

LTS101 Assessment 2

Teaching Plan and Rationale

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Introduction

This report outlines the rationale and teaching plan for a Lecture scheduled for week 11 in the Unit HET306 – Unix for Telecommunications. The unit is being run for the first time this semester and the development and organization of course material is still heavily under review. Of particular interest is that while the Unit is undertaken later in the degree, there are no pre-requisites, this may place difficulties in a situation where flexible enrolments allows students with differing levels of experience to be enrolled into this class.

The report is structured as follows, first I discuss the group of students present in the class, followed by the physical teaching environment. The report will then cover the subject matter for the session and finally the approach to be taken during the class.

Learners

While this Unit will eventually become compulsory for a subset of courses offered by the Faculty, at this stage it is offered as an optional unit. This is an advantage as it allows the material to be fine-tuned prior to more wide-spread use. The number of students enrolled in the Unit is 18, all bar one being under-graduate students – typically between 12 and 15 turn up for any given lecture. All students are completing a course within the Faculty of Information and Communications Technologies (FICT) with a major study in Telecommunications. Most of the students are nearing the end of their respective degrees.

The Unix operating system is a new experience for a vast majority of the class and therefore this Unit covers a large amount of new and different material. No pre-reading or other home work is required for the lecture. While some colleagues have expressed that students will be more likely to participate in classroom discussion in small groups, I have found that this particular group – and many groups composed entirely of engineers and computer people – are reluctant to do so in any teaching situation. Having said that, the approach I've taken throughout the lectures this semester has encouraged a handful of students to interrupt the lecture querying a particular aspect of the material and/or presentation.

Teaching Environment

The class is a formal lecture presented in the slightly informal surrounds of a standard classroom – likely due to the small number of enrolled students, I would anticipate that this would move to a more formal lecture theatre in future years. The Unit is focused on using the Unix Operating System to perform common network administration tasks and therefore using technological aids is required to properly

teach this unit. I use my own laptop to connect to the provided projection system in the room.

The duration (2 hours) of the scheduled lecture is long and can lead to a loss of concentration by the students. In order to help minimize this, the lecture is broken up into two 50 minute components with a ten minute break.

Other aspects are that some students have taken to bringing a laptop into the lecture and using the University Wireless Network to run practical samples during the lecture. This helps in their learning as they can begin applying material as soon as it is presented.

There is always the potential for a failure in technology. This particular Unit relies on the technology being available, not only as an aide to digital presentation but as part of the teaching process. If not available, it would be necessary to reschedule the lecture to a time when the technology was working.

Subject Matter

The purpose of this Unit is to:

- 1) Introduce students to a new computer operating system, the vast majority of which have never seen before.
- 2) Show students how to setup and configure primary network and Internet based services on these systems.

As such, there are a number of different topics to be taught which are scattered throughout the semester. As per the Unit Outline supplied to students at the beginning of semester, the proposed content for this week will cover setting up and configuring DHCP and DNS services under Unix. However, an earlier topic – File and Printer Sharing – was extended to cover three hours rather than the nominal two and as such this particular lecture will begin with the conclusion of the topic of using Unix to build simulated computer networks.

Where possible, the material is presented with real-world examples within the scope of what can be done in a lecture scenario via a wireless network connection.

It is highly unlikely that any students will have looked at these topics before, even those with prior experience on Unix based operating systems. As such it is imperative that information is presented in a clear manner.

Strategic Approach

The teaching approach for this Unit is coordinated across all contact time with the students. In this Unit, as with most engineering based subjects, requires that the majority of learning be done via practical implementation of learnt material. This holds even more so in this Unit since the key to understanding how to use a new Operating System to perform network and telecommunications based tasks is to actually practice doing those tasks. Having said that, the majority of the material covered in this Unit will be new to all students. As such, an exposition of content is required rather than just hands-on experience. Given this, the approach taken throughout the Unit is:

- **Lecture** – Primarily concerned with exposition of new content to students. The lecture is broken up with real-world examples sourced directly from remotely running Internet servers and other systems. In this way students can see that the material presented is not of academic interest only, but also the techniques used in real systems. Some students have taken to bringing in

laptops during class so they may directly apply some content to their own remote Unix systems we have provided for the duration of the Unit

- **Tutorial** – Held in a non-digitally connected and non-projector room. This is used primarily as an opportunity to expand on the ideas and ask students to think about how tasks are performed in general under Unix systems. Here we try to promote discussion by asking questions of students to imagine how best to accomplish a task. The idea is to get students to appreciate the limitation of the developers of existing systems/software and also why things are done as they are.
- **Laboratory** – Each week a lab is held where students are required to configure and build some network services on their provided Unix host. This is where the majority of learning takes place as students are asked to apply the content from lectures to real computers and to build sample networks of systems

Given that the lecture is primarily concerned with exposing students to content, how can we try to get to students with different learning styles:

- **Active/Reflective** – The provision and availability of wireless networking within the University, coupled with the fact that we give each student access to their personal (remote) Unix host 24/7, means that students who prefer to do so may apply the new knowledge presented in class immediately to their remote computer and see how it works. They can then ask questions immediately should something strange occur. More reflective learners can use the presentation of real-world examples during class to think about the impacts of decisions and design choice by the relative system maintainer.
- **Sensing/Intuitive** – Engineering in general is an intuitive profession and requires its practitioners to apply their knowledge in different ways to solve new and unique problems. As such, catering to sensing type students is encouraging behaviour that is not beneficial to engineers in general. The provision of laboratory tasks that have clear goals but fuzzy steps means that students are required to develop their engineering skills.
- **Visual/Verbal** – Lecture material is presented in both forms. The slides are presented with fixed verbal style (written) content with the facts laid out for students to read. This however is supplemented with visual demonstrations via live examples to remote network servers as well as diagrammatic examples on a white board to describe (in both in chronological and visual format) how different connected devices communicate with each other.
- **Sequential/Global** – It is difficult to present material to suit both types of learners in this environment. The Unit content is sequential by necessity (lots of small, independent sub-topics) and it is often necessary to explain how to build systems in sequential steps. However I try to outline at the beginning and end through use of real-world examples of what scenarios one might find themselves requiring to use a particular system.

References

- P. Ramsden, “**Learning to Teach in Higher Education, 2nd Edition**”, 2003
- A. Rogers, “**Teaching Adults, 3rd Edition**”, 2002
- P.T. Knight, “**Being a Teacher in Higher Education**”, 2002
- N. Corder, “**Learning to Teach Adults – An Introduction**”, 2002

Lesson Plan and Learning Objectives

Timing	Plan	Learning Objective
0 mins	Review of previous week Unix Bridge Implementation Unix router Implementation	Review
2 mins	Discussion of why we would want to simulate networks with Unix	Get students to think about possible real-world uses of network simulation
7 mins	Presentation of different network parameters that can be simulated with DummyNet	Expose students to available tools
10 mins	Discussion of how these features might be used to simulate certain types of networks	Students to participate in brief analysis of available options and how they might be deployed
15 mins	Presentation of how to install/start DummyNet	
20 mins	Presentation of how to configure DummyNet Pipes Encourage discussion of why pipes do not specify which packets are treated in which way	Understand difference between pipes and packet capturing rules A pipe defines a simulated network through which a packet can pass Still need rules to define which packets should be passed through different pipes
30 mins	How to forward packets to a pipe	
35 mins	Discussion with examples of determining what types of networks certain DummyNet configurations may be trying to simulate	
40 mins	Open discussion What is DHCP? What is DNS Why would you combine the two systems?	Students should already have a rudimentary understanding of DHCP and DNS. The discussion is to allow clarification of what these systems do. Further discussion is to allow students to explore why they may want their DHCP and DNS services to operate together
50 mins	Installing DHCP	Presentation of how to instructions
55 mins	10 minute break	Allow students to refresh
65 mins	Basic DHCP configuration Global options Leases Example with real-world DHCP configuration Discussion of parameters	Students to understand the difference between global options and lease configuration options Discussion to re-enforce techniques and reasons for using DHCP
70 mins	Static DHCP leases What are they/why? Example with real-world configuration	Discussion and example to re-enforce why static leases are useful

75 mins	Running the DHCP server How to start it Where databases are stored Exploration of stored database of a real-world DHCP configuration	Factual information on how to start Understanding the technique by which the database is maintained
80 mins	Installing DNS Location of DNS configuration files	
85 mins	DNS Configuration Specific options DNS zones – how they work Purpose of reverse zones Example with real-world configuration	Understand the meaning of different DNS options Discussion to re-enforce how these options apply to a real implementation
95 mins	Zone file configuration Examples of zone files with real-world configuration	Understand the purpose of zone files as databases
100 mins	Discussion of DNS database entry types – why would you need them? What do they mean?	Database entry types for DNS differ, prompt student discussion to re-enforce how these types differ and under what conditions they would be used for in a real-world scenario
110 mins	Automatic start of DNS Server	Factual information on how to start DNS