



# White Paper: Ensuring the quality of training when classroom instruction is delivered via virtual classroom

## Context and purpose

The COVID19 crisis has illustrated the need for both training organizations and operators to expand remote teaching/instructing, as traditional classroom instruction was not possible in many parts of the world.

Classroom instruction remains a traditional means of delivering academic, theoretical and operational knowledge for both licensing training and operator training. It is part of the regulatory requirement for personnel training in most of the aviation disciplines, even though some regulations recognize Virtual Classrooms (VC) instruction by means of videoconferencing, in real time, as a means of compliance to the amount of time spent in an actual classroom.

In parallel, the aviation industry has a limited level of experience in conducting Virtual Classroom, which includes videoconferencing .

The purpose of this white paper is to provide recommendations to operators and training organizations wishing to implement virtual classroom instruction for aviation academic, theoretical and operational knowledge, while maintaining an acceptable level of training effectiveness and knowledge transfer.

In this paper, the following acronyms are used:

- AOC: Operator holding an Air Operator Certificate
- ATO: Approved Training Organization
- VC: Virtual Classroom Instruction (which includes videoconferencing, etc.)



## Risk Assessment

Topic	Risk	Mitigation
Level of communication as within an actual classroom	<p>Marginal active exchange between the students and the instructor</p> <p>Poor non-verbal communication cues (loss of student understanding ...)</p> <p>Poor level of student attentiveness</p> <p>Marginal management of interruption by student asking questions</p>	<p>Definition of a proper level of communication and interaction for both the communication/interaction initiated by instructor and those initiated by student).</p> <p>Define ideal VC lesson length and associated breaks in between lesson sections.</p>
Equipment	<p>Poor pace and noisy/busy room or inappropriate room to study</p> <p>Poor video/picture resolutions or audio hindering comprehension of the training material</p>	<p>Definition of appropriate equipment and environment for suitable VC instruction and learning</p>
Tool	<p>Poor instructor assessment of the students' level of communication</p> <p>Poor identification of the actual student attending the instruction</p> <p>Poor capacity of the tool for students to achieve the learning objectives</p>	<p>Definition of appropriate functionality of the Tool for virtual classroom instruction</p> <p>Create a procedure for taking attendance.</p> <p>Ensure students are truly present in the VC by regularly interacting with them via the techniques taught during the instructor familiarization training.</p>
Instructor competence	<p>Lack of instructor familiarization with virtual classroom instruction systems</p> <p>Inappropriate instructional methods to virtual classroom instruction</p> <p>Instructor assessment methods inappropriate to virtual classroom instruction</p>	<p>Definition of instructor specific familiarization for training and assessment with virtual classroom instruction system.</p>
Training material	<p>Training material not adapted to VC</p>	<p>Short term: review training material and adapt where required/possible.</p> <p>Long term: take VC teaching into account when developing future training material.</p>



Topic	Risk	Mitigation
Training effectiveness	<p>Lack of monitoring of the trainees by the instructor</p> <p>Exceedance of trainee's cognitive limitations</p> <p>Implementation of VC with limited previous experience</p>	<p>Determination of acceptable instructor/trainee ratio and limitations for VC training time.</p> <p>Use of a producer and administrator to minimize instructor workload.</p> <p>Instructor specific familiarization</p> <p>Procedures to ensure satisfactory trainee progress.</p>
Regulatory Approval	Regulators globally may not understand or be comfortable with the technology and may block implementation.	Proactively proffer risk assessments, change management and completion data from any successful implementation for any industry or discipline.
Connectivity Adequacy and Potential Failures	Stakeholders will attempt to connect from different devices, over different networks causing disruptions or disconnections to the flow of training	Design, implement and communicate procedures and standards to overcome the risk.

## Ensuring the quality of training when classroom instruction is delivered by virtual classroom instruction

Part of classroom instruction delivered by an instructor to a student may be replaced by VC if an acceptable level of communication is ensured with appropriate equipment and tools.

A variety of tools are available to training organizations and operators to deliver VC in real time via an online platform.

The following section provides recommendations for AOCs and ATOs to ensure that students make satisfactory academic progress under the supervision of competent instructors and that a reliable record for the completion of training is maintained.



## Virtual Classroom Instruction – Level of Communication

An acceptable level of communication should meet all the following criteria:

- (1) Continuously maintain an active interaction: dynamic and two-way flow of communication without delay
- (2) Capability to share relevant material, as specified in the training manual, for the appropriate lesson, unit or course
- (3) Maintain a "Video and Audio" interactive communication by allowing for non-verbal communication cues (tone of voice, facial expression ...)
- (4) Ensure an appropriate level of student's attentiveness by providing guidance to the students such as quiet room without distractions
- (5) Ensure a policy for the use of the online platform such as "raise your hand, question"...
- (6) Monitor what the instructor's screen displays
- (7) Capability to follow the part of the presented content the instructor is focusing on by means of a digital pointer
- (8) Develop a Quick Reference Guides for instructors and students with the policies and procedures and techniques related to VC

## Virtual Classroom Instruction – Appropriate Organization, Equipment and Tools

### Organization

The experience gathered by corporate learning departments that have been hosting virtual classrooms successfully for several years, suggests that delivering training in a virtual classroom is best accomplished as a team rather than a single individual. Their experience suggests the following roles, for optimal delivery.

- **Producer:** The virtual classroom expert who provides technical expertise. Additionally, this role ensures the session starts and ends on time, manages the chat area, manages polls, sets up exercises and provides first line student IT support.
- **Instructor:** The instructor in charge of leading the training session, who has received additional training and assessment in the delivery of training using this medium.
- **Administrator:** The person in charge of event planning, instructor/producer logistics (are they co-located or remote from each other), course enrollment (including providing log-in details and ensuring course preparatory materials and guides are available) and ensuring the training record is updated as required.



### **Equipment**

The Equipment should ensure an acceptable level of communication without technical interruptions during the lesson, unit, or course.

The organization should define the screen characteristic to have a high enough resolution to watch videos or read computer files related to the available training materials.

### **Tool**

The tool should ensure visual identification of the students and continuous assessment of the level of communication with all students.

The tool should permit the instructor to achieve similar training and learning objectives and quality of instruction as in the actual classroom instruction, as defined by the organization. Key tool features that permit this, include:

- White board feature that can be opened up to participants to collaborate
- Breakout rooms, to replicate in-classroom group learning activities
- Chat – both private and group chat
- Concurrent users – maximum number of instructors and students per meeting
- User screen sharing – both for instructor and students
- Status change icons – to allow students to raise hands, use emoticons etc.
- Multiple File types that can be loaded and viewed

## **Virtual Classroom Instruction – Appropriate Course Content and Training Material**

### **Course Content**

The AOC and the ATO must analyze the Learning Objectives (LOs) of the course they want to deliver by means of VC, to identify the LOs of the course that are suitable for a VC environment and those that are not. Not all LOs will be suitable for the VC environment.

The training plan must potentially be adapted to VC delivery. This can be done by utilizing the tool features described above. For example, adapting verbal quizzes to polls, small-group activities to groups in virtual breakout rooms, raising of hands to the use of status change icons, writing on a flip chart to using the virtual whiteboard.

### **Training material**

Training material must be adapted to the VC environment. Develop an instructor guide that describes the activities and tools, with a detailed timeline and division of tasks and roles between instructor and producer (where used).



Training material characteristics to be considered:

- (1) Content and lesson flow for VC
- (2) Incorporation of VC tool features (e.g., chat, etc.) into the design
- (3) Integration of regular interaction, e.g., every 3 to 5 minutes
- (4) Amount of information per slide – usually one key concept per slide
- (5) Use of videos (definition of videos, required streaming bandwidth, etc.)
- (6) Division of tasks and roles between instructor and producer (where used)

## Virtual Classroom Instruction Instructor

The AOC and ATO should ensure that the instructor delivering VC:

- (1) Has access to an Instructor Quick Reference Guide for VC instruction, with the associated policies and procedures
- (2) Has received appropriate training covering at minimum learning style, teaching method associated to VC, and the chosen online platform system management
- (3) Has demonstrated his/her ability to manage time, training media and equipment to ensure that training objectives are met
- (4) Performs formative assessment only, as the summative assessments are excluded in VC

## Virtual Classroom Instruction - Student

The student should have access to a Student Quick Reference Guide for VC instruction with the associated student policies and procedures.

The AOC and ATO should ensure that the student receiving VC has attended a briefing on the VC procedures and policies.

## Virtual Classroom Instruction - Training Effectiveness

### **Maximum students and training times**

The maximum number of students, when classroom is delivered via VC, should be limited to 15 to 20 students. The maximum number of students should be reduced according to the limitation of the tool to maintain an acceptable level of communication.

The amount of time spent in effective VC should not exceed five hours per day. A break of at least 15-20 minutes should be planned for every hour of VC.

Regularly collecting and analyzing instructors and students feedback participating in VC instruction within the above limits will permit to validate or adapt the above recommended limitations.



### **Attendance records**

The instructor delivering a VC lesson, unit or course, should be responsible for the attendance records by ensuring that students are participating in the VC with the appropriate level of engagement and interaction during all the lesson, unit or course.

### **Student Progress**

Non-attendance in case of interruption or loss of level of communication should be managed in accordance with the "non-attendance" policy, as in actual classroom instruction.

### **Training system feedback loop**

The AOC and ATO should ensure that the instructor delivering VC:

- (1) Reports strengths and weaknesses of the training system (training environment, curriculum, assessment/evaluation) including feedback from trainees
- (2) Suggests improvements for the training system

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