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Design Guidelines for Learning Space AV Systems & Associated Infrastructure Clinical Skills Rooms

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1 INTRODUCTION

1.1 FACULTY OF MEDICINE DISTRIBUTED MEDICAL PROGRAM

In 2004, the University of British Columbia (UBC) Faculty of Medicine (FOM) initiated its Distributed Medical Program (DMP), the purpose of which is to provide equal access to medical teaching and training for students, residents, and practicing physicians across BC. The DMP is made possible by technology-enabled learning spaces located at university sites (UNBC, UBCO, UVic, and UBC) as well as Clinical Academic Campuses and Affiliated Regional Centres located across the province. Many of these spaces are also videoconference (VC)-enabled and are connected to each other via the central VC Bridge, all of which rests on a dedicated network called the Distributed Medical Program Audiovisual (DMP-AV) network.

1.2 DOCUMENT PURPOSE

This document is part of a collection of documents referred to as the **UBC FOM Design Guidelines for Learning Space AV Systems and Associated Infrastructure** (henceforth referred to as AV Design Guidelines). They provide guidelines for technology-enabled learning spaces based on best practices and extensive organizational experience developed since 2004. Each learning space type has (or will have) an associated AV Design Guideline document with high-level information about that space type. If additional, more detailed information is required, it can be provided by the UBC FOM project team. Please see section 4 for contact information.

The AV Design Guidelines are generally used in the early stages of a facilities project, along with the Functional Program and/or Project Plan, to align various stakeholders around a common, high-level vision of a given space. Where a functional plan includes technology-enabled rooms, the corresponding AV Design Guideline document(s) should accompany it. If a project is approved, the applicable AV Design Guidelines will be provided to all project team members and contractors.

This document in particular presents high-level guidelines for clinical skills rooms (CSRs) which are used for years 1-4 and beyond for clinical skills teaching and examination techniques.

The AV Design Guidelines are intended to encourage and facilitate conversation between designers and the UBC FOM project team to confirm that all designs match the intended use of the space. Information contained in this document (and all UBC FOM AV Design Guidelines) should be considered guidelines[1]. In every case, the project design team must consult with the UBC FOM's project team to clarify requirements and develop and approve designs specific to the space. The contents of this document will never supersede UBC project team decisions, a specification document, detailed design, or any other source that is considered by UBC to be more directly relevant to the project at hand. Furthermore, the contents of these documents must not be used as contract language.

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[1] A guideline is a general rule, principle, or piece of advice. As used in this project, guidelines are not considered mandatory. They are to be used to determine a course of action and are intended to enable alignment towards common designs. (Oxford Dictionaries Online: http://oxforddictionaries.com/definition/english/guideline?q=guideline)

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1.3   ROOM USAGE DESCRIPTIONS

CSRs are used in different ways throughout the medical program. In years 1 and 2, CSRs are used by 2-9 students and, more typically at the Vancouver site, by, 8 students, plus 1 instructor/clinician and 1 volunteer or standardized patient and sometimes 1 family member. In years 3 and 4, they are generally used by fewer students. CSRs are generally located at clinical academic campuses.

Clinical skills rooms are used by students and residents to practice performing clinical procedures within a safe learning environment. Procedures are usually conducted on volunteer or standardized patients (actors), or for more sensitive procedures, on task trainers or advanced clinical skills devices. Clinical skills rooms are also used to conduct exams, such as the objective structured clinical exam (OSCEs) for years 1 - 4. Clinical skills rooms are regularly used by students in years 1 & 2 for "Clinical Skills" and, at some distributed sites for "Doctor, Patient and Society" courses.

Technology is used to support the delivery of clinical skills education by enhancing access to materials that students can use to prepare, review, and debrief. However the primary objective and focus is always on the student's interaction with the patient, building communication skills, rapport, learning new skills and refining approach to clinical encounters, preparing students for medical practice.

1.4   FUNCTIONAL REQUIREMENTS

In a clinical skills room, the participants should be able to:

- Interact with a volunteer or standardized patient as they would in a real doctor's office, including access to an examination table, head wall with diagnostic equipment, and supplies such as sutures and gloves.
- Display electronic material from either their laptop or a room-based computer so that all participants in the room can see it.
- Have access to a whiteboard (movable or mounted).
- Access internet-based resources from a laptop or a room-based computer.
- Access and play videos, both in DVD format and digitized.
- Record their interactions with each other and with 'patients'.
- Play back the interaction recordings immediately.
- Store the recordings for later play back.
- Not see the observer(s) located outside of the clinical skills room.
- Not hear discourse from/between the observer(s) located outside of the clinical skills room.
- Have an indication (e.g.: a small light) that outside observers are able hear discussion in the clinical skills room.

In addition to the above requirements, an evaluator or instructor should be able to:

- Observe the clinical skills session from an enclosed position outside of the room, without being seen by the participants in the room.
- Hear the clinical skills session from a position outside of the room and be able to increase, decrease, or mute the volume.

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- Comment on the clinical skills session from a position outside of the room without being heard by the participants in the room.

If the physical space constraints allow it, it is preferable to have observation pairs to meet the observation requirements. The spaces should also have infrastructure to support IP cameras to enable recording of interactions that take place within the room for student learning. Consult with the UBC FOM project team to determine the best solution combination for a given project and space.

This document specifies infrastructure to support these functional requirements. Specific systems (e.g.: IP cameras, recording systems, etc.) are not included in this document.

2   OVERVIEW OF TECHNICAL SOLUTION

Some attributes of clinical skills rooms are:

- High definition digital display – This is used to review procedural instruction videos, prior to launching into a clinical skills class; review exhibits to enhance the students' ability to correlate diagnostic information with case history (x-rays, lab results, photographs, medical records, etc). Increasingly these items are accessed in digital format within the clinical settings. Students and educators can also refer to other information to help with their learning during these sessions.
- Recording cameras – Recording a student conducting their procedure provides unparalleled capability to provide feedback objectively. The ability for a student to record their procedure, and immediately playback for debriefing enables the student to collect important feedback, just-in-time, when the learning opportunities are still present. Recording also allows for the educator to annotate comments for the student to consider during self-study reflection or for exam preparation.
- Observation rooms – Just like recording, observation rooms allow for students and educators to watch a colleague during a presentation, and make notes for learning opportunities whilst the procedure is taking place. The use of observation rooms allows the student performing the procedure to do so without the distraction of their colleagues looking on in the room, and also provides a level of comfort for the patient. Learning opportunities are very similar to recording. Some, but not all, clinical skills rooms have observation rooms.

Given that the room should closely model a patient examination room, there are many things that need to be in the room (e.g.: sink, soap, and paper towels are required for hand washing, cleaning materials, and teaching specific procedures, such as dialysis). Please see the functional program and the non-AV equipment list for additional information regarding these non-technical requirements.

The room should also have-appropriate architecture, acoustical treatments, wall and furniture colours, lighting, cooling, power and data ports, and cable pathways. The following sections describe guidelines for additional aspects of room and AV system design. Spaces are primarily used during business hours (6am-6pm Monday-Friday), but can be used at any time. Exams typically occur on weekends which needs to be considered.

AV equipment in this space has a life cycle. The best practices included herein consider renewal as part of this.

3 TECHNICAL SOLUTION DESCRIPTION

The following content is divided into trade specific sub-sections related to specific infrastructure needed in order for the AV system to function as intended. The sections are as follows:

1. Architecture & Interior Design
2. Mechanical
3. Electrical
4. Data & Telephone
5. Acoustics
6. AV System

The information contained in this AV Design Guideline is relatively high-level and intended to be used for early project planning (e.g.: budget estimates) and to create a common understanding of what is necessary for CSRs to be fit for intended use. Once a project has been approved, this AV Design Guideline document can also be used to inform detailed design of the spaces.

All information in this document should be considered as in support of the AV system. There are additional infrastructure requirements unrelated to the AV system, and thus not contained herein, but that are still necessary for the space to be fit for intended use. For example, power outlets not required for AV components, door sizes, wheelchair access, etc. These should be included in the space design developed by the architect.

3.1 ARCHITECTURE & INTERIOR DESIGN

3.1.1 GENERAL DESCRIPTION

- CSRs hold up to 11 people (9 students + 1 tutor + 1 patient).
- The floor space should be 17 to 23 net square meters.
- Each clinical skills room should have a door with a push button code with key override or key card access with key override lock.
- If there is a common door to the area where the clinical skills rooms are located, it should have card access.
- There should be a whiteboard permanently installed in each clinical skills room. It may be retractable. Minimum whiteboard size is 6'x4'. If there is not enough wall space to facilitate a permanently installed white board, a movable whiteboard is an acceptable alternative.
- One of the walls should be able to accommodate the load of the flat-panel display (up to 150lbs).
- The UBC FOM project team should specify which wall will be used for the display, subject to the functional requirements. Corner mounts are not acceptable.
- In existing facilities, where walls haven't been designed to accommodate the load of a flat panel display, ¾" plywood may be installed. This plywood should be attached to at least 3 studs and should be painted the same colour as the wall. In some areas, plywood may need to be treated with appropriate finish to meet infection control specifications.
- The clinical skills room may require shelving or cabinetry for small items used in clinical procedures such as hospital linens, hospital gowns, gloves, otoscope tips, tongue depressors, sutures, etc.

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Shelving/cabinetry should not be mounted directly below the flat panel display. Please see the functional program for additional information.

- Clinical skills room will require one wall to be dedicated as the 'head wall' where the diagnostic set, examination table, and ample standing room are available. The display, window, and whiteboard should not impede this area. Please see the functional program for additional information.
- Sufficient wall space should be available to accommodate an observation window (if needed), a plasma display with attached speakers, a white board, anatomical charts, bedside equipment, bed headboard, and cupboards.

3.1.2 WINDOWS

- Designers should consult with the UBC FOM project team on each project to determine which rooms require observation windows.
- If required, one of the walls of a clinical skills room may have a window to an observation position or adjacent clinical skills room, with one-way glass between the "observation" room and the "activity" room. The window dimensions should be 8' wide by 4' high. The bottom edge of the frame should be 30" above finished floor.
- The observation window should have retractable blinds. A horizontally retractable whiteboard is an acceptable solution, in which case the whiteboard should be large enough to cover the window.
- It is preferable that clinical skills rooms have no exterior windows except for the observation position, to preserve patient privacy.
    - If non-observation windows are unavoidable, adequate wall space for headwall, display, whiteboard, and anatomical charts should be provided.
    - If non-observation windows are unavoidable, appropriate window coverings (e.g.: blinds) should be provided. Blinds should be 100% blackout to ensure patient privacy whilst changing and for privacy during examination procedures.

3.1.3 FURNITURE

- Each clinical skills room should have the following furniture:
    - 11 slim, stackable, plastic, washable chairs
    - 1 plastic folding table
    - 1 rolling doctor's stool
    - 1 small table or stand with wheels for a laptop or other portable equipment
    - 1 small over-bed table for teaching models
    - 1 standard patient bed/examination table
    - Diagnostic set
    - 1 floor standing examination light
- An effort should be made to have furniture match the esthetics of the room and existing furniture styles.
- The clinical skills room should have millwork (cabinets, cupboards, and counters) in accordance with a usual doctor's office design and layout.
- Please see the functional program and the non-AV equipment list for more information.

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3.2   MECHANICAL

3.2.1   HVAC AND HEAT LOAD

- Cooling systems should be designed for a heat load from the specified equipment and a team of up to eleven performing intensive work and one person dressed only in a hospital gown inside the room for one or more hours with all doors closed. It is preferred to have individual temperature control within each room. This is especially important when students are working in smaller groups with one patient, the patient becomes very cold if the temperature cannot be adjusted to a comfortable level for someone dressed only in a hospital gown.

3.2.2   PROTECTION FROM WATER DAMAGE

- All AV equipment should be protected from damage caused by plumbing failures and excessive condensation.
- If overhead water pipes exist, the designs should include a mitigation strategy in the event of a leak.

3.3   ELECTRICAL

3.3.1   LIGHTING

- The clinical skills room lighting should meet or exceed classroom standards.
- The observation room or area should have dimmable lighting so that the one-way glass is effective.

3.3.2   POWER OUTLETS

- There should be one, standard duplex power outlet on the wall for the display.
    - The power outlet for the display should be behind the display.
    - If the power outlet for the display cannot be located behind the display, the power cord should be hidden behind surface-mounted Panduit or wire mold.
- There should be two standard, duplex power outlets above the ceiling tiles on the observation window wall in each clinical skills room (for an IP camera and audio system, as needed).
- In addition to the above, clinical skills rooms should have sufficient power outlets to accommodate:
    - A portable recording/playback device;
    - Participants' laptops.
    - The diagnostic set (power outlet for this should be located at the head of the examination table).
    - Examination light.
    - Examination bed (depending on the bed specifications, some have a heated drawer for instruments) and some may require power assisted height adjustments.
    - Task trainer (computerized simulator).

3.3.3   CONDUITS AND CABLE PATHWAYS

- There should be no visible cabling in the room; surface-mounted Panduit or wire mold is an acceptable option for renovated existing facilities with no drywall (or where in-wall conduit is not feasible).
    - Surface-mounted Panduit or wire mold should be screwed in place rather than glued. Square or rectangular Panduit is preferable to round Panduit.
- There should be a mud ring on either side of the wall above the ceiling tile on the observation window wall to accommodate the microphone cable and the low-voltage cable for the light in the activity room (see audio system section for details).
- In the observation room, there should be a location for volume control (usually to the right of the observation window) with conduit for low-voltage wires up into the ceiling space in the observation room.

3.4   DATA & TELEPHONE

- Clinical skills rooms should have wireless internet access to the UBC network.
- There should be a single data jack above the ceiling tiles in each clinical skills room to accommodate an IP camera.
- There should be two data jacks in each clinical skills room to accommodate computers. Location to be confirmed by the audiovisual designer.

3.5   ACOUSTICS

3.5.1   BACKGROUND NOISE

- Noise control measures must be undertaken to achieve a background noise criterion of NC 30-35 for the clinical skills rooms.

3.5.2   NOISE ISOLATION

- Clinical skills room must achieve a Sound Transmission Class (STC) rating of STC 50-54.
    - Groups of students in adjoining rooms should be able to converse at normal levels and not interrupt their colleagues in adjacent rooms.
    - Appropriate sealant of observation windows should be in place to increase noise isolation. The observation windows themselves should also meet this STC rating.
    - Two layers of 16 mm thick Type X gwb on each side with 25 gauge studs is generally sufficient to achieve this STC rating.
    - Solid core wood or filled metal doors with full perimeter acoustic seals including an automatic door bottom should be provided.

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3.6   AV SYSTEM

3.6.1   AUDIO

- All clinical skills rooms should have side-mounted speakers attached to the displays (provided by the display manufacturer) for audio produced by display connected devices.
- In rooms acting as an observation side of an observation/activity pair, two speakers should be mounted in the ceiling above the observation window to produce audio from the activity room.
- In rooms acting as an activity side of an observation/activity pair, a ceiling microphone should be installed in the center of the ceiling to provide audio to the observation room.
- A small red light should be installed in the ceiling of the activity room immediately above the observation window, and should illuminate whenever the audio system is turned on.
- A volume control should be mounted in the observation room to the immediate right of the observation window. The volume knob should also control the power to the audio system and the light indicator in the activity room.

3.6.2   DISPLAYS

- All clinical skills rooms should have a 42" to 60" flat panel display mounted to one wall, usually 50" above finished floor.
- There should be a VGA cable for any participant to be able to connect their laptop, and the display should be ready for digital connections (i.e.: HDMI).
    o The cable should be neatly stored while not in use – it may be hung on a hook on the wall below the display.
    o The cable must be long enough to reach to any participant's laptop within the room.

4   CONTACT

If you have questions or require additional information, please contact Izaak Housden, Sr. Technology Analyst, Island Medical Program at ihousden@uvic.ca or 250-472-5506.

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5   REFERENCE DIAGRAMS

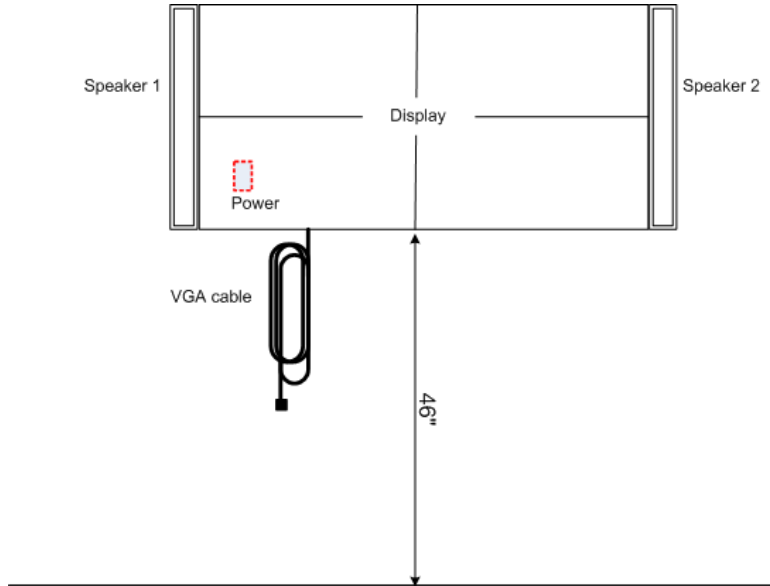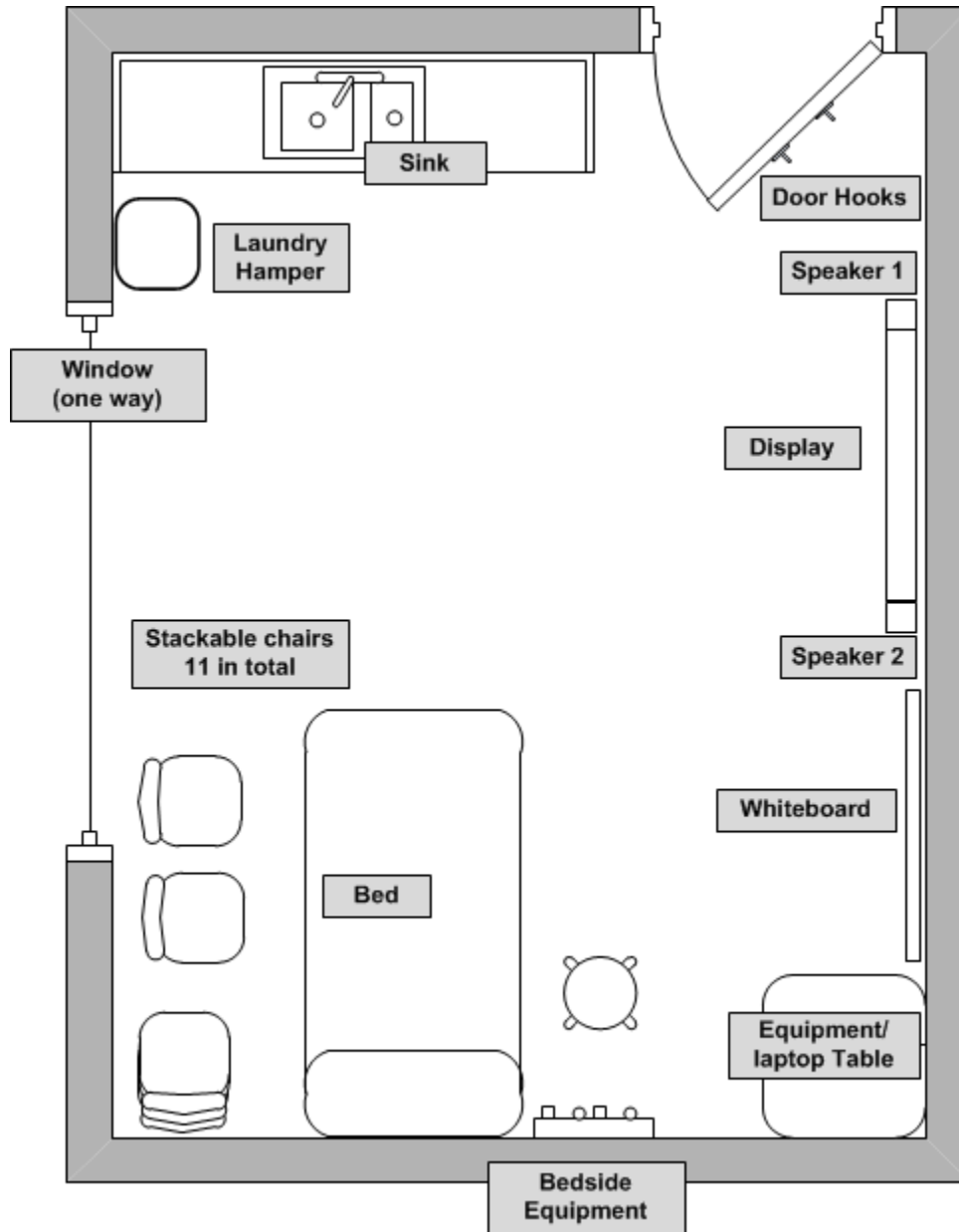**Figure 1: Display diagram**

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Figure 2: Birds-eye floor plan layout

Please note: Placement of the display and the window and general the room layout will depend on room geometry and other structural constraints. Please contact us for additional information.