Breaking Boundaries: Improving Ensemble Performance Through Interactive Video Conference Technology

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Part I: Interactive Video Conference (IVC) Technology and Teaching Music

- What is interactive video conference technology?
  - Used to communicate with both video and audio live and in real time.
- It can:
  - Inspire, motivate and engage
  - Introduce new concepts
  - Reinforce
  - Provide remedial help or enrichment
  - Aid in contest preparation
  - Private lessons with no geographical boundaries
  - Provide exposure to high level music performances

Part II: CIM's Background

- Early pioneer—began using this technology in 1998!
- Currently, we provide instruction via video conference for:
  - Conservatory students
  - K-12 students
  - Senior centers and community groups
- 400-600 connections annually
- Work regularly with K-12 schools around the world

Part III: Optimizing Sound (see p. 5)

- Most video conference systems are optimized to transmit the sound of the speaking human voice in the following ways:
  - Automatic Gain Control
  - Noise Fill
  - Noise Suppression
  - Dynamic Compression

Part IV: Ways to Connect

- Skype
- Desktop Platforms (such as Vidyo)
- Tablet/Smartphone Apps (like Polycom RealPresence)
- Video Conferencing Codecs
- DVTS
- **How to choose:**
    - Price: upfront and ongoing
    - Connection quality: sound and picture
    - Options for improvement

Part V: Skype

- Advantages:
    - Free
    - Readily available
    - Runs on almost anything
- Disadvantages:
    - Need a solid internet connection
        - Hard-wired is better than wifi
    - Extreme ranges are easily distorted
    - Dynamics are compressed
- Ok for singing (?)
- Adding an external microphone:
    - We used Yeti Blue
    - Around $100
    - Multiple pick up patterns for various situations

Part VI: Vidyo

- Software-based
- Runs on desktop or laptop using a webcam
- More stable than skype or other free services
- Connects through a browser like Firefox or Internet Explorer
- One party can pay for software ($100/month) and then share with other sites to which they want to connect for an additional $5.
- Hard-wired connection yields best results

Part VI: Codecs

- CIM uses Polycom; other brands include Lifesize, Cisco/Tanberg, Marconi (mostly in Europe)
- Polycom has **Live Music Mode**
    - Algorithm
    - Allows for capture, transmission and reproduction of nearly the entire range of audio frequencies
- Internet2
    - Nationwide, high speed, high bandwidth academic and research network
- Expensive, but yields best possible results
- Pressure from software based solutions to reduce cost.
- Microphone choices

Part VII: Polycom RealPresence

- Devices
    - Lower cost than typical Polycom unit
- Software
    - Free app for apple and android
    - Paid version for desktop/laptop
        - Buy host server and licenses
- Connection quality is crucially important
    - Compare good vs. bad wifi connections

Part VIII: DVTS

- Digital Video Transfer System
- Experimental and unstable, BUT extremely high quality
- Requires 1,000 times more bandwidth than a typical Polycom connection

Part IX: Troubleshooting

- Firewalls
- Microphone Placement
- Bandwidth
    - More is better

Part X: Using IVC in Performance-Based Music Classes

- Coaching sessions
    - Access to great teachers regardless of geography
    - Can coach anything—full ensemble, sectionals, small groups, private lessons
- CIM Prep: Can enroll from anywhere and take lessons through IVC
- Quick Tips
    - DELAY: Typical ½ to 1 second
        - Easiest to just avoid this by not trying to sing/play together
        - Call and response/echo methods are very effective
    - May need to stop and start more frequently
    - Need cooperation of far end teacher
    - Test call
    - Use a camera that can zoom in and out

Part XI: Working with CIM and/or Other Institutions

- **Content Provider**: Institution that provides educational video conferences that are aligned to national and state standards
    - Two in the US for classical music: Cleveland Institute of Music and Manhattan School of Music
    - Thousands exist, offering programming on virtually every topic.
    - To search, visit the Center for Interactive Learning and Collaboration: www.cilc.org
- We schedule on demand
- Classes are typically 45 minutes, but we're flexible
- Register 4 weeks ahead
    - Pre-conference lessons
    - Test call
- Point to Point: $175
    - Discounts available throughout the year and for multiple sessions
- Multipoint: Free-$50

Part XII: Grants/Cost

- Your school may already have the technology in place
- Costs of systems are coming down
- Software-based platforms are much more affordable
    - May or may not work for performance coaching
- Obtaining grant funding

Part XIII: Time for Questions

MOST PLATFORMS ARE DESIGNED FOR PEOPLE TALKING

Therefore, they employ the following features:

- **Automatic Gain Control:**
  - Dynamic Range= Data= Bandwidth
  - Very soft dynamics- interprets as background noise- more hiss
  - Squashes loud dynamics
  - Everything will sound pretty much the same range

- **Noise Fill**
  - Soft, high voice—cranks up
  - Problematic for flute—sound continues on in a loop

- **Noise Suppression**
  - Listens for background noise, like a/c unit, and eliminates it
  - Problem for long, low sustained notes—sound will disappear

- **Noise Compression**
  - Squashes everything to "accepted dynamic range"
  - No compression at all would explode bandwidth

****Live Music Mode *(from Polycom)*****

- Eliminates auto gain, noise fill, and noise suppression
- Need to be manually cautious of levels
- Running sound board is specific to individual instruments