

Cafegymnasium: The One-Size-Fits-All Approach for Schools

By Rose Mary Su and Scott R. Jordan

In schools where space and/or budget are limited, designers have to be creative with space planning. Often multiple uses are addressed by a single, large assembly space to get more value from these spaces. In lower schools, such as K-8, the most common combination is the amalgamation of the auditorium with the cafeteria or a gym. These hybrids can make sense because most of the time the two functions do not conflict in schedule. Unfortunately, the savings in space comes with inevitable compromise for the acoustics of the performing arts space. If your school is taking this combination approach, let's call it the "cafegymnasium approach." There are a few acoustical and audiovisual system design considerations to evaluate in order to provide the right kind of balance.

First, it is difficult to design an auditorium space that is also used for other functions. The acoustical design of an auditorium is different than that of any other school space, because of the specific demands of the performing arts, which distinguish the auditorium from other types of large assembly spaces or a lecture hall. The auditorium will provide many students their first introduction to performing arts, both as audiences and as performers. When a space is dedicated specifically for music performance, the room is tailored to provide a specific performer and audience environment, and a specific acoustical response.

One of the main parameters used to evaluate the acoustical condition of a space is the reverberation time (RT), which is the time required, in seconds, for the average sound in a room to decrease after a source stops generating sound. The RT of a space is dependent on the volume and the amount of sound absorptive materials in the space. In general, the more sound absorption the space has, the lower the RT. For an auditorium space dedicated to performing arts in a school facility, the recommended RT is generally much longer than the RT of a gymnasium or a cafeteria. Performers often speak positively of a performance space "speaking back" to them, which means they can hear their sound filling the room and returning to their ears.

Cafeterias and gymnasiums are a completely different type of assembly space compared to the auditorium. Unlike the auditorium where the audience is generally quiet and only the performers generate sounds, the gymnasium and the cafeteria are active spaces where anyone within the space would potentially generate sound. When there are excessive sound sources in a relatively reverberant room, noise buildup would occur when there are too many active noise-generating participants, making the space extremely uncomfortable acoustically. This is especially noticeable in a space with very low volume and almost no sound absorption. Acoustical design for these spaces seeks to avoid letting the space "speak back" to the occupants; rather, the design seeks to control activity noise from occupants.

There isn't a one-size-fits-all solution to this problem. When a dedicated space such as an auditorium is combined with a cafeteria or a gymnasium, the acoustical conditions cannot be designed the same way as a space that is only dedicated to performing arts. There is a need to provide a compromise to accommodate for both uses.

The best way to think about this problem is to assume that more than 90 percent of the time the hybrid space would be used as the cafeteria or the gymnasium. We would also assume that 10 percent of the time the

space would be used for musical or theatrical performances. Because of this, it is important to focus on the 90 percent so that the space is satisfactory to the occupants most of the time. The hybrid space needs to be designed more like a typical cafeteria or a gymnasium with a lower RT than a dedicated auditorium. This means a significant amount of sound absorptive finishes at the ceiling surfaces and additional sound absorption at the walls for the larger volume spaces. This is most common for the gymnasium.

By providing an acoustically dry space with a lower RT, this would make the hybrid space less ideal acoustically for performances. Users will more often resort to using sound amplification for performances than they might in a purpose-built performance space. It is necessary that a high-quality sound system be provided since the space would be used for a wide range of applications.

Unlike an auditorium that would typically have a dedicated control location in the audience area for a sound operator and a booth for equipment, there is typically no dedicated front-of-house location for an operator and audio-mixing console in these hybrid spaces. The audiovisual (AV) equipment would most likely reside onstage or in a dedicated AV closet nearby. The AV system design typically includes connection panels that allow for portable equipment to be used, for audio and video sources to be connected and for additional loudspeakers, such as stage monitor loudspeakers, to be plugged in and used.

For most applications, the AV system would be located in a combined AV rack operated by school staff members who may have minimal experience running an AV system. These systems have to be easy and intuitive to use. A well-thought-out control system can remove the fear that the inexperienced might have with running the AV system, allowing them to easily run any type of simple AV presentation.

A control system will typically have a processor that is connected to all the equipment in the system and programmed to issue central commands to operate the equipment via a touch panel in the room. These controllers work with the control system to effectively reduce complex system operations down to a simple button push. While the control system may add a layer of complexity and cost to the overall AV system design, the end result is an AV system that will be easy to use for the end user, resulting in the audiovisual system being used more often.

There are other considerations that are not directly related to the audiovisual system, but can directly impact the design of the system. Lighting, both electrical and natural, is common in both cafeterias and gymnasiums. Controlling the light in these spaces is essential for video presentations or theatrical productions. If a room is naturally bright, without any means to shade off windows, this can require a significantly larger, brighter and more expensive video projector to achieve the same perceived brightness and contrast that a space with more control over lighting can achieve with a smaller, less expensive projector. Such conditions can also limit theatrical productions.

Careful coordination between the AV system designer, the acoustician and the architect is critical in providing the right type of room with appropriate room finishes and AV system requirements. Schools should think carefully



Photo Credit: Symmes Maine McKee

The auditorium Natick High School acts as a mixed-use space for students, combining gymnasium and auditorium services under one roof.

about whether a hybrid space is appropriate for the student population. If the school's performing arts program is strong, a hybrid space may be inappropriate. In such schools, a high-quality space dedicated to performance arts should be a priority. For some elementary schools and middle schools where the music and drama programs are a smaller component of the learning experience, a cafegymnasium may provide the best value for a limited budget and space.

Rose Mary Su and Scott R. Jordan are consultants in acoustics and audiovisual systems at Acentech Inc. in Cambridge, Mass. They can be reached at rsu@acentech.com and sjordan@acentech.com. Jonah Sacks of Acentech also contributed to the article.

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