

Using ICT to Enhance Traditional Classroom Instruction for Computer Science Undergraduates

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This paper describes the use of both information and communication technology (ICT) and classroom based instructional methods to accommodate students with different learning styles, provide varied and more convenient learning environments, and work around the constraints of curriculum time faced by both teachers and students, in a computer science undergraduate communication course. It also reports survey findings on the students' views on the instructional activities carried out and the resources provided in the course. Documentation of the methods of incorporating ICT into the classroom and the evaluation of their varying degrees of effectiveness can encourage teachers to re-think their current methods of teaching and help them appreciate the supportive role of ICT in enhancing their delivery of instruction.

INTRODUCTION

“Computers are changing the way we work and the way we live ... We will use IT to encourage students to learn more independently, to learn actively.”

(Goh Chok Tong, PM of Singapore in *Masterplan for IT in Education*)

Most of us use technology tools such as e-mail, the Internet and other software applications in our daily lives to help us create, obtain and communicate information. Findings from the *Survey on Infocomm Usage in Households 2000*, conducted by the Infocomm Authority of Singapore (IDA) indicated that “PC ownership and home Internet access are no longer luxury items but common resources used by many individuals” (Infocomm Development Authority of Singapore, 2001a: 20).

The Singapore government, which is aware that a skilled, IT-literate workforce is the country's greatest asset in a competitive global economy, supports "continued efforts to encourage adoption of Infocomm technology to improve [the people's] quality of life and enhance employability" (Infocomm Development Authority of Singapore, 2001b: 21).

As part of its efforts to encourage the use of IT, the government developed national educational policies and strategies on IT use in schools. In 1997, the Ministry of Education launched a *Masterplan for IT in Education*, which is "a blueprint" for the use of IT in Singapore schools.

With the support from national policies promoting IT in education, more teachers were trained in core IT skills and findings from IDA's *2000 Infocomm Literacy Survey* indicated that 71% of respondents from the teaching profession claimed that they were "Infocomm savvy" (Infocomm Development Authority of Singapore, 2001b).

Impact of ICT on Education

Information and Communication Technology (ICT): "the study of the technology used to handle information and aid communication."
(FOLDOC, 2002)

The term "ICT" was first used in the report *Information and Communication Technology in UK Schools*, submitted in 1997 to the UK government by Dennis Stevenson, the Chairman of The Independent ICT in School Commission (1996/7). The report explained that the more commonly used term "Information Technology" was expanded to "Information and Communication Technology" (ICT) to more accurately "reflect the increasing role of both information and communication technologies in all aspects of society" (Stevenson, 1997).

In the field of education, ICT has enabled instruction to be delivered and received anytime and anywhere, providing students with more varied and convenient learning environments. Teachers and students can distribute and access course materials in virtual environments as well as communicate outside traditional physical

classroom settings. From early 2003, “U21global”, an e-university based in Singapore will offer courses in information technology and business. Its degrees will be approved and recognised by 15 international universities including the National University of Singapore (Olsen, 2001).

ICT has also supported and transformed the learning/teaching process by enabling explorative and interactive activities to be created and conducted in virtual learning environments. With ICT tools like the Internet, e-mail, online discussion forums, chatrooms and video-conferencing, students can learn independently and/or in collaboration with other students in virtual study groups.

Purpose of Paper

As teachers develop greater confidence and skill in the use of educational technology, there will be more attempts to integrate ICT into the teaching and learning processes, with varying results. According to Williams (2000), efforts at integration in the classroom can range from a “basic level” where ICT tools such as e-mail is used to collect and distribute class assignments, to a “high level” where technology takes on “a pivotal role” (Williams, 2000: 13) in the instructional process and where it will be difficult to imagine how the lesson can be carried out without the use of such technology.

The main purposes of this paper are to describe the ICT and classroom based instructional methods used in a Business and Technical Communication course for computer science undergraduates and report the participants’ views on the instructional activities carried out and the resources provided in the course.

The sharing of information on the methods of incorporating ICT into the classroom and the evaluation of their varying degrees of effectiveness can encourage teachers to re-think their current methods of teaching and help them appreciate the role of ICT in enhancing their delivery of instruction.

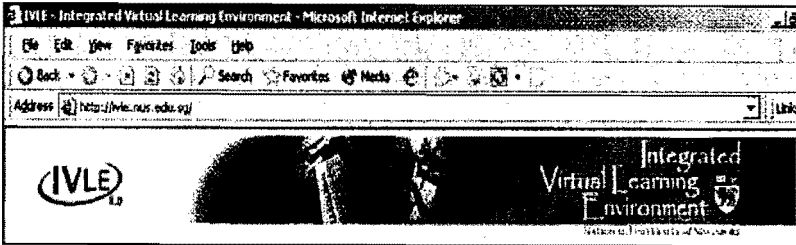
COURSE DESCRIPTION

At the National University of Singapore (NUS), the School of Computing (SoC) trains its computer science undergraduates to become the country's future information technologists, research and development (R&D) specialists, and software architects. SoC provides its staff and undergraduates with access to a wide range of computing equipment, facilities and networks for teaching/learning purposes. Its extensive physical and technology infrastructure facilitate the use of both classroom-based and ICT-based instructional methods in the delivery of its courses.

Business and Technical Communication (CS2301) is a 12-week course designed for first year SoC computer science undergraduates. The course aims to develop the students' oral and written communication skills. It covers topics like proposal report writing, software documentation, business correspondence and presentation skills. The instructional methods used in CS2301 include lectures, tutorials, student-tutor conferences, e-mail consultations, forum discussions on the University's Integrated Virtual Learning Environment – IVLE (Figure 1) and self-instruction available from the course websites.

Course evaluation consists of an open-book written examination at the end of the course and continual assessment comprising of oral assignments, written assignments and course participation. The level and quality of participation by students in both tutorial activities and online discussions are taken into consideration when awarding participation grades. The awarding of grades for participation emphasises to the students that they are personally responsible for contributing to the learning process.

Figure 1. NUS Integrated Virtual Learning Environment (IVLE)



COURSE INSTRUCTIONAL METHODS AND ACTIVITIES

The instructional methods used in CS2301 include classroom-based and ICT-based instructional methods.

Classroom-based Instructional Methods

In this paper, classroom-based instructional methods refer to the more established ways of delivering instruction at physical venues and there is usually face-to-face interaction between the participants. These methods include: Lecture, tutorial, and student-tutor conference.

A brief description of the classroom-based instructional methods used in CS2301 and their main instructional purposes are summarised in Tables 1 and 2:

Lecture – the tutor gives a formal mass delivery of content to all the students (approximately 325 students) in the course.

Tutorial – the tutor and the students in the tutorial group discuss or exchange ideas and feedback on course related issues/topics. Pre-set tutorial activities such as pop quizzes, peer reviews of written assignments and feedback on oral presentations are also carried out.

Student-Tutor Conference – the tutor provides remedial assistance and/or feedback to pairs/groups of students (not more than four students). Each student pair/group signs up for a 15-20 minute conference slot to meet with the tutor.

Table 1. CS2301 Classroom-based Instructional Methods

| Classroom-Based Instructional Method | Frequency | Duration | Location | Participant Size |
|---|-----------------------|------------------------------|-----------------|--|
| Lecture | Scheduled Weekly | 2 hours | Lecture Theatre | Large Group (All students) |
| Tutorial | Scheduled Weekly | 2 hours | Tutorial Room | Small Group (about 13 students per tutorial group) |
| Student-Tutor Conference | Scheduled Fortnightly | 15-20 minutes per pair/group | Tutorial Room | Pair/Small Group (2-4 students per conference time slot) |

Table 2. Main Purposes of Classroom-based Instructional Methods in CS2301

| Classroom-Based Instructional Method | Learning Environment | Main Instructional Purpose(s) |
|---|-----------------------------|--|
| Lecture | face-to-face Passive | To provide mass delivery of content. |
| Tutorial | face-to-face Interactive | To review lecture teaching points. To stimulate thinking and participation for application of theory. |
| Student-Tutor Conference | face-to-face Interactive | To provide remedial assistance and/or feedback. |

ICT-based Instructional Methods

ICT-based instructional methods are used in virtual learning environments that are outside the confines of physical teaching venues. Such virtual environments can be interactive even though the participants do not meet face-to-face. These methods include: E-mail Consultation, Forum Discussion, and Self-Instruction on the Internet.

The ICT-based instructional methods used and their main instructional purposes are summarised in Tables 3 and 4:

Table 3. CS2301 ICT-based Instructional Methods

| ICT-Based Instructional Method | Frequency | Duration | Location | Participant Size |
|---------------------------------------|-----------------------------------|-----------------|-----------------|--|
| E-mail Consultation | As required throughout the course | throughout | Internet | Individual |
| Forum Discussion | As required throughout the course | throughout | IVLE/Internet | Small Group (All tutorial groups belonging to tutor) |
| Self-Instruction | As required throughout the course | throughout | Internet | Individual |

Table 4. Main Purposes of ICT-based Instructional Methods Used in CS2301

| ICT-Based Instructional Method | Learning Environment | Main Instructional Purpose(s) |
|---------------------------------------|-----------------------------|--|
| E-mail Consultation | Virtual Interactive | To provide personalised remedial assistance and/or feedback. |
| Forum Discussion | Virtual Interactive | To review main teaching points. To develop peer/ collaborative learning skills. |
| Self-Instruction | Virtual Exploratory | To provide self-instruction through e-resources prior to classroom-based instruction. To provide a means for continued learning through the use of supplementary e-resources. |

E-mail Consultation

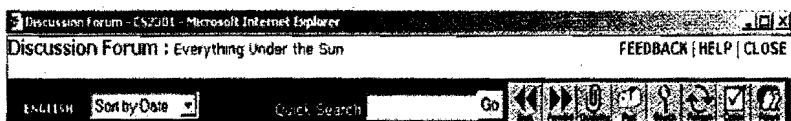
The student initiates and determines the time and frequency for e-mail consultations that are available from the start of the course. The student e-mails queries or ideas to the tutor who replies with feedback or clarifications. The tutor saves the messages from such consultations for student/course evaluation purposes as these electronic records are helpful in tracking the progress of students

who need more attention or identifying specific areas in the course that present difficulties to them.

Forum Discussion

The student or tutor initiates/contributes to discussion on a course related topic and posts it on the tutor's IVLE Discussion Forum (Figure 2), that is accessible only to members of the tutor's groups. IVLE generated statistics on the *Level of Forum Activity* showed an 82% participation rate i.e., out of a total of 65 students (in the tutor's 5 tutorial groups for AY2001/2002, semester 2), 53 of them posted at least a topic for discussion and/or a reply to a topic. As "lurking participants" in the Forum are not tracked, these figures do not include those "who read the postings but do not contribute postings of their own" (Kleem, 1998). In this paper the term, *Discussion Forum* refers to the online learning environment while the term, *Forum Discussion* refers to the instructional method.

Figure 2. Tutor's Discussion Forum - *Everything Under the Sun*.



The following structured activities were carried out in the Discussion Forum:

- A bonding activity (*Name Your Forum Contest*) was carried out early in the course to establish a sense of identity and ownership among the students for their own Forum. According to Kleem (1998), the bonding of students in a virtual community through such an icebreaker activity is important as it gives them greater incentive to participate actively in their own Forum.
- Review activities were carried out to reinforce the main teaching points. For instance, after completing the user manual assignment, the students were asked to reflect on what they had learnt in the process of drafting a user manual and share their experiences by posting a useful tip for drafting the manual. The postings were then collated into a handout for examination

revision purposes. A brief description of the review activity is provided in Appendix 1.

- Peer learning activities were carried out to enable the students to actively help each other in the learning process. When students are encouraged to analyse their peers' postings and provide evaluative responses based on their own knowledge/experiences, it can avoid the contribution of postings that are mainly opinion-based and do not add much to the students' understanding of the course. Such activities are briefly described in Appendix 2.

Self-Instruction

In preparation for classroom-based instruction, the students access the course websites for e-resources such as supplementary reading materials, lecture notes, online quizzes and links to relevant sites. Students also utilise the e-resources for continued learning in the course topics that interest them. The following two course websites are available to the students:

1. The official *CS2301 Home Page* that provides information such as course descriptions, academic policies, lecture/tutorial schedules, announcements, tutors' contact details, reading lists, lecture PowerPoint slides and instructional video clips (Figure 3).

2. The *Tutor's Website* (the tutor's own academic website) that is built and maintained by the tutor. This website provides course materials created and/or selected by the tutor for use by her students (Figure 4). Prior to attending classroom-based lessons, students access the e-resources and undergo self-instruction from the materials available. Thereafter, the students can explore the e-resources for continued learning at their own time and pace. Findings from the survey indicated that most respondents (48%) access the *Tutor's Website* on a *Weekly* basis (Appendix 3, Question 2 collated results).

Figure 3. The “Official” CS2301 Home Page

| | | | | | | | |
|-------------|---------------|----------|------------------|------------------|------------|------|--------|
| CS2301 HOME | ANNOUNCEMENTS | SCHEDULE | TEXTS/REFERENCES | COURSE MATERIALS | CONTACT US | FILE | VIDEOS |
|-------------|---------------|----------|------------------|------------------|------------|------|--------|

Welcome to the CS2301 Home Page!

Presenting...

**THE
ADVENTURES
OF PIP**



To give you an idea how useful CS2301 will be during your school term and even after you graduate, check out "The Adventures of Pip," our special feature!

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Figure 4. Tutor’s Website - Report Writing Page

Business and Technical Communication

CS 2301

| <p><u>Copyright Agreement</u></p> <p><u>General Information</u></p> <p>Report Writing</p> <p>Manual Writing</p> <p>Business Correspondence</p> <p>Oral Presentation</p> <p>Intercultural Communication</p> | <p>Report Writing</p> <p>Instructions for use: This page contains links to useful supplementary course materials. To view/download a file, click on the file's corresponding link.</p> <table border="1"> <thead> <tr> <th>File Name</th> <th>File Size</th> <th>Content Description</th> <th></th> </tr> </thead> <tbody> <tr> <td>report_review.doc</td> <td>(41kb)</td> <td>Review of types of reports and samples</td> <td>VIEW</td> </tr> <tr> <td>cs2301_readcenterApp.doc</td> <td>(63kb)</td> <td>Use of reader-centered approach in report writing</td> <td>VIEW</td> </tr> <tr> <td>PropiPP_review.doc</td> <td>(34kb)</td> <td>Overview of proposal writing steps presented in a table</td> <td>VIEW</td> </tr> <tr> <td>cs2301_proposal_dummy.doc</td> <td>(31kb)</td> <td>Template for main sections of proposal report</td> <td>VIEW</td> </tr> <tr> <td>cs2301_headingstyles.doc</td> <td>(40kb)</td> <td>Stylesheet for formatting report sections</td> <td>VIEW</td> </tr> <tr> <td>Internet_VCfund.htm</td> <td>(11kb)</td> <td>Sample of Request for Proposal from Internet IncubatorFund (Dept of Trade & Industry) U.K.</td> <td>VIEW</td> </tr> <tr> <td>VCfund_form.pdf</td> <td>(51kb)</td> <td>Sample of Proposal Form from Internet IncubatorFund</td> <td>VIEW</td> </tr> <tr> <td>Sloan Center Request for Proposals.htm</td> <td>(12kb)</td> <td>Sample of Request for Proposal from Sloan Center for Asynchronous Learning Environments (University of Illinois) U.S.</td> <td>VIEW</td> </tr> </tbody> </table> | File Name | File Size | Content Description | | report_review.doc | (41kb) | Review of types of reports and samples | VIEW | cs2301_readcenterApp.doc | (63kb) | Use of reader-centered approach in report writing | VIEW | PropiPP_review.doc | (34kb) | Overview of proposal writing steps presented in a table | VIEW | cs2301_proposal_dummy.doc | (31kb) | Template for main sections of proposal report | VIEW | cs2301_headingstyles.doc | (40kb) | Stylesheet for formatting report sections | VIEW | Internet_VCfund.htm | (11kb) | Sample of Request for Proposal from Internet IncubatorFund (Dept of Trade & Industry) U.K. | VIEW | VCfund_form.pdf | (51kb) | Sample of Proposal Form from Internet IncubatorFund | VIEW | Sloan Center Request for Proposals.htm | (12kb) | Sample of Request for Proposal from Sloan Center for Asynchronous Learning Environments (University of Illinois) U.S. | VIEW |
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Rationale for Use of Instructional Methods

Each instructional method has its advantages and limitations and no single method is likely to be able to meet all the needs of the teacher and the student. In CS2301, ICT-based instructional

methods were used to support, complement and enhance traditional classroom-based methods for the following main reasons:

- To accommodate students with different learning styles whose needs may not be satisfied by the use of only one instructional method.
- To provide students with varied and more convenient learning environments.
- To work around curriculum time constraints faced by both tutors and students.

Accommodating Students with Different Learning Styles

Forum discussions and Tutorials are suitable for students who prefer active learning through peer interaction. In contrast, Lectures that involve the mass delivery of content to largely passive audiences suit the more reflective learners. E-mail consultations and Student-tutor conferences suit students who are hesitant about speaking up publicly and/or prefer more personal attention. Self-directed or highly motivated students can carry out Self-instruction at their own pace, using the e-resources available in the *Tutor's Website*.

Providing Varied and More Convenient Learning Environments

Using both ICT and classroom based instructional methods can provide students with varied and more convenient learning environments. Lectures, Tutorials and Student-Tutor conferences are conducted at scheduled times, in physical settings where students experience face-to-face interaction with the tutor and their peers. E-mail consultations, Forum Discussions and Self-Instruction via the Internet are carried out in virtual asynchronous environments where peer/tutor interactions and self-directed learning occur at flexible times determined by the students, providing "an experience in distance education – education unconstrained by time and place" (Karayan & Crowe, 1997).

Working around Curriculum Time Constraints

Both tutors and students face curriculum time constraints. There are limited hours scheduled for instruction and there are always students who would need additional or remedial assistance outside

these scheduled times. The use of ICT-based instructional methods increases the availability of the tutor for consultation, enables students to have greater access to the tutor and vice versa outside the scheduled contact hours. With more opportunities for communication and interaction, the student/teacher bond can be strengthened as well.

SURVEY DESIGN

Attitude survey questionnaires (Appendix 3) were administered at the end of the course to 54 respondents. The survey aims to gather data on the respondents' views about the ICT and classroom based activities (excluding e-mail consultation and lecture to reduce the scope of the survey) in the following areas:

- Usefulness of the activities in helping respondents understand course topics.
- Respondents' level of interest in the course activities.
- Respondents' preferred frequency of course activities.
- Usefulness of e-resources and handouts in helping respondents understand course topics.

FINDINGS AND DISCUSSION

Usefulness of ICT and Classroom based Activities

The respondents were asked to indicate their views on the usefulness of the following activities in helping them understand the topics in the course, from a scale of *Not Useful* to *Very Useful*:

- ICT-based activity – Contributing to Forum Discussion.
- Classroom-based activities – Peer Review of written work, Feedback on oral presentations, Student-tutor conference, Discussion of quiz questions & answers.

70% of the respondents found the activity of Contributing to Forum Discussion *Useful* to *Very Useful* in helping them understand the topics in the course (Appendix 3, Question 6 collated results). In contrast, all the respondents (100%) found the classroom-based activities of Peer review, Feedback and Student-tutor conference *Useful* to *Very Useful* in helping them understand the course. 96% of the respondents found the Discussion of quiz

questions & answers *Useful* to *Very Useful* in helping them understand the course.

The results indicate that respondents considered classroom-based activities more *Useful* in contributing to their understanding of the course than the ICT-based activity of Contributing to Forum Discussion. The range of topics covered in Forum discussion threads although mostly within the bounds of the course objectives, tend to be broader and more varied than those covered in the more focused discussions held during tightly scheduled tutorials/conferences. Consequently, Forum postings on diverse issues that branch from the main course topics may be regarded by some participants as not contributing much to their understanding of the course.

Level of Interest in ICT and Classroom based Activities

The respondents were asked to indicate their level of interest in the following activities from *Boring* to *Very Interesting*:

- ICT-based activity – Contributing to Forum Discussion.
- Classroom-based activities – Peer Review of written work, Feedback on oral presentations, Discussion of quiz questions & answers.

83% of respondents found Contributing to Forum Discussions *Interesting* to *Very Interesting* (Appendix 3, Question 5 collated results). In comparison, 96% of the respondents found the classroom-based activities of Peer review and Feedback *Interesting* to *Very Interesting*. Fewer respondents (89%) found the Discussion of quiz questions & answers *Interesting* to *Very Interesting*.

The respondents found classroom-based activities slightly more *Interesting* than Contributing to Forum Discussion. Communicating through text-based asynchronous discussions in the Forum is a different experience from face-to-face interactions in physical settings given its lack of verbal/para-verbal cues and a narrower range of expressivity for communicating emotions. It is possible that some respondents needed to adjust to this different mode of communication. In addition, delayed responses in Forum discussions may have discouraged interest in the activity among the

respondents who are more used to the spontaneity of face-to-face interactions.

Preferred Frequency of ICT and Classroom based Activities

The respondents were asked to indicate (*Yes* or *No*) whether they would like to have more of the following activities:

- ICT-based activity – Forum Discussion.
- Classroom-based activities – Peer Review and Feedback, Student-tutor conference, Pop Quiz.

56% of respondents wanted more Forum discussions (Appendix 3, Question 7 collated results). In contrast, 93% of respondents wanted more classroom-based Peer Review and Feedback activities while 78% of respondents wanted more Student-tutor conferences. Fewer respondents (46%) wanted more Pop Quizzes.

The survey findings indicate that respondents wanted more classroom-based activities except for pop quizzes, which is not surprising since the quizzes test students on their degree of familiarity with the course content. The results show that fewer respondents wanted more forum discussion activities and this is possibly due to the need for respondents to take the initiative to start or respond to discussions on the Forum and express their thoughts in writing rather than verbally. In addition, the asynchronous nature of Forum discussions lacks the sense of immediacy present in face-to-face interactions.

Usefulness of E-Resources and Traditional Course Materials

The respondents were asked to indicate their views on the usefulness of the following materials in helping them understand the course topics, from *Not Useful* to *Very Useful*:

- E-resources – Forum Postings and online materials/links in the *Tutor's Website*.
- Traditional resources – Handouts.

98% of the respondents found the e-resources available from the *Tutor's Website* and traditional Handouts *Useful* to *Very Useful*

(Appendix 3, Question 3 collated results). In contrast, 76% of the respondents regarded Forum Postings as *Useful* to *Very Useful*.

Fewer respondents found the content in Forum postings to be *Useful* to their understanding of the course. It is possible that they felt the e-resources and the handouts contained information immediately relevant to the course topics compared to Forum postings that cover more diverse topics.

CONCLUSION

Each instructional method has its advantages and limitations and no single method is likely to be able to meet all the needs of the teacher and the student. Both ICT and classroom based instructional methods were used in CS2301 to accommodate students with different learning styles, provide varied and more convenient learning environments and work around the constraints of curriculum time faced by both tutors and students in the course.

The survey results on the students' views on the instructional activities carried out and the resources provided in the course revealed that although receptive to ICT-based activities, most respondents considered classroom-based activities to be more interesting and useful in contributing to their understanding of the course. These findings could be attributed to the respondents' need to adjust to a mode of electronic communication that is largely text-based and asynchronous compared to spontaneous and immediate face-to-face interactions in physical learning environments. Most respondents in the survey found e-resources and traditional handouts, which provided immediately relevant course information, to be more useful to their understanding of the course than the broader content available in Forum postings.

The survey findings have provided valuable insight into the effectiveness of this attempt to use ICT to enhance traditional classroom-based instruction. The results have prompted thoughts on the following possible modifications to the implementation of the instructional activities: preparing the students more thoroughly for the different learning experience in virtual learning environments, and including more structured forum activities that require postings by individual students and tracking participation in forum discussions more closely to avoid "lurking".

The continued documentation of the methods of incorporating ICT into the classroom and the evaluation of their varying degrees of effectiveness can encourage teachers to re-think their current methods of teaching and help them appreciate the supportive role of ICT in enhancing their delivery of instruction.

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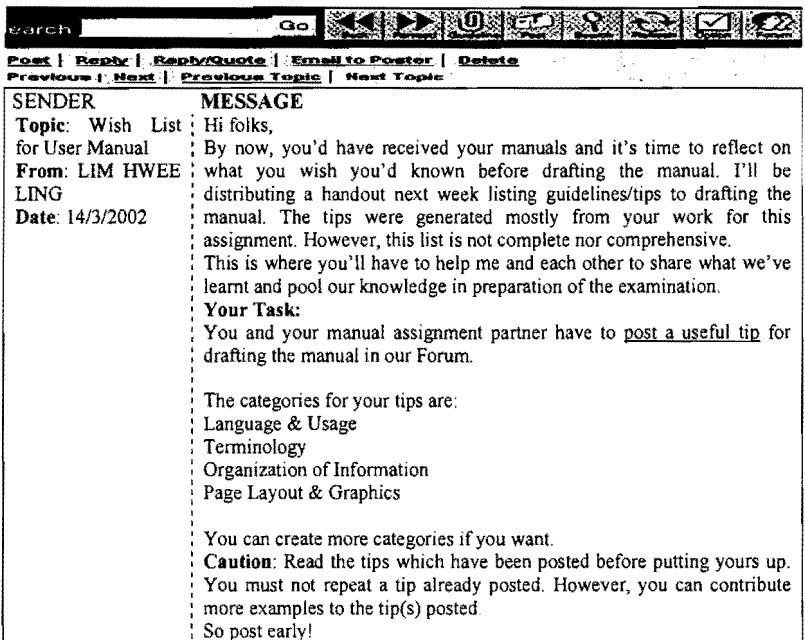
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Appendix 1. Forum Postings from User Manual Review Activity

A review activity was conducted after the completion of the user manual assignment. The students were asked to reflect on what they had learnt in the process of drafting a user manual and share their experiences by posting a useful tip for drafting the manual. The postings were then collated into a handout for examination revision purposes. A brief description of the activity is provided below:


- The tutor posts an announcement on the Forum that defines the task and its objectives (Figure A-1).
- The tutor creates categories for the organisation of the tips and posts a sample tip in each category.
- Postings by students (Figure A-2) are collated into a handout listing guidelines/tips for drafting a user manual. The handout is later distributed to the students for examination revision purposes.

Figure A-1. Task Announcement by Tutor on the Forum



The screenshot shows a forum interface with a search bar at the top left containing the text "earch" and a "Go" button. To the right of the search bar are several navigation icons: a left arrow, a right arrow, a magnifying glass, a speech bubble, a document, a checkmark, and a refresh symbol. Below the search bar is a row of text links: "Post", "Reply", "Reply/Quote", "Email to Poster", and "Delete". Below these links is another row of text links: "Previous", "Next", "Previous Topic", and "Next Topic". The main content area is a message box with a border. It is divided into two columns: "SENDER" and "MESSAGE". The "SENDER" column contains the following text: "Topic: Wish List for User Manual", "From: LIM HWEE LING", and "Date: 14/3/2002". The "MESSAGE" column contains the following text: "Hi folks,", "By now, you'd have received your manuals and it's time to reflect on what you wish you'd known before drafting the manual. I'll be distributing a handout next week listing guidelines/tips to drafting the manual. The tips were generated mostly from your work for this assignment. However, this list is not complete nor comprehensive. This is where you'll have to help me and each other to share what we've learnt and pool our knowledge in preparation of the examination.", "Your Task:", "You and your manual assignment partner have to post a useful tip for drafting the manual in our Forum.", "The categories for your tips are:", "Language & Usage", "Terminology", "Organization of Information", "Page Layout & Graphics", "You can create more categories if you want.", "Caution: Read the tips which have been posted before putting yours up. You must not repeat a tip already posted. However, you can contribute more examples to the tip(s) posted.", "So post early!"

Figure A-2. Samples of Tips Posted by Students

| search <input type="text"/> <input type="button" value="Go"/>  | |
|--|---|
| Post Reply Reply/Quote Email to Poster Delete Previous Next Previous Topic Next Topic | |
| SENDER | MESSAGE |
| Topic: Re: Manual Wish List Page Layout From: Tan YF Date: 16/03/2002 | If you have more than 1 tip/option/note/caution placed together, instead of writing TIP: You may click on the MAGNIFY button to zoom in, or click on the REDUCE button to zoom out. TIP: You may click on the SAVE menu to save the diagram to a picture file. TIP: To return to the main window, click on the cancel menu. You can write this: TIP: You may click on the MAGNIFY button to zoom in, or click on the REDUCE button to zoom out. You may click on the SAVE menu to save the diagram to a picture file. To return to the main window, click on the cancel menu. |
| Topic: Re: Manual Wish List Organisation of Information From: Koh HG Date: 16/03/2002 | My last step for <u>Opening Files</u> was: Click on File; select Edit under the drop-down menu ... and then I did not mention any outcome or description. You bet the reader wouldn't know what to expect from that step – and that isn't good at all. We should never assume that a step is too simple to be explained. Why did I miss that out? |
| Topic: Re: Manual Wish List Graphics From: Koh SJ Date: 18/03/2002 | When labeling the graphics in the manual, it should be clearly described accordingly to it's intended purpose. E.g. An Open File Dialog Box should not be named as Dialog Box only. Cheers From: Koh SJ, Tan LK |

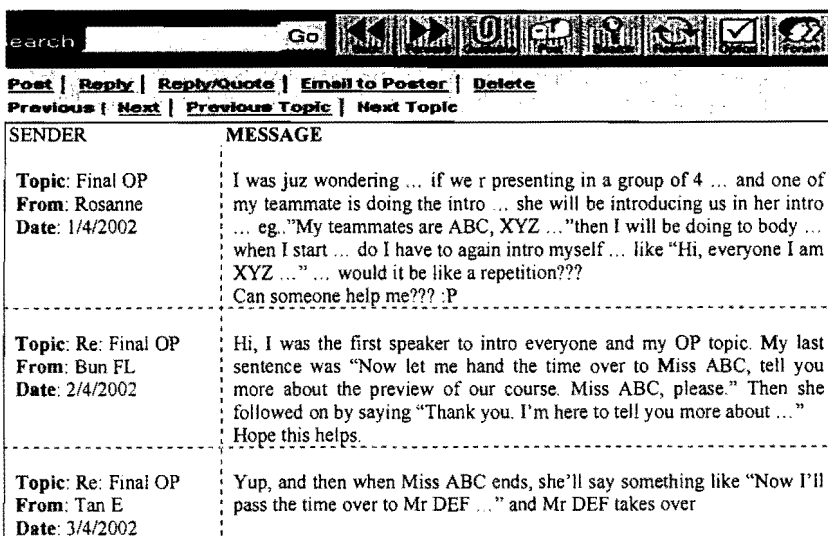
Appendix 2. Forum Postings from Peer Learning Activities

Peer learning activities were carried out to enable the students to actively help each other in the learning process. When students are encouraged to analyse their peers' postings and provide evaluative responses based on their own knowledge/experiences, it avoids the contribution of postings that are mainly opinion-based and do not add much to the students' understanding of the course. Such activities are briefly described below:

Students initiate discussions on difficulties they encountered in the course and their peers use their own knowledge and/or experiences to offer solutions to the problems (Figure B-1).

Students who miss the pop quiz exercises during tutorials are asked to post their quiz answers on the Forum. Their answers have to be evaluated by at least two of their peers before marks are credited for their answers (Figure B-2).

Figure B-1. Extracts from a Peer Learning Discussion Thread



| SENDER | MESSAGE |
|--|---|
| Topic: Final OP From: Rosanne Date: 1/4/2002 | I was juz wondering ... if we r presenting in a group of 4 ... and one of my teammate is doing the intro ... she will be introducing us in her intro ... eg."My teammates are ABC, XYZ ..."then I will be doing to body ... when I start ... do I have to again intro myself ... like "Hi, everyone I am XYZ ..." ... would it be like a repetition??? Can someone help me??? :P |
| Topic: Re: Final OP From: Bun FL Date: 2/4/2002 | Hi, I was the first speaker to intro everyone and my OP topic. My last sentence was "Now let me hand the time over to Miss ABC, tell you more about the preview of our course. Miss ABC, please." Then she followed on by saying "Thank you. I'm here to tell you more about ..." Hope this helps. |
| Topic: Re: Final OP From: Tan E Date: 3/4/2002 | Yup, and then when Miss ABC ends, she'll say something like "Now I'll pass the time over to Mr DEF ..." and Mr DEF takes over |

| | |
|---|---|
| Topic: Re: Final OP From: Fong QY Date: 3/4/2002 | Hi Rosanne, Actually, that Miss ABC was me (hehe..) What I did was to re-introduce myself again as: "I'm Miss ABC and I'm one of the trainers of the Telebun School of Computer Technology .." This will help the audience identify WHO is speaking and WHAT she's going to talk about (esp. if your team is large. But if your 1 st speaker had already introduced u to the audience in great detail, I suppose you could just simply start by: "Hi, I'm Miss ABC and I shall now give you a preview on our course ..." Hope this helps. QY |
| Topic: Re: Final OP From: Bun FL Date: 3/4/2002 | Yes, I would agree with QY. It really does depend on what your first speaker says and how he or she introduces the rest of you. All the best Rosanne! |

Figure B-2. Extracts from Pop Quiz Discussion Thread

earch Go

[Post](#) | [Reply](#) | [Reply/Quote](#) | [Email to Poster](#) | [Delete](#)

[Previous](#) | [Next](#) | [Previous Topic](#) | [Next Topic](#)

| SENDER | MESSAGE |
|--|---|
| Topic: Answers for Pop Quiz2 From: JV Date: 1/2/2002 | Qualifications is better as it gives us a clear information that we are talking abt the talents of the company/person ... than using Software development experience ... It also looks more formal. It is more catchy and user friendly Small is better to use because in a proposal it is better to use simple and clear words ... As diminutive seems a bit complex it is better to use small lapped up is not so formal and negative meaning and looks as if accepting with swallowing |
| Topic: Re: Answers for Pop Quiz2 From: Marcus Date: 1/2/2002 | Hmm ... Isn't "Our Software Development Experience" more eye-catching, attention grabbing?? I feel that "Qualifications" is kind of formal and dull. |
| Topic: Re: Answers for Pop Quiz2 From: Choo FC Date: 1/2/2002 | I also feel that "Qualifications" is a bit dull. I would be more interested to read "Our Software Development Experience" rather than "Qualifications". |
| Topic: Re: Answers for Pop Quiz2 From: Nie LL Date: 1/2/2002 | For question 3, another word not being used properly is "happily", because the writer should not put his strong opinion into the proposal. I didn't find it also at the beginning, hehe! |
| Topic: Marks for JV From: LIM HWEE LING Date: 2/2/2002 | Okay, you got 4 out of 5. Many thanks to those who commented on his answers. |

Appendix 3. Collated Survey Results

Survey on Attitudes of NUS School of Computing Undergraduates Towards CS2301 Course Activities and Resources

1. How challenging did you find the following assignments?

| Assignments | Easy | Just Right | Difficult | Total |
|---------------------------------------|------|------------|-----------|-------|
| a. Proposal Report | - | 26 | 28 | 54 |
| | 0% | 48% | 52% | 100% |
| b. User Manual | 2 | 22 | 30 | 54 |
| | 4% | 41% | 55% | 100% |
| c. Business Letter | 12 | 37 | 5 | 54 |
| | 22% | 69% | 9% | 100% |
| d. Individual Short Talk Presentation | 11 | 35 | 8 | 54 |
| | 20% | 65% | 15% | 100% |
| e. Group Formal Oral Presentation | 4 | 30 | 20 | 54 |
| | 7% | 56% | 37% | 100% |
| f. Pop Quiz | 11 | 40 | 3 | 54 |
| | 20% | 74% | 6% | 100% |

2. How often do you access the following resources available to you in this course?

| Course Resources | Never | Daily | Weekly | Monthly | Only when reminded | Total |
|--|-------|-------|--------|---------|--------------------|-------|
| a. Your Forum: <i>Everything Under the Sun.</i> | 1 | 13 | 28 | 2 | 10 | 54 |
| | 2% | 24% | 52% | 4% | 18% | 100% |
| b. General Forum: <i>Common Room.</i> | 17 | 4 | 15 | 9 | 9 | 54 |
| | 31% | 7% | 28% | 17% | 17% | 100% |
| c. Tutor's website: <i>http://courses.nus.edu.sg/course/elclimh/notes/my_cs2301/index.htm</i> | 1 | 6 | 26 | 12 | 9 | 54 |
| | 2% | 11% | 48% | 22% | 17% | 100% |
| d. Official CS2301 website: <i>http://courses.nus.edu.sg/course/elcleeg/cs2301</i> | 2 | 5 | 11 | 15 | 21 | 54 |
| | 4% | 9% | 20% | 28% | 39% | 100% |

3. How useful were the following resources in helping you understand the topics in the course?

| Course Resources | Not Useful | Useful | Very Useful | Total |
|---|-------------------|---------------|--------------------|--------------|
| a. Postings in Forum: <i>Everything Under the Sun.</i> | 13 | 37 | 4 | 54 |
| | 24% | 69% | 7% | 100% |
| b. Materials and links provided in tutor's website: <i>http://courses.nus.edu.sg/course/elclimhl/notes/my_cs2301/index.htm</i> | 1 | 22 | 31 | 54 |
| | 2% | 41% | 57% | 100% |
| c. Handouts from tutor: <i>(e.g. newspaper articles on e-mail, Guidelines on Drafting User Manual, Organization of Preparation and speech outlines etc.)</i> | 1 | 28 | 25 | 54 |
| | 2% | 52% | 46% | 100% |

4. How often do you participate in the following course activities?

| Course Activities | Never | Seldom | Sometimes | Often | Always | Total |
|--|--------------|---------------|------------------|--------------|---------------|--------------|
| a. Contributing to discussions in Forum: <i>Everything Under the Sun.</i> | 7 | 24 | 20 | 3 | - | 54 |
| | 13% | 44% | 37% | 6% | 0% | 100% |
| b. Reviewing and giving feedback on the <i>written</i> work done by others in your tutorial group. <i>(e.g. 1st draft review of proposal report, user manual assignments).</i> | 3 | 8 | 13 | 17 | 13 | 54 |
| | 6% | 15% | 24% | 31% | 24% | 100% |
| c. Giving feedback on the oral presentations done by others in your tutorial group. <i>(e.g. short talk, formal group oral presentation).</i> | 2 | 8 | 21 | 17 | 6 | 54 |
| | 4% | 15% | 39% | 31% | 11% | 100% |
| d. Discussing pop quiz questions & answers during tutorials. | - | 6 | 27 | 12 | 9 | 54 |
| | 0% | 11% | 50% | 22% | 17% | 100% |

5. How interesting were the following course activities?

| Course Activities | Boring | Interesting | Very Interesting | Total |
|--|---------------|--------------------|-------------------------|--------------|
| a. Contributing to discussions in Forum: <i>Everything Under the Sun.</i> | 9 | 41 | 4 | 54 |
| | 17% | 76% | 7% | 100% |
| b. Reviewing and giving feedback on the <i>written</i> work done by others in your tutorial group. <i>(e.g. 1st draft review of proposal report, user manual assignments).</i> | 2 | 42 | 10 | 54 |
| | 4% | 78% | 18% | 100% |
| c. Giving feedback on the <i>oral</i> presentations done by others in your tutorial group. <i>(e.g. short talk, formal group oral presentation).</i> | 2 | 26 | 26 | 54 |
| | 4% | 48% | 48% | 100% |
| d. Discussing pop quiz questions & answers during tutorials. | 6 | 40 | 8 | 54 |
| | 11% | 74% | 15% | 100% |

6. How useful were the following activities in helping you understand the topics in the course?

| Course Activities | Not Useful | Useful | Very Useful | Total |
|--|-------------------|---------------|--------------------|--------------|
| a. Contributing to discussions in your Forum: <i>Everything Under the Sun.</i> | 16 | 32 | 6 | 54 |
| | 30% | 59% | 11% | 100% |
| b. Reviewing and giving feedback on the <i>written</i> work done by others in your tutorial group. <i>(e.g. 1st draft review of proposal report, user manual assignments).</i> | - | 30 | 24 | 54 |
| | 0% | 56% | 44% | 100% |
| c. Giving feedback on the oral presentation done by others in your tutorial group. <i>(e.g. short talk, formal group oral presentation).</i> | - | 26 | 28 | 54 |
| | 0% | 48% | 52% | 100% |
| d. Discussing pop quiz questions & answers during tutorials. | 2 | 33 | 19 | 54 |
| | 4% | 61% | 35% | 100% |
| e. Consulting with your tutor in Conferencing Sessions. | - | 26 | 28 | 54 |
| | 0% | 48% | 52% | 100% |

7. Would you like to have more of the following activities?

| <i>Course Activities</i> | Yes | No | Total |
|------------------------------|------------|-----------|--------------|
| a. Forum Discussions. | 30 | 24 | 54 |
| | 56% | 44% | 100% |
| b. Peer Review and Feedback. | 50 | 4 | 54 |
| | 93% | 7% | 100% |
| c. Conferencing Sessions. | 42 | 12 | 54 |
| | 78% | 22% | 100% |
| d. Pop quizzes. | 25 | 29 | 54 |
| | 46% | 54% | 100% |

8. Suggest some ways for improve the course activities or resources. Your suggestions can cover the following areas:

- amount and types of course materials given
- timing and frequency of conferencing sessions
- types and frequency of assignments
- types of course activities etc.

Please include any other comments or suggestions you may have about this course.

(extracts from comments by respondents)

- On the whole, this course was extremely enjoyable. I enjoyed my tutorial group totally. We were open & frank to one another, helping us to better our written & oratorical abilities. Materials were extremely useful, giving us an outline of what is wanted & expected from us.
- The amount and types of course materials given is all right and so are the types and frequency of assignment. The types of course activities are very interesting. But the time for conferencing sessions is a little short.
- I enjoyed this course very much, especially tutorial lessons because of the interactive nature of the tutorial. I had a lot of fun with my tutor and coursemates. However, I find the number of hours per week given to the course is rather long, because of the 2-hr tutorial PLUS the conference. I think tutorial time should not be shortened, but time could be given back in other ways such as having the conference the same day as the tutorial to minimize time chalked up having to come back another day. I also felt that the many number projects made the course rather heavy and time-consuming. Perhaps more weightage ought to be given to projects, and also to this module as a whole.
- I enjoyed the course. Although the 2 hour tutorial felt a bit long in the beginning, I realized that we used the 2 hours effectively and efficiently to learn more about business communication. Special thanks to Ms Lim Hwee Ling for clarifying our doubts and making our tutorials enjoyable, and even what can be considered as fun.
- The forum is not useful at all. It is just meant for students to hand up their pop quiz answers.
- It has been an interesting course, with all the interactions in class, reviews and feedbacks.

- More examples of projects for us to go through. More time for us to finish the projects. Over, it is a very useful and interactive module.
- Very interesting course, very tedious work sometimes (user manual). Probably the course can start off with an easier activity, like Business Correspondence, just to warm up to the groupmatesI also find that the course materials are not easily available on the ivle. We must go to another website which is not listed anywhere, and download the materials from there. It will be easier on the students if materials for any assignment/activities or for the course are uploaded to the workbin in ivle. Therefore, you might consider a common workbin for lecture materials or common assignment sheets, plus another working for each tutor. This facilitates easier access of the materials, compared to the tutor's website. Reason being, we always check the ivle website, hence when we check other modules, at the same time we can check 2301 materials, hence it saves time. Material distribution during tutorials and conferences are also a bit confusing. Some materials we can get from the tutor's website, but some we only get them during the tutorials/conference. There are many materials for tutorials, therefore it can get very confusing. Overall, I think I enjoyed my time during the course. Our tutor Ms Lim, can definitely get participation from her tutorial groups. Active way to conduct tutorial.
- The effect of peer review & feedback is not adequate. It depends so much on how serious the reviewers are. Sometimes, cannot learn anything from the peer review, but sometimes very useful.