Hardware-enhanced and software-only language labs – a brief comparison of benefits and drawbacks

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1 Summary

Discussion around hardware-enhanced and software-only language labs has recently included the notions of software-only solutions being a more modern solution. However, although software-only labs are viable solutions in their own right, this perception can be shown to disregard the inherent pedagogical advantages of hardware-enhanced language labs, which still cannot be met by software-only solutions.

Certain features of hardware-enhanced language labs are still beyond the reach of a software-only solution and this should be considered when investing in language learning technology. Some of the key advantages of hardware-enhanced systems include consistent high quality voice communication, reliability of voice functions and the absence of delay during voice transmission. Hardware-enchanced labs are also not affected by other programs being run in the system or by complex communication tasks, which may occasionally cause software-only language learning solutions to 'slow down'.

When a language lab is used for examination purposes, hardware-enhanced solutions offer a secure exam environment with no possibility for outside interference, as well as a guaranteed audio quality throughout the examination process.

All in all, both language lab types have specific benefits and drawbacks. Whereas software-only labs generally offer a more economical alternative, it remains evident that hardware-enhanced language labs continue to provide a pedagogically more advanced solution.

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SANAKO specializes in language learning, virtual meetings and web-based real time conferencing software and licensing, serving academic and business clients globally.

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2 Introduction

The common perception of language learning solutions that utilize any extra components, in addition to the software program itself, is that they are somehow 'dated' technology. However, this point of view overlooks a lot of the inherent benefits of these 'hardware-enhanced' language labs and can be shown to be far too simplistic for a realistic appraisal of the pros and cons of each language lab type.

This paper aims to provide a concise overview of the key characteristics of both 'software-only' and 'hardware-enhanced' language labs and to answer some of the most common questions related to them. We will also illustrate how hardware-enhanced labs are still able to better meet the strict pedagogical needs of language instruction. However, it is best to start by defining the terms 'Software-only' and 'Hardware-enhanced'.

3 What is a 'Software-only' lab?

Software-only labs have no additional connections between the computers other than the standard network cable. The software can be installed onto an existing IC suite, which will then, with the addition of headsets, become a language learning space, in addition to other use. The fact that only software components are needed allows the language learning system to be extended to any room within an institution with computers.

4 What is a 'Hardware-enhanced' lab?

Whether they are referred to as 'hardware-enhanced', 'hybrid', or as 'software plus' labs we are talking about solutions where the language learning software itself is similar to software-only labs, but additional cabling has been included for voice communication and possibly for certain control features. This provides for more functionalities than a software-only solution is able to offer and, perhaps most importantly, guarantees an excellent and consistent audio quality.

5 How good is the voice quality?

The most basic and crucial feature of any language lab system is normally the voice communication. The following compares hardware-enhanced and software-only solutions through looking at some of the most common audio issues and explains how hardware-enhanced labs still correspond better with strict pedagogical requirements for voice quality.

Audio quality – "Could you repeat that?"

To make a simple comparison, most software-only systems will hold telephone audio quality as their reference point. However, the requirements of serious language instruction demand an even better audio quality that allows students to distinguish between minute variations in speech patterns. After all the idea of doing listening comprehension exercises that require detailed understanding over the phone would seem rather strange (actual phone conversation exercises are, naturally, another matter altogether).

Reliability – "Can you hear me?"

Another issue to consider when comparing the voice quality in software-only and hardware-enhanced labs is the question of reliability. In a software-only system, the audio quality may be affected or the connection may even break occasionally if the IC network is being heavily used.

In hardware-enhanced language labs, the audio quality and different voice communication functions can be fully guaranteed as they have their own separate lines. This means that the voice communication is unaffected by factors such as the number of simultaneous speakers, the type of material that is being used and other tasks being performed at the same time (in the lab or elsewhere in the institution).

Delay – "Why am I hearing you late?"

We are all familiar with the experience of watching a TV program where the sound drags slightly behind the image. This issue is referred to as latency and it is to a varying extent always present in software-only labs.

The technical reason behind the delay is that it always takes a certain amount of time to transmit data (in this case voice) from one place to another. Because of this the speakers in a software-only lab hear the words slightly after they see their partner pronounce them. Although the amount of delay varies, even a small delay may disturb the learning experience, for example during pair discussion exercises.

In comparison, hardware-enhanced labs have virtually no delay even during heavy and complicated tasks, such as group discussion, as everything the learners say and hear is transmitted through a 'direct line'.

6 Will something be affected by the language lab and vice versa?

Both software-only and hardware-enhanced language labs include software programs that use the resources of an institution's IC network. However, differences can be noted as to their impact on other activities and the extent to which the labs will in turn be affected by other tasks.

Competition for resources?

Software-only solutions basically have to compete for the available resources with all the other applications that are being used simultaneously. Understandably, this means that if a lot of tasks are being performed simultaneously, the language lab system may 'slow down' and the voice quality may also suffer.

The advantages of hardware-enhanced labs then are directly tied in with the fact that they have their own direct lines for

certain 'heavy' or 'demanding' features. This means that hardware-enhanced labs will naturally put far less pressure on the available resources and that the pedagogical process will not be disturbed by occasional reduced performance.

Interference with other systems?

Since the software-only systems use the computer network for all voice transfer, it is only natural that there exists the possibility of interference with other communication systems that use the same resources. Unless a software-only lab has been properly and carefully configured, this interference may manifest itself as overlapping, as well as breaks in the audio.

A hardware-enhanced solution avoids any potential issues with interference. Since all voice communication goes through separate cables, it will not be affected by other applications.

7 Are there security issues?

Hardware-enhanced language labs provide optimum security in exam situations. Since all audio is sent through an independent system with its own cabling there is no possibility of outside interference. The guaranteed system security and integrity is essential when conducting college placement tests, AP exams and other official tests.

The audio material in software systems is generally, either unprotected, in which case it is possible to access the audio material from outside the classroom, or protected, which can slow down other tasks.

8 Summary of essential pluses and minuses

Hardware-enhanced labs

Pluses:

+
- Excellent audio quality and instantaneous voice communication between instructor and students
- Guaranteed audio quality in all situations
- Reliability even during challenging tasks and conditions
- Advanced monitoring and student control features
- Easy conversion of analog teaching materials
- High level of security for official testing

Minuses:

−
- Requires a classroom dedicated for language instruction
- Hardware components may require maintenance
- Higher cost

Software-only labs

Pluses:

+
- Flexibility, students may be seated in different classrooms
- Easy upgrading and maintenance. No additional maintenance costs, except for the headsets
- Relatively low cost

Minuses:

−
- Delay in voice communication between learners
- Audio quality may be affected by other usage of the school network.
- System may 'slow down' when the network is heavily used.
- Limited student monitoring possibilities
- Possible security issues during testing
- Conversion of existing teaching materials is time-consuming