



VR Powered Immersive Learning - Make Learning a Reality[®]

Virtuosi delivers immediate impact on bottom line growth for the global pharmaceutical industry

*Virtuosi[®] is the **standard** pharmaceutical industry education platform designed with employee learning at the center.*

Our development team includes pharmaceutical executives, adult learning professionals and virtual reality experts. We work together to understand your employees and deliver on your education needs.

Available in 5 languages, manufacturing and laboratory teams engage in analytical and critical thinking. This allows the employee to solve complex problems, gain confidence in their abilities and apply what they have learned through VR interactive experiences with no risk to product or environment. The content provided is critical to the employees' roles. The content centers on aseptic processing, microbiology, and Cell and Gene Therapy (CGT) production.

Virtuosi offers unique value by teaching the *Why* behind the *What* resulting in longer term retention of foundational, yet critical concepts. The employees become virtually engaged in the world of manufacturing and laboratory settings. This affords you time to keep your facility running, with no planned shutdowns for training, including saving your SME's time.

Increased Productivity | Improved Knowledge Retention | Quality Assured Releases | Scalable

THE CONTENT

- 56 Episodes consist of compliant and interactive technical courses.
- Foundational and advanced aseptic practices covering the manufacturing and microbiology in both traditional and cell and gene spaces.
- 60-90 minutes per episode (15-20 minutes per CGT episode); segmented into 2 to 12 minute lessons, allowing the employee flexibility to learn on their schedule.
- 26 VR experiences intentionally immersing the employee in the manufacturing and laboratory environments where most appropriate .
- Over 100 hours of education delivered, including process checks and knowledge assessments.

THE PRODUCT

- The Virtuosi hardware package includes a VR-ready workstation with a HTC Vive Pro[®], or Pro Eye[®] system. These state-of-the-art systems provide true-to-life precision tracking within the painstakingly constructed Virtuosi VR aseptic facility, and microbiology and CGT laboratories.
- Our on-demand education and technique instruction content is seamlessly integrated with the VR experiences via an embedded Learning Management System (LMS).
- The cloud-based content allows for effortless delivery of updates should regulatory requirements change over time.
- Each seat-licensed user has a unique username and login credentials for single sign-on and traceability of that employee's progress within the educational curricula. Individualized training records are generated based upon successful completion of each Virtuosi Episode and associated VR Interactive Experience. 21 CFR 11 compliant.

EXPERIENCE LEARNING[®]

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CURRICULA

KEY: ■ Signifies Course
VR Signifies VR Interactive Experience

MICROBIOLOGY FOR STERILE MANUFACTURING EXPERIENCE

- Industrial Microbiology
- Microbiology Laboratory Practices
 - VR *Serial Dilution Technique and Usage*
 - VR *Pipette Use*
- Media, Buffers, and Reagent Management
- Aseptic Technique and Behavior in Laboratories
 - VR *Hand Washing*
 - VR *Vertical & Horizontal Unidirectional Air Flow*
- Sampling and Sample Management
- Microbial Identification and Culture Maintenance
 - VR *Streaking for Isolation*
 - VR *Gram Staining*
- Microbial Limits Testing
 - VR *Microbial Limits Testing*
- Sterility Testing
 - VR *Sterility Testing*
- Microbiological Investigations
- Bacterial Endotoxin Testing
 - VR *BET Solution and Sample Preparation*
- Preservatives and Antimicrobial Effectiveness Testing
- Sterilization Indicator Control and Usage
- Microbiology Data Evaluation and Reporting
- Microbiology Method Suitability

STERILE MANUFACTURING EXPERIENCE

- Sterility Assurance
- Aseptic Technique and Behavior in Manufacturing
 - VR *Hand Washing*
 - VR *Fallen Vial Intervention*
 - VR *Needle Change Intervention*
- Gowning for Classified Environments
- Sterilization Process Control
- Terminal Sterilization Process Control
- Sterile Filtration Process Control
- Depyrogenation Process Control
- Isolator Process Control
- The Math and Science of Sterilization and Depyrogenation
- Facility Cleaning and Disinfection
 - VR *Techniques of Walls and Floors*
- Air Flow Pattern Studies
 - VR *Vertical and Horizontal Unidirectional Air Flow*
- Environmental Monitoring
 - VR *Environmental Monitoring Sampling Plan Development*
 - VR *Contact Plates and Swab Sampling*
- Manufacturing Equipment Use Cycle
 - VR *Making Vertical and Horizontal Aseptic Connections*
- Equipment Cleaning
- Formulation of Bulk Product
- Container Closure Integrity and Visual Inspection
 - VR *Visual Inspection of Vials, Ampoules, and I.V. Bags*
- Aseptic Process Simulation

CELL AND GENE | ATMP EXPERIENCE

- Introduction to ATMPs
- Life Science Fundamentals - Cells, Genes, and Proteins
- The Science Behind ATMPs
- ATMP Manufacturing Overview
- The Quality Management System
- Quality in Manufacturing Support Functions
- Aseptic Technique and Behavior Essentials
 - VR *Handwashing*
- Non-Sterile Gowning
- Pipettes and Pipette Aids
- Pipette Use and Care
 - VR *Large Volume Pipetting*
 - VR *Introduction to Micropipetting*
 - VR *Pipetting Small Volumes*
 - VR *Multichannel Pipette Techniques*
- Sterile and Non-Sterile Gloving
 - Demo *Donning Sterile Gloves Demonstration Video*
- Surface Sanitization
- Sterile Gowning
 - Demo *Sterile Gowning Demonstration*
- Biosafety Cabinet Types and Uses
 - VR *Airflow in a Biosafety Cabinet*
- Preparing to Use the Biosafety Cabinet
- Operating in a Biosafety Cabinet
 - VR *Using a Biosafety Cabinet*
- Gene Therapy Manufacturing Overview
- Aseptic Technique and Behavior in a Cleanroom
 - VR *Vertical and Horizontal Air Flow*
- Introduction to Aseptic Connections
- Connectors - Types and Uses
- Tube Welding
- Aseptic Disconnections
- Fluid Transfers
- Sampling with Aseptic Connections

Virtuosi® is brought to you by Quality Executive Partners, Inc., (QxP), a globally recognized management consulting firm that includes leading technical experts and former quality executives within the pharmaceutical industry. Our field consulting experience has shown the critical need for innovative education. Only through real education can you experience real results. Leveraging the QxP "Teach and Do" methodology, Virtuosi is poised to radically change the pharmaceutical industry and positively impact the lives of patients.

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