

*The names in this proposal have been changed.
All other content is as originally written.*

A DISCUSSION AND PLAN FOR BUILDING ENVIRONMENTAL LABORATORIES UNIVERSITY

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*The ability to learn faster than your competitors may
be the only sustainable competitive advantage.*

ARIE DE GEUS,
PLANNING DIRECTOR
ROYAL DUTCH/SHELL

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Introduction

In light of the rapid growth at Environmental Laboratories and in the interest of institutionalizing a learning culture, company executives have determined a need for a formal, automated training and learning management system.

Environmental Laboratories University Objectives

Objectives for the Environmental Laboratories University include:

- Promoting learning in the organization
- Encouraging innovation
- Providing consistent training for all new hires and existing staff
- Shortening the supervised training period for new hires and beginners
- Providing a common baseline of knowledge and skills for all Technicians and Technical Service Reps
- Increasing the accuracy and efficiency of all production and customer service staff
- Aligning the entire organization with current business processes
- Providing a venue for communicating changes in business processes and the LIMS
- Tracking and documenting employee training for the purposes of performance management, career development and compliance
- Increasing employee loyalty
- Advancing the leadership skills of managers
- Attracting new employees
- Providing added value to Environmental Laboratories' customers.

About This Document

This document explores the key aspects of creating and implementing an automated training system and recommends a plan of attack for its development and implementation.



Current Situation

The State of Training Today

Training has always been an important function at Environmental Laboratories (EL) during the more than four decades since the company's inception.

Currently, most technical training is provided on an as needed basis delivered primarily through shadowing, where new hires or beginners observe experts as they perform their testing procedures.

Some formal training programs have been established by the Human Resources Department, under the direction of Carla Jayne, and the Regulatory Affairs Department, under the direction of Judy Cohen with support by Ken Stone. Most of these programs were purchased pre-packaged from outside vendors.

Formal training is currently in place for:

- OSHA Safety Requirements
- Ethics and Data Integrity
- Diversity
- Sexual Harassment

In addition, EPA . compliant SOPs documenting approximately 150 testing procedures are available online.

Planned Training Facilities

Group training is currently conducted in the break room of the Main Building. Plans are in progress to convert half the break room into a fully equipped Learning Center with computer work stations. In addition, management is considering plans to install learning stations close by each laboratory facility to make it more convenient for individual staff members to learn during lab downtimes.

Transitioning to an Automated Training System: Environmental Science University

Although some training cannot be entirely replaced with an automated system, automating the delivery of knowledge will help reduce the need for supervised training periods and supply a consistent product to all learners. In making the transition, the biggest challenge facing EL is the development of content. We'll take a more detailed look at processes and plans for content development later in this document, but first let's look at three key foundational elements that must be in place to launch Environmental Laboratories University (ELU).

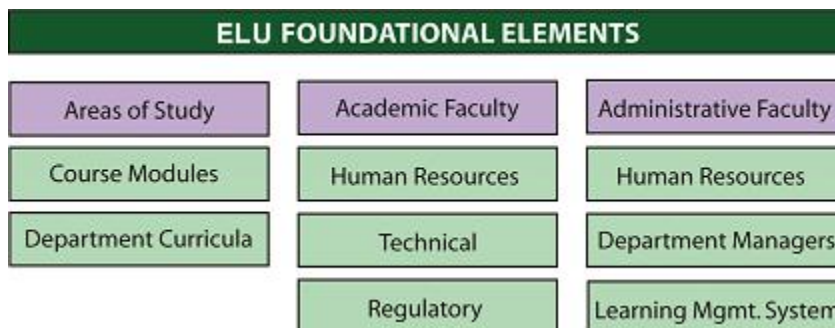


EL: The Foundation

Work on building ELU begins with determining and defining the following foundational elements:

- **Areas of Study**
- **Academic Faculty and Responsibilities**
- **Administrative Faculty and Responsibilities**

In our meetings with the executive team on June 18th and 19th, we made excellent progress towards making the necessary (if tentative) decisions to putting these three elements in place. Let's take a brief look at each of them: the ground we've covered and what remains to be done to start building ELU on a solid foundation. We'll take a closer look at these foundational elements later in this document.



Areas of Study

A university begins with areas of study and a collection of knowledge. During our individual and group discussions with the executive team, the following areas of study were suggested to provide a well-rounded technical and business education for EL employees:

- Laboratory Test SOPs and Task Flows
- Business Processes
- Laboratory Information Management System (LIMS)
- Laboratory Technique
- Analytical Chemistry Theory
- Environmental Science
- Instrument Analysis



- Quality Systems
- Scientific Mathematics
- Microsoft Office/Adobe Acrobat skills
- Business Writing
- Finance
- OSHA Safety & Compliance
- The EPA and Compliance
- Diversity
- Sexual Harassment
- Ethics and Data Integrity
- Leadership
- EL: Vision, Mission, and Goals

AREAS OF STUDY: TO DO

Although the above list may need some later refinements, it is comprehensive enough to offer us an excellent start. With these study areas determined, the next steps are:

1. Define courses (or modules) for each area of study
2. Group courses into baseline and advanced knowledge/skills
3. Define department-specific curricula for baseline and master level study
4. Develop all courses
5. Implement them for the online ELU.

Academic Faculty

The academic faculty will take responsibility for developing and maintaining course material. They will also serve as subject matter experts in their chosen areas for trainees.

ACADEMIC FACULTY: TO DO

As we discovered, it appears that most of the reference materials we need for this development (including some fully developed course materials) are already available in house. We had great participation at our meeting last week, so once the commitment to go ahead is made, all we have to do is begin the work of outlining and developing course material. A list of faculty members and the courses they signed up for at the June 18-19 meetings is included in the Appendix to this document.



Administrative Faculty

The administrative faculty will take responsibility for:

- Building and maintaining a curriculum of required, non-technical courses for all new and existing staff
- Scheduling the delivery of non-technical training
- Scheduling seats in the Learning Center for all training
- Maintaining training and performance records.
- Maintaining training facilities

A computerized Learning Management System that automatically tracks and stores training data for all employees will support the administrative function.

Primary responsibility for administering training naturally falls to the Human Resource Department. In addition, all department managers will make a contribution to this function by managing their people's education. The Regulatory Department will also play an administrative role, seeing that all training and training materials are in compliance with state and Federal rules.

Finally, the Technology Department will have an essential role in developing and maintaining the Learning Management System and selecting, building and maintaining all computers and technology incorporated in training facilities.

ADMINISTRATIVE FACULTY: TO DO

In addition to the ongoing scheduling and administering of training, the Administrative Faculty will:

- Select required non-technical courses for the baseline/new hire curriculum
- Select non-technical courses for the master level curriculum
- Define requirements for the Learning Management System
- Develop procedures for maintaining training facilities

A suggested list of Administration Faculty members and their roles is included in the Appendix to this document.



The Curriculum

Curriculum Design

Once final decisions on initial company-wide course offerings have been made, The ELU Executive Committee (see organization chart on next page) will work with lab and lab support managers to specify an individual curriculum for each department.

The committee will also specify required courses for all baseline/new hire training, regardless of department, and categorize course offerings into baseline and master levels.

The following is a sample curriculum. This sample, including the course groupings, is for illustrative purposes only.

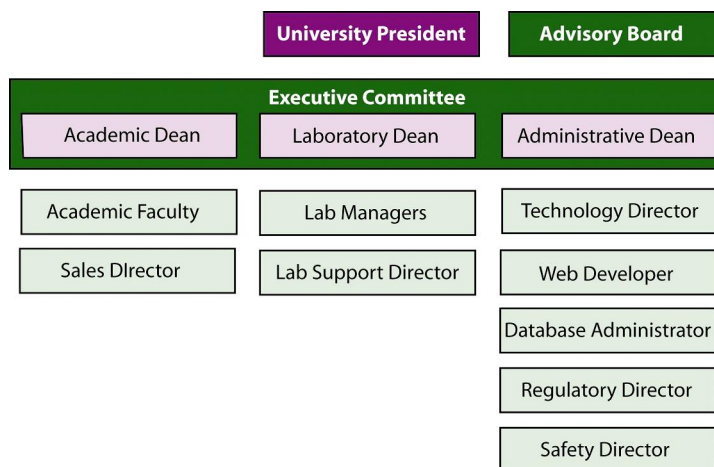
Inorganics Department Baseline Curriculum		
Academic	Technical	Business
Analytical Chem. 101	Lab Technique 101	LIMS for Techs 101
Scientific Math 101	SOPs Nos 5-9, 20, 48	Bus. Proc. for Techs
Quality Systems 101	Instrument Anal. 101	EPA and Compliance
		MS Office 101
		Bus. Writing 101
		OSHA Safety
		ESC Mission/Goals
		Finance 101
		Ethics & Data Integ.
		Diversity
		Sexual Harassment



ELU Organization Chart

The Environmental Laboratories University will have an organizational structure for making high level decisions about curriculum and administration, maintaining training courses and facilities, and delegating development work.

The chart below is a suggestion for purposes of discussion.





Course Design & Development

We will need at least two slightly different processes to develop course materials: one for Lab procedures and one for everything else. These processes (*for Phase One only; to be abbreviated in Phase Two. See Phase One and Phase Two project plans later in this document*) require additional thinking and development, but here are some brief suggestions to get us started seeing some of the issues involved:

LAB PROCEDURES

1. Bromberg/Jansen create documentation structure (once)
2. Lab Technician documents procedure in MS Word
3. Lab Manager reviews/revises technician's work
4. Jansen reviews/okays procedure for training
5. Morton reviews documented procedure for compliance
6. Bromberg/Weber design PowerPoint template (once)
7. Bromberg implements procedure in PowerPoint
8. Final review by Lab Manager, Jansen and Morton

ALL OTHER COURSES

1. Bromberg/Jansen create documentation structure (once)
2. Assigned faculty member generates outline in MS Word
3. Jansen reviews outline and makes suggestions
4. Faculty member completes the writing
5. Jansen or specialist in field reviews material
6. Bromberg/Weber design PowerPoint template (once)
7. Bromberg implements material in PowerPoint
8. Final review by author and Jansen

Some Comments about These Authoring Processes and Templates

The structures and templates created in Phase One and refined in Phase Two will embody accepted principles of Instructional Design and Adult Learning. Faculty authors will require some coaching in these principles. Some unique subject matter may require a customized process and template.

In Phase Two of the project, authors may elect to write directly in the PowerPoint template. We may also choose to create MS Word templates with fixed table cells restricting the word count for any given page.



Training Delivery & Administration

The Training Delivery & Administration functions include:

- Setting requirements and making recommendations for the Learning Management System
- Maintaining all training records
- Ensuring that course materials are in compliance with state and Federal laws
- Delivering classroom training
- Scheduling seats in the proposed Learning Center
- Maintaining training facilities and equipment
- Booking guest lecturers
- Making the necessary provisions for customer training

As mentioned earlier, the Administrative Faculty and their support staff will take responsibility for these functions.

A Note about Scheduling

As EL grows and training becomes an even more important part of the EL culture, scheduling seats in the proposed ELU Learning Center will no doubt become a necessity. Scheduling becomes especially essential when e-learning is coupled with classroom and/or lab work.



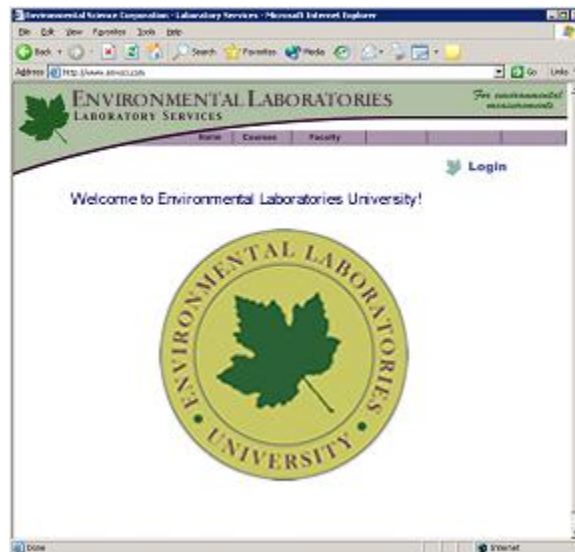
ELU Website

The ELU website (see Project Plan: Phase One, Step 9) serves as a portal to all courses and reference materials, including SOPs.

The site links to data warehoused in the ELU Learning Management System to allow employees to login and review their training records.

I recommend providing an alternate access to the site in which all courses can be viewed but exam data is not exported to the Learning Management System. This gives employees the opportunity to learn or reference material without pressure.

EL can also make this no record-keeping functionality available to customers.





Technology

Technology plays a critical role in almost all aspects of ELU, including the following:

- Developing, updating and maintaining the Learning Management System
- Developing templates for authoring interactive learning
- Implementing course materials for online delivery
- Developing and maintaining the ELU website
- Outfitting and maintaining Learning Center equipment

See my technology recommendations in the next section, ELU Project Plan: Introduction.



The ELU Project Plan: Introduction

I have divided the project plan that follows into two phases. In Phase One we develop a complete prototype of ELU, including course modules, the ELU website and the Learning Management System. In Phase Two, we refine the prototype and complete the development and online implementation of additional course materials.

Prototyping all parts of ELU simultaneously offers us the great advantage of seeing the whole, the parts, and how the parts work together. The momentum achieved from executing a complete prototype makes it more likely that the entire project will be both fully realized and completed in a shorter time span.

The proposed pilot of the ELU prototype at the end of Phase One (see Phase One, Steps 12-14) should raise most of the issues we will be confronting in the ongoing development process. Knowing them all or most of them early will help ensure a better, more refined final product.

More About Phase One

The schedule for Phase One is highly compressed (approximately 9 weeks) but nonetheless doable. (I've confirmed the timing to develop the LMS prototype with John Weber.) You may decide, however, to slow the schedule down either to soften the burden on your team or to take summer vacations into account.

In thinking about Phase One, you may also conclude that we remove some of the bigger pieces such as the ELU website or the LMS based on budget or time constrictions. Of course, these decisions are entirely up to you and your team.

Some Technology Assumptions

In developing the project plan, I have made two big assumptions (and implied recommendations) about technology. Here they are:

- We will use PowerPoint with some Visual Basic coding for quizzes and other interactivity to build the authoring templates and implement the courses online. (John Weber tested this solution out briefly and believes it's feasible.)

PowerPoint is as user friendly as it gets, especially when compared to HTML authoring tools such as Dreamweaver or any other computer-based training tool, including Flash, Director, and Authorware. (If you've not tried this before, open any PowerPoint presentation and SAVE AS a web page. You'll see how well it works and how nicely it presents itself for the purposes of training.)



- We will develop our own Learning Management software and not rely on a service like TrainCaster. For about the same price as a year's rental, EL will have something that it can entirely control and that can be readily modified according to changing needs. And we won't have to worry about what happens if TrainCaster goes out of business.

Defining the LMS requirements (Step 3 in Phase One of the project plan) will help us determine what technologies to use for developing the LMS. My guess is that you already have all of them in house.

The following pages describe the two phases of the ELU project. Phase One is presented as a detailed action plan with actions/deliverables and dates. Phase Two is presented as a description of ongoing development work to refine the prototype and complete the training materials.



The ELU Project Plan: Phase One

PHASE ONE ACTIONS	DATE COMPLETE	PARTICIPANTS
1. ELU Executive Team (See ESU Organization Chart) meets to review, revise, finalize and build consensus around this plan.	July 10	Jansen, Cohen, Thompson, Weber, Hennessey, Morton, Gianni and Bromberg.
2. Write up structures for courses: Learning Objectives, Vocabulary, Topic A, Review Quiz, References, etc.	July 17	Bromberg, Jansen
3. Generate requirements for ESU website and Learning Management System	July 17	Parsons, Jansen, Weber, Hennessey, Morton, Jansen and Bromberg.
4. Generate outlines for academic courses in PowerPoint	July 24	See Appendix: Table 1, Academic Faculty
5. Write up 1 SOP from each Lab in PowerPoint	July 24	Dept. Managers, Technicians, Lankford and Bromberg.
6. Review SOPs and generate recommendations/revisions	July 31	Jansen, Morton, Bromberg
7. Design PowerPoint course templates	August 14	Bromberg, Weber .Jansen,
8. Implement SOPs in PowerPoint/HTML	August 21	Bromberg, Weber
9. Prototype Environmental Science University website	August 14	Bromberg, Weber
10. Complete 1 st draft of selected academic course materials	August 21	See Appendix: Table 1, Academic Faculty
11. Prototype Learning Management System	August 28	Weber, Brown, Parsons and Bromberg
12. Design Pilot and develop Pilot materials (see below).	September 4	Bromberg with reviews by Jansen, Parsons, Bromberg, Brown, Weber and Hennessey
13. Pilot SOP Training, ESU website, and LMS.	September 10	Jansen, Parsons, Gianni, Bromberg, Brown, Weber, Hennessey, Morton, Technicians.
14. Debrief Pilot and generate list of revisions.	September 11	Jansen, Parsons, Bromberg, Brown, Weber, Hennessey, and Morton.

Notes: This plan does not take summer vacation schedules into account into account. Bold face type indicates meetings at Environmental Laboratories headquarters with Weber and Bromberg present.



The ELU Project Plan: Phase Two

Phase One ends with a list of revisions generated from the pilot debrief, so Phase Two will begin with implementing those revisions. The majority of the work in Phase Two however will focus on the development and online implementation of additional course materials.

The biggest challenge, once again, will be developing content for the lab procedures. However, once we've refined the templates and processes and implemented the revisions generated at the completion of Phase One, development work should become more straightforward.

Here is some simple math that helps make the lab procedure process appear more manageable:

Once a week, 3 technicians in each lab generate one procedure each. If there are 5 labs (I'm not sure how many you have), then we could generate 15 procedures per week. Over the course of 10 weeks all 150 procedures would be documented.

Although I wouldn't recommend moving that quickly because of the burden placed on EL technicians and the bottleneck that would necessarily occur in the reviewing process, you can nonetheless see that development of 150 procedures becomes manageable when dividing up the development work amongst available EL manpower.



Consulting Proposal

For EL to gain the most value from my services, I am recommending that I fill the role of Project Manager for Phase One. In this role, I will work with an internal EL Project Manager (Jansen) to:

- Revise the final plan document based on outcomes of the Executive Committee meeting (See Phase One, Step 1)
- Help motivate the team
- Provide coaching in instructional design for course authors
- Manage production in conjunction with the Executive Committee (see EDU Organization Chart)
- Serve as a unifying force for all development work
- Consult in curriculum design with Jansen, Hennessey and Lab Managers
- Serve as the project liaison for Cohen and Brown.
- Attend critical meetings in Wheeling (see Phase One plan).

Additionally, I would like to take on the following Phase One design/development projects:

- Design course structures in conjunction with Jansen
- Design PowerPoint templates in conjunction Jansen and with programming support by Weber
- Execute a final clean-up edit for all course material
- Implement all Phase One courses (6) for the web
- Design and build the prototype ELU website in conjunction with Weber
- Design the ELU training pilot in conjunction with the ELU Executive Committee (see Phase One plan)
- Assist in developing Learning Management System requirements and selecting all technologies
- Develop an ELU marketing presentation for internal (and perhaps external) use.



Consulting Fees

I estimate 36 days of work @ a per diem rate of \$1,200.

Total fees: \$43,200.00

If you are amenable to the above, I will prepare a consulting contract with deliverables, fees, payment schedules and terms.

I sincerely believe my background, experience and talents can add great value and efficiency to the project and look forward to the possibility of working together to help make ELU a reality.



APPENDIX

Table 1: Faculty Members and Courses.

Table 2: Suggested List of Administration Faculty and Their Roles



Table 1. Academic Faculty & Courses

Faculty Member	Role
Laboratory Test SOPs	Jane Morton
Laboratory Test Task Flows	Margaret Jansen / Lab Mgrs & Technicians
Business Processes	Eric Williams
Laboratory Information Management System (LIMS)	Dorothy McDowell
Laboratory Technique	Paulette
Analytical Chemistry Theory	Jane Morton
Environmental Science	Jane Morton
Instrument Analysis	Department Managers
Quality Systems	Jane Morton
Scientific Mathematics	Jane Morton (course has been developed)
Microsoft Office/Adobe Acrobat skills	Dorothy McDowell
Business Writing	Carla Green
Finance	Carla Green
OSHA Safety & Compliance	Ken Thompson
The EPA and Compliance	Jane Morton
Diversity	Carla Green
Sexual Harassment	Carla Green
Ethics and Data Integrity	Jane Morton (lecture written)
Leadership	Carla Green
EL: Vision, Mission, and Goals	James Givens



Table 2. Administrative Faculty & Roles

Faculty Member	Role
Carla Green	Administrative Dean
Tom Brown	Technology Director
Dorothy McDowell (or New Hire)	ECU Web Developer
Dorothy McDowell	Learning Mgmt. System (LMS) Administrator
Jane Morton	Regulatory Director
Ken Thompson	Safety Director
Ken Thompson	Training Facilities Manager