**Computing@Carnegie Mellon – Restructuring Proposal**

**Academic Year 2010 – 2011**

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## Introduction

Computing @Carnegie Mellon (C@CM) is a 3-unit, pass/fail required course for all undergraduate students to take during their first semester on campus. The C@CM Advisory Committee approves the course curriculum. Over years the curriculum has evolved to accommodate faculty and students needs and changes in the technology. For example a few years ago, we dropped word-processing and introduced computer security because most of the students entering Carnegie Mellon were well versed with word-processing. This year the Advisory Committee approved piloting change in the delivery of C@CM course from in-class instruction to online instruction for one module on file storage and sharing. For the fall 2010, we propose the following changes in course structure, curriculum, and support services for the Advisory Committee’s approval:

## Course Structure

During the Fall 2009, we conducted C@CM instruction in hybrid mode that included a combination of online and in-class instruction taught by Carnegie Mellon undergraduate students. Prior to Fall 2009, C@CM was taught in-class by Carnegie Mellon undergraduate students. We propose to create an OLI version of C@CM that could be used as a completely self-paced online course or to support a hybrid course in which students work in the online environment and participate in optional support sessions led by teaching assistants. An OLI version of C@CM will not only reduce reliance on scarce Cluster spaces but will also allow us to better attend to the high variability in our students’ background knowledge, current skills and future goals; and will allow us to continuously update and improve the course based on analysis of student use and on changing needs.

## Course Curriculum

An online course structure will allow us to evolve the curriculum to re-focus on areas that are pertinent for students to be successful with Computing@Carnegie Mellon. There will be a core set of modules for all students that can be supplemented with modules specific to major/department/college (fall 2010 curriculum will only have core set of modules). We propose fall 2010 curriculum to include the fall 2009 content (excluding excel, Dreamweaver, and calendar) and including Computer Security, Information Literacy and Legal and Ethical issues.

## Course Support Services

We will provide human Teaching Assistants (TA) for students to get help with online curriculum. We are still working on support model.

## Resource Constraints

One of the reasons we are asking the committee to approve the proposal to move C@CM to an online format has to do with resource constraints. In its current format, C@CM requires the use of a large number of Clusters for a large number of hours each week. Other courses have to compete with C@CM for this scarce resource. If C@CM can be moved to an online version, we will be able to better accommodate faculty needs for Clusters.

As the committee knows, C@CM also creates a kind of “resource constraint” for students. In this case it is a scheduling constraint: C@CM is yet another course each student has to take into consideration in creating a schedule of courses that work for them. Removing that constraint will help students have more options for taking the courses they want to take.

Finally, there is the challenge of staffing C@CM with student instructors. Although those who have lead the effort over the years have done a good job at staffing C@CM, identifying and training students to teach this course is a significant job. It is arguably uses resources that might be better used to update and improve an online version each year.

## Proposed Changes for Course Structure

We propose to create an OLI version of C@CM that could be used as a completely self-paced online course or to support a hybrid course in which students work in the online environment and participate in optional support sessions led by teaching assistants.

An OLI version of C@CM will not only reduce reliance on scarce Cluster spaces but will also allow us to better attend to the high variability in our students’ background knowledge, current skills and future goals; and will allow us to continuously update and improve the course based on analysis of student use and on changing needs.

In addition to the resource constraint issue, a primary reason for moving C@CM online is to improve the learning experience of students taking the course. We recognize that many first-year students need support to become self-directed learners and learn to use online resources effectively to support their learning. In addition to supporting students to learn the C@CM curriculum, we will design the learning experience to help students learn to monitor, evaluate and adjust their approaches to learning. As a result of the feedback and experience of students in the pilot unit, we would like to offer C@CM as an online course and offer support sessions around each topic that would be optional for students to attend. Designing the structure of the hybrid and support model will be part of the course development project, but a few additional details can be found below.

One of the advantages of the OLI environment is that we can collect interaction-level data on what students are doing and learning and use that data to give feedback to the course design team to continuously improve the course to support students to achieve the learning outcomes. We are using multiple sources of data from the pilot we conducted in Mini 1 to evaluate the effectiveness of the course and focus our future development efforts. The sources of data we are using for analysis include:

|  |  |
| --- | --- |
| Data | Source |
| Performance on Pre-test Questions | OLI |
| Self Assessment on Topics  | OLI |
| Performance on Post-test Questions | Blackboard |
| Time Spent on Learning Activities | OLI |
| Help Needed on Learning Activities | OLI |
| Path Through Learning Material | OLI |
| Self-Report Time and Feedback | Survey Monkey |

We are conducting the analysis of data now and will report some results on of the relationship between learning gain and interaction with the OLI learning activities at the meeting.

While we conduct our analysis of learning gain, we share below information from the survey and the system log files which show the amount of time students spent engaged in the OLI environment, the areas in which the students needed the most support and student recommendations about the future structure of C@CM.

### Overall Use of the Interactive Learning Activities (Source: OLI Log)

Use of the activity is defined as asking for a hint or responding to a question in a tutor. It does not include clicking through pages. Note that students that were enrolled in two Mac OS sections are not included in the dataset due to variations in the course materials.

|  |  |
| --- | --- |
| Enrolled Students | 617[[1]](#endnote-2) |
| * Participating Students
 | * 490
 |
| * Use Rate
 | * 79.4%
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### Learning Opportunities (Source: Survey Monkey)

Students were asked if there was enough opportunity to practices the skills being taught or to review the concepts being introduced.[[2]](#endnote-3) We will also use data from the OLI logs to identify activities where students needed the most help and where they selected incorrect answers most frequently. This data will illustrate the areas that need additional development to better support students’ learning.

*Learning Opportunities: n=310*

### Time Contribution (Source: Survey Monkey and OLI Logs)

We asked students how much time they spent working through the OLI unit. We also analyzed the OLI data logs[[3]](#endnote-4) for the amount of time students spent engaged in OLI activities. We did not count time when there was no activity for more than 20 minutes. This eliminates the noise caused by students walking away from their computer for an extended period of time.

*Self-Reported Time Contribution: n=314
Data Log Time Contribution: n=482*

### Time Contribution Under 1 Hour (Source: OLI Logs)

We further examined the data logs for students who spent less than one hour interacting with the course.

*Data Log Time Contribution: n=482*

### Future Development (Source: Survey Monkey)

We asked if they recommend we offer C@CM as a fully online course in OLI (online only with no TA or teaching support).

*Future Development: n=365*

|  |  |
| --- | --- |
|  | Percentage of Respondents |
| Yes  | 42% |
| No | 44% |
| Did Not Respond | 14% |

### Future Development Comments (Source: Survey Monkey and OLI Logs)

We asked why they do or do not recommend that we offer C@CM as a fully online course in the OLI.

Do Not Recommend

Of the students who gave reasons for not recommending a fully online course, we grouped their reasons into the following categories.

|  |  |
| --- | --- |
| Categorical Reason | Percentage of Respondents |
| They believe human teaching is better than fully online but did not give a specific reason | 29% |
| They believe human teaching is better than fully online because people need to get help or ask questions and get answers from TAs | 25% |
| They believe that if the course were only online and not monitored by a teacher, people would not do it or would cheat | 21% |
| They believe it would be too hard to learn | 7% |
| They believe that C@CM is of no or questionable value | 6% |
| They did not like the design of the OLI course | 6% |
| They commented but did not spend time in course | 3% |
| They thought a fully online course would not be as fun | 2% |

Recommend

Of the students who gave reasons for recommending a fully online course, we grouped their reasons into the following categories.

|  |  |
| --- | --- |
| Categorical Reason | Percentage of Respondents |
| They thought it would address the great variability in knowledge of the students in the class | 21% |
| They wanted work on the material at their own pace | 20% |
| They did not find the class time or TA valuable | 16% |
| They thought people should have a choice to do it all online | 14% |
| They thought it would help with scheduling or be more convenient | 14% |
| They liked the design of the OLI course | 7% |
| They liked being able to have it as a reference later | 6% |
| They thought C@CM is of no or questionable value | 2% |

## Proposed Curriculum

The proposed fall 2010 curriculum is divided into three major units: Computer Security, Information Literacy, and Legal and Ethical Issues. We will attempt to weave CMU specific information and technical tools into these three major units as much as possible or create another unit. General tools like Excel, Dreamweaver, and Oracle Calendar will be excluded[[4]](#endnote-5). Following is rough outline for each proposed units. Actual topics may change as we start developing learning objectives:

### Computer Security

* Understand and apply safe computing practices that includes: computing alerts; physical machine security (logging off, utilizing password protection, USB drives and other removable devices); password security (use of social networking sites); malicious attacks (virus, security patches, social engineering – phishing, identity theft, password protection for emails); file back-ups
* The dangers of exposing personal privacy as it relates to information technology (data mining, hacking, personally identifiable information, anonymity, web site privacy policies and cookies).
* How not to get kicked off from the network during first week (cover this material before student arrive)
* Understand and protect yourself from malicious attacks (computer viruses, Trojan horses, worms, phishing attempts, etc.).
	+ Operate virus protection software.
	+ Employ security measures such as file protections, passwords and back up.

### Information Literacy

* Understand and apply searching strategies for the web and electronic databases using keywords and search commands (Boolean operators, truncation, wildcards, proximity and adjacency).
* Understand the basic structure of databases (records and fields) and types of databases (citations, abstracts, full text, full context).
* Critically evaluate sources on issues of currency, authorship, authority, scope, coverage, timeliness, reliability and design.
	+ Use appropriate terminology for discipline-specific databases and web sites.
* Abide by intellectual property protocols by properly citing sources.
* Import data from web sources and electronic databases into personal databases and reports.

### Legal and Ethical Issues (goal is exposure rather than developing expertise)

### Use video-based cases to demonstrate the importance – get CMU specific information from Student Affairs and other sources about common problems that student run into – look at data to develop goals; proactive curriculum;

* Understand university computing policy that includes: privileges and responsibilities; privacy; misuse and inappropriate behavior; enforcement; network bandwidth guidelines; monitoring and suspension; copyright policy (infringement notification, suspension)
* Expose the principles of appropriate conduct in electronic communication. Recognize the difference; define or recognize terms;
* Recognize the basics of copyright and intellectual property laws as they apply to electronic materials (copyright infringement, computer piracy, plagiarism).
* Recognize and expose social networking issues;
* Expose common information technology code of ethics.
* Understand governance and usage issues (free use and free speech).
* Expose issues of justice and equality related to information technology (digital divide, global inequalities, professional accountability, electronic surveillance, information stewardship and security and accessibility).
* Be aware of illegal downloading of music

### Carnegie Mellon-Specific Tools and Other Information

#### *We will attempt to weave CMU specific information and technical tools into these three major units (or create another unit) to the extent possible*

* Understand file storage and sharing in university supported environment that includes: file management; places to store files; controlling who can access your files
* Understand Andrew account, access rights; plus addressing; setting return address from Andrew; LDAP; people search; creating distribution lists
* Apply CMU VPN on personal computer
* Understand access and availability of university owned software
* Understand CMU printing and be able to print to public printers from clusters or personal computers
* Expose CMU Networking environment; Data Center; how things are interconnected…
* Introduction to SIS, Blackboard, Portal, LIS,
* Clusters (Virtual tour, intro to Window, Mac, and Unix environment)
* ???Health & Wellness (Ergonomics, Repetitive stress syndrome, Psychological issues, Physical security)

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## Proposed Support Model

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### One possible example of support model could be:

### Orientation Sessions

Large-group sessions where the teaching assistants will introduce students to the course structure, requirements and available support resources. Students will be oriented to the OLI environment and instructed on how to work through the online course.

### Support Sessions

Optional support sessions where students can receive targeted instruction on concepts they do not understand or receive on-demand support from a teaching assistant as they work through the course in OLI. Sessions will be held in the C@CM Office in Baker Hall 140 D where the required hardware/software will be provided. Sessions will also be held in partnership with Academic Development’s peer tutoring program in the residence halls. Students will be required to bring their own computers to these sessions.

The support session schedule will be determined by students’ availability throughout the day. The evening sessions will be held at the same time as Academic Development’s current evening tutoring schedule (Sundays through Thursday, 8:30 PM – 11:00 PM).

### Exam Review Sessions

Prior to each exam, the teaching assistants will offer hands-on review sessions to address any remaining questions and prepare students for the exams.

1. Students enrolled in Mac OS sections are not included in the dataset due to variations in the course materials.
 [↑](#endnote-ref-2)
2. Students were asked to select N/A if they did not complete the activities.
 [↑](#endnote-ref-3)
3. Students participating in other OLI courses were excluded because the data logs cannot be filtered to only include time contributed to C@CM. There were 194 students excluded because they were also enrolled in another OLI course.
 [↑](#endnote-ref-4)
4. Fall 2009 curriculum include: Introduction to Andrew Services; Blackboard, Portal and HUB; The Help Center; Email Options; Public Printing; Andrew Calendar; Excel; Dreamweaver; File Storage & Sharing (OLI); and Group Presentations

 Assuming course is extended over entire semester. [↑](#endnote-ref-5)