

# *Applications of Laboratory Video to Learning Environments*

## *Creating Laboratory Videos to Enhance Student Learning*

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### **Abstract:**

This report proposes a methodology to create small videos and podcasts (also known as learning objects) for use in a laboratory teaching environment. Small video clips (under five minutes total) could be created and distributed to students with the aim of lowering their laboratory technology learning curve and to enhance their overall learning potential for a lab session. Appropriate video formats ("codecs") could be utilized to make the videos viewable under a plethora of computer platforms (Macintosh, Windows, etc.)

Although the authors will focus on applications best suited to scientific laboratories, the proposals contained within this project could find multiple applications within other laboratory learning environments (Allied Health, Social Sciences, Integrated Media, Language laboratory sessions, etc.), and we will attempt to address techniques relevant to a multitude of disciplines both within the Mt. Hood Community College community and the larger community of laboratory educators everywhere.

Instructions and examples of creating learning objects for laboratory teaching environs will be provided. This methodology is applicable towards all faculty and staff interested in creating videos for laboratory learning environments.

Note that this document may be viewed on the World Wide Web: <http://gst-d2L.com/TLC>

### **Contents:**

<b>I. Project Goals</b>	<b>Page 2</b>
<b>II. TLC Goals</b>	<b>Page 2</b>
<b>III. Innovation</b>	<b>Page 3</b>
<b>IV. Evaluation</b>	<b>Page 3</b>
<b>V. Post-project Responsibilities</b>	<b>Page 4</b>
<b>VI. Progress and Timeline</b>	<b>Page 4</b>
<b>VII. Use of Funds</b>	<b>Page 4</b>
<b>VIII. Personal Comment</b>	<b>Page 4</b>

Thank you for considering our request. If we can answer any additional questions you might have, please contact us. Thank you for your time,

Valory Thatcher and Michael Russell

## **I. Project Goals:**

A *learning object* is a digital resource or set of resources designed to facilitate learning outcomes that can be simultaneously used and reused. Learning objects provide learner opportunities to reinforce concepts and procedures and can be used in a variety of contexts.

When students enter a laboratory learning session, an inevitable feeling of trepidation occurs in most of the participants. New technology and/or specialized techniques are required to master the assignment, and additional intellectual knowledge may be necessary to analyze and compute the collected data. Also, because student access to laboratory settings is also limited, there is tremendous pressure to assimilate complicated information in a rather short period of time. Ultimately, labs can be quite frustrating!

Recognizing this dilemma, the authors have decided to pool their collective knowledge and resources in order to lower the learning threshold for our students while in a laboratory session. We propose to create a series of potentially re-usable video learning objects that introduce important techniques and/or technology to students prior to their appearance in the laboratory. The learning objects should be short and to the point, and they should be accessible to users of all computer platforms.

The "*Applications of Laboratory Video to Learning Environments*" project proposes to explore the methodology needed to create virtual video lectures relevant to student laboratory sessions. The initial video learning objects will be focused on students of anatomy/physiology and chemistry, but the procedures and details will be applicable to instructors and students in a plethora of fields... whenever there is novel technology or techniques to be learned, we believe that the students will appreciate the video learning object modality. The proposal can be divided into three goals:

- Goal #1 of the project will be to create a series of video learning objects within our respective areas of expertise (namely Anatomy/Physiology/Microbiology and Chemistry.) We will master the technology and learning curve in order to develop the best set of video learning objects possible for laboratory sessions.
- Goal #2 of the "*Applications of Laboratory Video to Learning Environments*" project will be to extrapolate what we learned in our discipline-specific areas into a broader, more holistic set of principles applicable to laboratory instruction everywhere, regardless of the content area.
- Goal #3 will be to actively encourage other faculty and staff members to create their own laboratory-based video learning objects. The goal will be accomplished through a variety of mediums: a **written paper** outlining the research performed and results obtained for this project (which will be released to the TLC when completed); an **oral presentation** (to be arranged with the TLC, possibly for Spring Term 2007); a **web site** with accompanying materials (<http://gst-d2L.com/TLC>); and a **commitment to assist other faculty and staff** members to create their own video learning objects for the laboratory.

It is not enough to simply present the material; providing a forum by which interested faculty members can ask questions and receive answers is essential to the goals of this project. The primary goal is to explore the creation of video learning objects for the laboratory within the context of the MHCC community. We will do everything in our power to help others accomplish this goal.

## **II. TLC Goals:**

The "*Applications of Laboratory Video to Learning Environments*" project discussed above fits well into the Teaching and Learning Cooperative's two primary directives:

Directive #1, "*Developing and sustaining effective teaching and learning with the emphasis on student learning*", is followed absolutely in each of the project goals listed above. The first goal, creating the video learning objects, is necessary to enlighten faculty members (and the authors themselves!) about this new technology and how it might enhance student learning (through video, audio, etc.) in their laboratories. The second goal, enhancing the applicability of video learning objects to other disciplines, will allow instructors to actually create their own video-enhanced laboratory learning objects in their given fields which will address a greater quantity of student learning styles by offering students an additional (and accessible) learning tool. The primary goal of this project is to enhance student learning and teaching effectiveness in a laboratory session; the medium by which this will occur is through a novel application of video learning objects to the laboratory session.

Directive #2, "*Ensuring broad applicability throughout the MHCC teaching and learning community*", will be followed closely as well. All of our protocols and instructions are available free of charge to any learning community that wishes them, be they from Mt. Hood Community College or elsewhere. We will be sharing our results with our colleagues through a written paper, a web site (<http://gst-d2L.com/TLC>) and a presentation on the MHCC campus during late spring 2007. We are always available for comments and questions, and we are committed to instructor success as much as we are committed to maximizing the power of student learning.

## **III. Innovation:**

We are unaware of anyone in the MHCC community using video learning objects to enhance their laboratory sessions. Other institutions have attempted to incorporate video in their laboratory sessions, some with success (<http://www.dartmouth.edu/~chemlab/chem3-5/index.html>) and many have questionable quality ([http://homework.sdmesa.edu/dgergens/podcasts/gergens\\_podcast\\_code.xml](http://homework.sdmesa.edu/dgergens/podcasts/gergens_podcast_code.xml)). This TLC Innovation Grant wishes to extend the possibilities of the video methodology used at MHCC by creating reusable video segments applicable toward student learning in a laboratory environment, a feat not attempted anywhere else on the MHCC campus to the best of our knowledge.

The basic tools necessary for creating video learning objects for laboratory teaching environments are readily available to the MHCC community. Consumer-level camcorders are inexpensive and available through the Teaching and Learning Cooperative. Most recent computers have both video and sound input ports that can be used to transfer digital signals for editing later. The QuickTime architecture is important for recording and compressing video and audio files, and it is a free cross-platform program. All that is needed to start this innovative use of laboratory videos is a team of technological vanguards to lead the way, mastering the technical obstacles and sharing the results with everyone interested in developing laboratory video learning objects, and we would be honored to be MHCC's vanguards!

## **IV. Evaluation:**

We hope to create several examples of video learning objects from laboratory sessions from a selection of our classes in Anatomy / Physiology / Microbiology and Chemistry. These modular video learning objects will focus on one or two topics exclusively and shall be no more than ten minutes in length. We will also provide detailed instructions on how to create these presentations using appropriate software and hardware, and these

instructions will be made applicable to both Windows and Macintosh formats to the furthest extent possible. This methodology will also be useful to people wishing to learn about video creation in general.

Testing the video learning objects on an audience is mandatory. We have a small contingent of students who have volunteered to "test drive" the video segments for us, telling us what they like, do not like, and possible improvements, especially when compared to the original "non-video" laboratory session.

#### **V. Post-project Responsibilities:**

A presentation will be arranged by the end of Spring Term 2007 for interested faculty and staff regarding the creation of instructional videos for the laboratory. A formal paper outlining the specific details of this project shall be created and distributed to interested parties. A web site for our proposal (<http://gst-d2L.com/TLC>) will contain these documents as well as any other pertinent information. In addition, we can always be reached for personal consultation either through electronic mail (valory.thatcher@mhcc.edu or mike.russell@mhcc.edu) or telephone (503.491.7337 or 503.491.7348), and multiple presentations can be arranged to meet the interests and expectations of the MHCC community - we are happy to share the knowledge gained!

#### **VI. Progress and Timeline:**

All of the plans outlined in the Project Goals section will be complete by June of 2007. The results of the project will be available for colleagues at this time. This project should be completely finished - including the paper, presentation, and all research - by June of 2007. All of the timelines are dependant on the TLC's wishes - we are *very* flexible.

#### **VII. Use of Funds:**

Personnel:	\$1000 (split 50% between the two participants)
Materials:	\$0
<b>Total:</b>	<b>\$1000</b>

Learning the hardware and software protocols required to create effective laboratory videos will take considerable time, and although we have some experience with video creation, we have not adequately applied them to a laboratory learning environment.

We believe that the ability to make laboratory videos would benefit anyone within the MHCC community involved in teaching laboratory sessions to students. It would provide an additional learning opportunity for our students and keep MHCC technologically competitive with other colleges. All we need are the resources to get started!

#### **VIII. Personal Comment:**

We appreciate your time in considering our request. If we can answer any questions that this paper does not address, please feel free to contact either of us using the information given below. Thank you for your time,

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