has two basic units:
   - A transmitter and a receiver.
   - The transmitter is to be carried by the teacher whereas the receiver by the student.

2. The channels available are shown at the back of the transmitter.

3. Students should adjust the volume of the receiver to the level suggested by their audiologists (please refer to the audiological report).

4. Teachers need only to do two things:
   - Wear the transmitter and microphone, with the microphone at a distance of 6 inches from the mouth.
   - Turn the switch to the position of "MIC/AUX".

5. No light signal when the system is in use.

6. "No Battery" signal means inadequate power and that battery replacement is needed.

7. "No FM" signal means unable to receive signals. Teachers should check:
   - if the transmitter is on.
   - if the transmitter and the receiver are using the same channel.
   - if the selected channel is the same as the one recorded in the audiological report by the audiologists.

8. Turn the button to adjust the channel. On finding the right channel, switch off the device first before switching it on again. The new channel is ready for use.

9. To receive external sounds like radios and TVs, use the linking cord provided to connect the "AUX" socket of the transmitter with.....

10. The socket marked with "PHONES" or the sign of a headphone.

11. Teachers may also place the microphone in front of the radio or TV.

12. Teachers should exercise extra care in connecting and disconnecting the linking cord to avoid damaging the FM system and its parts.

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