CHAPTER FOUR - RESULTS AND DISCUSSION

The preliminary study questionnaire aimed to gauge whether the twenty five (25) respondents were familiar with the Internet, receptive to Internet use and willing to collaborate. It also attempted to identify whether they (the respondents) regarded audience and revision as important.

PRELIMINARY FINDINGS

Familiarity with the Internet

Most of the twenty five respondents have experience in using electronic mail (e-mail). Nine (36%) of them used e-mail frequently, nine (36%) seldom used the e-mail and seven (28%) had never used e-mail.

On a similar note, twelve (48%) of the respondents surfed the World Wide Web frequently, while nine (36%) seldom did so and only a minimal four (16%) did not.

However, ten (40%) of them frequently chat on-line, three (12%) seldom chat and another twelve (48%) had never done so. A majority of the respondents had little experience chatting on-line as they had access to only one Internet-connected computer in the MARA Junior Science College (MRSM). Furthermore, twenty one (84%) of the respondents did not have computers at home.

Thus, it is assumed that a majority of the respondents were familiar with the use of electronic mail and the World Wide Web. However, they might not

know the full features and capabilities of the Internet such as Internet Relay Chat, web page design and video-conferencing.

Attitude towards the Internet

The respondents cited the expensive rates for Internet use, congested lines and the technical jargon on the Internet as discouraging. However, they realised that the Internet had tremendous potential as a convenient resource for obtaining current information and also to serve as a tool for communication.

Due to their lack of exposure in communicating and collaborating with others via the Internet, some of them were not certain of the effectiveness of the Internet in improving their writing skills. Eight of the respondents (32%) thought the English on the Internet was sub-standard. Another four could not provide any answer. These two groups of respondents accounted for forty eight percent (48%) of the respondents.

On the contrary, eight (32%) of them thought the Internet would stimulate new ideas and enable them to get to know other cultures. Another three (12%) believed that communicating via the Internet would improve their vocabulary, spelling and grammar. Another student (4%) felt that frequent usage of English would improve his proficiency. Finally, a student (4%) said that since he had to use English to communicate, he would be forced to learn the language. This would require him to practise using the language. Since practice often refines skill, he believed communicating via the Internet would improve his writing ability.

Hence, thirteen respondents (52% of the students) were receptive towards the use of the Internet for communication and writing. Learning journal citations further indicated that they regarded information technology as a key component in their future education and career (Appendix 3). This reality had been constantly impressed upon them through the publicity given to the Multimedia Super Corridor (MSC) and one of its flagships, the smart school. Hence, the respondents were receptive towards the use of the Internet.

Attitude towards collaborative efforts

In contrasting the benefits of collaborative versus individual learning, most of them were unable to identify a significant learning experience for both kinds of learning environments. However, when asked more specifically pertaining to the advantages and disadvantages of collaborative and individual learning, the respondents claimed that they preferred working individually. The freedom to do things their own way dispensed with the need to argue with others to reach a consensus. Other instances where the respondents preferred individual work were when the workload and the demands of the task were manageable. This attributed to confidence in their own abilities to manage the task.

Preference for individual work however, did not negate the value of collaboration. They recognised that collaboration is a means to enrich the pool of ideas. As such, collaborative work could result in a higher quality product that would take a shorter time to complete.

However, they emphasised that group work would only be beneficial if there were:

1) team work
2) willingness to consider and accept others' opinions
3) ability to reason logically with each other
4) willingness to commit to a common interest/goal
5) self-discipline/sacrifice

In the context of this study, the respondents chose collaborative work despite their preference for individual work. Creating web pages for an international contest was something new. They knew that the product had to be fun, original and appealing to an international audience. Furthermore, the theme for their group was water pollution, a presumably dry topic that might appeal only to a small number of audience. Having to learn web page design further increased the difficulty of the task set before them.

Thus, although they decided to join the contest, it was with mixed feelings. They were challenged to test their creativity and skills. At the same time, they were apprehensive regarding whether they were competent to undertake the task. It was therefore not surprising that they chose to collaborate.

Attitude towards the importance of audience

The respondents were asked to rank the importance of the following when starting on an essay -- writing the introduction, brainstorming the

content, analysing the audience, getting the first sentence and getting the main idea.

Analysing the audience was ranked the lowest in importance. Getting the main idea was the highest in priority, followed by writing the introduction, developing the content, brainstorming, and getting the first sentence. In fact, sixteen (64%) of the respondents claimed that analysing the audience was not a relevant factor in starting on an essay. Hence, it reflected on their disregard for audience analysis when writing. This might be due to the nature of the writing task whereby the audience is usually the teacher and the purpose for writing was for practice and assessment. Hence, there was no need for actual communication.

In conclusion, the students did not rank audience highly. Thus, from the students' perspective, audience was not important contrary to what the teacher or researcher believed.

ANALYSIS OF QUALITATIVE DATA

RQ1: Did collaboration in networked classrooms create a supportive learning environment for writing?

The results and discussion of RQ 1 will be carried out under the following subheadings:

i) by increasing awareness of audience through attempts to elaborate ideas;

ii) by increasing awareness of audience through clarification of ideas due to cultural differences;

iii) by increasing awareness of audience through requests for clarification when in doubt;

iv) by increasing awareness of audience through revision of writing based on feedback;

v) by increasing opportunities for sharing and enriching ideas;

vi) by allaying fears regarding the use of technology;

vii) by facilitating delegation of tasks and

viii) by increasing self-directed learning by stimulating students' to carry out their own research

Question 1 (i): Did collaboration in networked classrooms create a supportive learning environment by increasing awareness of audience through attempts to elaborate ideas?

First instance: giving example of how role-playing works

The role playing game (RPG) involved different choices leading to different routes and different conclusions. Therefore, the player was given the freedom to make his own decisions based on the options given to him. This in turn determined whether he would ultimately achieve his objective and emerge a winner or otherwise.

However, the RPG was disorganised due to the various links and diverse choices posed to the player which led to different courses of events. As such, careful planning in terms of outlining the different paths as well as the relevant links from one section of the story to the other was imperative. This was so

that the various links from one page to the other would make sense and the momentum throughout the game would not be lost.

Confusion due to the seemingly uncertain and chaotic nature of the task was expressed by the French students. Although enthusiastic about the RPG idea, the French teacher advisor asked for further clarification regarding how it could be played. She was worried about the technical aspects as information technology was foreign to her. She and her students had hardly ever e-mailed anybody prior to the contest much less create a web page.

She felt that the first proposal for content (an on-line magazine regarding the water pollution problems among the three countries) was more manageable as the need for technological expertise in terms of web page design was not as essential. Furthermore, in terms of development of ideas, it was not as demanding as that of the role-playing game.

The American students were disappointed that the RPG might not be used but were willing to agree to whatever was best for the team in order to meet the deadline. They did however, hope that complications due to the RPG concept could be overcome as it was a very interesting idea.

In order to clarify how the role-playing game works, the Malaysian student leader listed the main theme and the main objectives of having a role-playing game. She further elaborated by providing a specific example of a person lost in the Forest of Doom and the corresponding consequences due to choices he made. In addition, she explained how previous suggestions (i.e. letter to the editor, comparison of water test results, articles, riddles, puzzles on water pollution) could be modified and incorporated.

Among the proposed modifications were changing the letter to the editor to a word from the Game Master. The Malaysian students also suggested incorporating water test results and articles, riddles and puzzles on water pollution as clues to solve problems. Stressing that these suggestions were refinements of earlier proposals, they emphasised that ideas, which were suggested earlier, were not rejected.

Their action was constructive as they tried to resolve the difference in opinions by listing, elaborating and comparing and contrasting prior and current proposals. They did not insist on their own ideas at the detriment of others' contributions or feelings. The tone used was polite. Furthermore, they posed their own ideas as suggestions. In other words, they acknowledged others' contributions and were open to feedback.

After reading the elaborated explanation, the French team felt relieved and claimed that they had a better grasp of what the RPG involved and how it functioned. They even suggested that the visitor should be given three different scenarios to choose from. All three schools would have to write on a round-robin basis. For example, the Malaysian students would begin with the first episode. The French students would take over from the Malaysian students and the American students would write the closure. Similarly, for the second scenario, the French students would write the first episode, the American students the second episode and the Malaysian students the third. The third scenario followed the same round-robin fashion. The American students would begin first, followed by the Malaysian students and finally, the French students would write closure.

Text would be created first. The illustration would then be added when the story was completed and the direction of the story was clearer. In conjunction, in order to facilitate brainstorming as well as to hasten work, all parties concerned decided that each subgroup from each school would team up with another subgroup from the other two schools.

The Malaysian students agreed with the proposal and suggested that all three schools should adhere to some guidelines. This was so that there would be uniformity in their stories. They proposed that

1) the introduction of the story evolve around the different predominant kinds of pollution in all the three countries. There would be a short briefing by a commander who would direct and brief a special agent (the player) on the mission he would be assigned to. This introduction would be written by all the 'A' subgroups in Malaysia, France and the United States.
2) all three schools produce an outline of their scenarios inclusive of the challenges or obstacles that the player would face. In order to show collaboration, it was decided that the special agent would have to utilise information from all three scenarios in order to complete his mission.

Second instance: giving examples by putting their web pages on the Internet

Some of the Malaysian students feared that their story might not integrate with those of the French and American's. They wondered whether

their collaborative partners really understood how the RPG was supposed to be played. This was because there were so many links, routes, and consequences in the RPG. Each web page would have two or three choices for the player to choose from. Since these choices would be in the form of links to the other web pages, anyone unfamiliar with how the RPG worked might not be able to develop the story appropriately.

Hence, they decided to create and put up their part of the webpages for Episode one (the introduction) on the Internet, based on what they had proposed. Since their partners had earlier expressed difficulty in conceptualising the RPG, the Malaysian students figured that enabling the French and American students to play the game would enhance comprehension. This indicated that technology would be used, as a tool to show what words could not represent.

Facilitating visualisation of the RPG further promoted the possibility of feedback. As time was a constraint, they thought that it would be unwise to change their conceptual framework of a game (RPG) to something else. It was better to refine whatever they had, the RPG, as all partners might deem fit from time to time.

The ephemerality provided for by word processing features in web page design was an added plus point. The students were not reluctant to change any aspect of their web pages based on feedback from the French or American students. Instead, they welcomed any feedback that would help improve the quality of their work.

Conclusion

Collaboration in networked classrooms did increase awareness of the audience (their collaborative counterparts). Initially, the students thought that there was no need to consider what their audience might think. What they had planned to do was to have each school carry out their part of the collaborative work. For example, for Episode one, the Malaysian students would write the introduction, the French students the second episode and the American students the third episode. This would involve minimal interaction and collaboration, as each school would merely have to continue where the other left off and proceed with the other round of story writing.

The Malaysian students realised that their counterparts were essential in achieving their common goal, i.e. to create the web pages. Hence, they had to ensure that whatever they wanted to convey was well communicated. If not, then further elaboration should be given in order to clarify, and not cause misunderstanding. Moreover, if proposals were made, then sufficient and reasonable justifications should be made. Perhaps then they could persuade their counterparts to think from the Malaysian students' perspective. Only when communication was clear would collaborative efforts be effective and efficient.

Question 1a (ii): Did collaboration in networked classrooms create a supportive learning environment for writing by increasing awareness of audience through clarification of ideas due to cultural differences?

The Malaysian students were used to collaborative work among their peers who were from the same culture. Thus, there was not much need for explanation when communicating. For example, they did not need to explain where Alor Setar was nor what mangrove swamp meant.

However, others outside Malaysia who do not speak Bahasa Malaysia or are not
familiar with matters unique to Malaysia would have difficulty in comprehending such words. The same applies to readers who are foreign to the French or American culture and geography.

Conclusion

Collaboration in networked classrooms did increase the students' awareness of audience as the Malaysian students suggested that all three schools should write an index or glossary to facilitate and enhance the audience's understanding of their stories.

Question 1a (iii): Did collaboration in networked classrooms create a supportive learning environment for writing by increasing awareness of audience through requests for clarification when in doubt?

First instance: request for clarification regarding how the various suggestions could be integrated

The Malaysian students were not certain how the French students' suggestions of a letter to the minister, a quiz, a green chart of environmental do's and don't's, weather forecast and comparison of water samples should be integrated into their RPG. Since they were doing a game, they could not figure out how essays such as the comparison of water tests could be incorporated. Thus, they requested for clarification.

In response, the French students gave an example of a hero walking across a public park and coincidentally coming upon a sign in the park (the green chart). The quiz would function as a pretext to question people on how respectful they are of the environment. To further clarify how the game could be played (the French version), they (the French students) e-mailed their scenarios and outline of the story.

Second instance: request for further clarification due to difficulty in visualising the proposed integration of stories

The Malaysian students were still worried as they had difficulty visualising how the French and American proposals could be integrated. As such, they requested for further clarification.

The French students presented a detailed outline, which integrated the proposals put forth by all three schools. The player would be given a choice of either playing the role of a mutant or a secret agent. Both would have the task of saving the earth but with different story lines.

A druidess called Franceline would be communicating with a person through telepathy (suggestion from France). However, while communicating, the earth split into two, earth A and earth B. The survivor was trapped in the strong room in earth A with his precious load of information on pollution (Malaysian suggestion). Thus, the druidess summoned the secret agent (French suggestion) to rescue the survivor and obtain the information from him. Otherwise, earth B would suffer the same fate as earth A. At this point, the player would be given a choice of either being a secret agent or the survivor.

If the player chose to be the survivor, he would be caught in the turmoil and chaos arising from the aftermath of the split, get knocked down and lose consciousness. Upon regaining his senses, he would find himself in the middle of a village strewn with rubbish. He would then be given a choice of either ignoring the problem or trying to find out the source of the problem. If he chose the former, he would proceed to episode 1 (Malaysian suggestion).

However, should he choose the second option, he would find himself lying beside a chemically polluted river (second Malaysian episode).

He would be posed with a choice of either crossing the river or looking for a bridge. If he chose the former, a crocodile (US episode) would bite him. In trying to look for medicine, he would chance upon a hall where he would have to answer three questions (third Malaysian episode). If he failed, he would die. However, if he answered correctly, a tape recorded by a mad scientist would appear. The contents of the tape would provide him with solutions to reduce pollution. He would further be led into a mediaeval castle where he would again be tested. The obstacles would be in the form of riddles. He would have to answer all the riddles correctly in order to leave (French episode). If he answered incorrectly, he would fall into a dungeon and die.

However, if he chose to look for a bridge, he would suddenly feel very tired, and decide to sit down. Incidentally, he would find a newspaper on the ground. If he decided to read it, he would find important information (Malaysian and US water test results and articles on water pollution). If he decided to ignore it, he would unfortunately be back on the road and be chased by a wild boar (Malaysian episode). He would then be saved by the secret agent.

The secret agent's story line would have a similar concept but with a different starting point, course of events and choices. There would be opportunities for him to save the survivor-mutant if the survivor-mutant had made the right choice. Otherwise, they would not cross paths and the

survivor-mutant would be stranded in space or die. The secret agent would then be left in limbo. His mission would be abandoned unsuccessfully.

The French students stressed that their suggestion was only a draft. Thus, they would welcome feedback from the Malaysian and American students.

Conclusion

In both instances, exchange of ideas formed the basis for any progress in achieving a common goal. In the course of these exchanges, differences of opinions were bound to occur. As such, it was only natural that students sought clarification after ideas had been suggested. This progression from mere statements of ideas to clarification was facilitated by a sense of responsibility to the collaborative counterpart who had tried hard to think of interesting ideas in order to produce a higher quality product. In this sense, the high level of commitment put into the project by either counterpart served as an external motivator. It provided a reason to understand each other as the eventual outcome of their communication enhanced their common goal. As such, collaboration in networked classrooms provided avenues for active inquiry and meaningful learning. This increased the value of having an audience.

Question 1a (iv): Did collaboration in networked classrooms create a supportive learning environment for writing by increasing awareness of audience through revision of writing based on feedback?

Content development

The French students were very impressed with the story the Malaysian students had put up on the Internet. They also enjoyed playing the game. As such, no changes in terms of content development were suggested. Furthermore, the French students were mostly not well versed in English. They had to rely on their teacher advisor to translate from French to English. Hence, they did not comment on the sentence structure.

In addition, due to time constraint, the content was not revised. Contrary to what had been agreed upon earlier, all three schools realised that writing a chain story necessitated waiting for the other school to finish. Hence, it would be more time consuming unless each school kept strictly to an agreed upon schedule. Even then, there might be disagreements regarding development of ideas.

Therefore, the most practical solution was to write three separate stories. This implied that there would be no need for integration. In other words, there was no necessity to sacrifice any section of the stories proposed by the three schools. In addition, all of them would have to adhere to the guidelines agreed upon earlier and retain the RPG concept. A common front page would indicate uniformity in all the three different stories.

Writing separate stories also reduced difficulty in linking web pages among the three different schools. In the case of the Malaysian students, they had roughly eighty web pages due to the complexity of the story. Since the role-playing game was complicated in nature due to the various links, routes and conclusions, everyone agreed that it would be easier to manage and revise one's own web pages.

Web page design

The only change suggested by the French students pertained to web page design. After viewing the example that the Malaysian students had put up on the Internet, the French students suggested that the key words should be in a different colour to attract the reader's attention. Moreover, they (the French students) proposed illustrating most of the episodes with photos relevant to the contents of that particular section to provide a suitable mood and context. For example, if the episode was set against a mangrove swamp setting, then the background could be pictures of mangrove swamps.

The Malaysian students were receptive to these feedback and made the necessary revision. They also admitted that the web pages were done in a rush. Therefore, due consideration would be given to the points raised in future web designs.

Conclusion

The common intention of winning the contest was the primary reason for the willingness to revise. Therefore, collaboration in networked classrooms facilitated revision by enabling an external reader committed to a common goal to provide feedback. This was in contrast with their view of the value of revision prior to the contest. Revision was ranked eighth from among ten factors that students considered important when writing an essay. Writing an outline was ranked the most important factor followed by grammar, spelling, developing the content, sentence construction, and organisation. The length and number of paragraphs were the final two factors.

Question 1 (v): Did collaboration in networked classrooms create a supportive learning environment for writing by increasing opportunities for sharing and enriching ideas?

Active and fruitful brainstorming sessions

Collaboration among the three schools promoted exchange of ideas in attempts to identify suitable contents to be developed. The initial suggestion for content came from the French. The teacher advisor and her students suggested writing a letter to the editor concerning water pollution issues, an interview with a notable environmentalist, comparison of weather forecast among the three countries, and a comparative study of water samples.

The Malaysian students liked the idea of fresh and salt water experiments and felt that since mangrove swamps are unique to tropical countries, facts about these swamps should somehow be incorporated into whatever they would be developing. They felt that the audience from non-tropical countries would be interested to know about mangrove swamps as these swamps were rarely highlighted or even talked about in newspapers.

They further refined the idea of the online-magazine proposed by the French, incorporating the idea of a mangrove swamp in their story. They suggested writing a fable in which the characters involved were animals in the mangrove swamps (or any other habitats based on the topic). These animals would be adversely affected by environmental degradation and the tragedy that would befall them would serve as a lesson to others. They further proposed that the "animals" from France and America should meet with the Malaysian "animals" as if they were visitors who happened to drop by.

Other suggestions included riddles about the environment integrating cultural elements and scientific facts, poetry writing based on what is happening to the environment, compilation of quotable quotes or creation of original puns based on the theme of environment and role playing games.

The French found the idea of creating and presenting fables interesting. They agreed that having foreign visitors drop by would provide a lot of room for cultural exchange. Fables would also provide a more interesting context for presenting different problems and solutions that are being or will be carried out in the different countries.

A change from an on-line magazine to an interactive role-playing game

However, after much discussion and deliberations, two Malaysian students felt that the web pages should appeal to their common would-be audience -- anyone accessing their web site. Hence, the web site should be different from others normally found on the web. If possible, it should be fun. From their experience with video games, they felt that an interactive story similar to Dungeons and Dragons, a mission-based game would provide this fun element. As such, they should no longer think in terms of an on-line magazine but rather, of a game concept. The game suggested was called RPG (role-playing game).

In their example, they stated that the "player" would have to make choices as he proceeded further along the game. For example, if he were facing a bear, he would be given two choices -- either to climb a tree or run away. Each choice would lead him along a different direction and thus, different conclusions.

The scenario suggested was that of a time traveller. His present (our future) was very polluted. Thus, he would be given a mission to study how water pollution came about and if possible, stop or reduce it. He could begin either from France, Malaysia or America. Throughout the adventure, he would have to solve riddles, quizzes, conduct interviews and try to produce original poems. Should he fail, he would be stranded in time.

So far, the students showed that they were aware of their readers. They considered what the readers would be interested in by putting themselves in

their would-be readers' shoes. The change from an on-line magazine to a role-playing game was evidence of this "analysis of the audience/readers".

They further explained the value of the role-playing game by reasoning. They justified their proposal by pointing out that a game would "intrigue" the player. Hence, the player could learn about pollution and at the same time, have fun. The means was through the interactive nature of their game.

The French students also requested for feedback in terms of disagreements, suggestions or alterations to the proposed story, ideas for the front page and a logo to represent their school. A suggestion was a nice planet or a drawing showing running water.

The Malaysian students thought that it would be better to show unity among the three schools by having symbols of the three countries on their front page. Finally, it was decided that the front-page design would portray a combination of the Eiffel Tower in France, the Twin Towers in Malaysia and the Statue of Liberty in America.

Conclusion

Collaboration among these networked classrooms indicated that due to the greater resource of ideas, what may have just resulted in an on-line magazine had become an interactive game that had a higher possibility of appeal to the audience.

Furthermore, the initial idea of merely presenting the school logo, a nice planet and running water seemed childish. With collaboration, the subsequent product took on a more mature and professional look that highlighted the

special features of each country e.g. the Statue of Liberty for America, the Eiffel Tower for France and the Petronas Twin Towers for Malaysia. Hence, collaboration resulted not only in the enrichment of ideas, but also, a more attractive product.

Question 1 (vi): Did collaboration in networked classrooms create a supportive learning environment for writing by allaying fears regarding new technology?

The situation

The idea of the RPG posed an irresistible challenge to the French, Americans and the Malaysians themselves. All the participants had to decide whether they wanted to play safe by carrying on with the on-line magazine or be bold and daring enough to explore a game concept that was so far still not clearly defined.

Most of the Malaysian students were in favour of the role-playing game. Although they were not sure how the content should be best developed, they felt that appeal to the audience (the visitors to their web site) should be the primary criterion for deciding whether to carry on with the role-playing game or the on-line magazine. Working hard on a cliched idea, i.e. an on-line magazine, was not their cup of tea. Hence, although they were aware that the game was complex and could result in many complications, they persisted with the idea. They believed that if everyone contributed and co-operated, then the burden would be shared and any difficulties could be resolved.

The American and French students were interested in the role-playing game but were not sure whether they had the ability to develop such a game. The American students were twelve to thirteen years old. As such, the teacher advisor was worried that his students would not be able to contribute much. He feared that their maturity level was not equal to that of the other two schools'.

Furthermore, he would only be their class teacher later towards the end of the project. As such, it would be difficult for him to ask them to meet and assign them to different tasks. In other words, he would have difficulty in monitoring them. Hence, although he liked the idea of RPG, he would leave the final decision to the other two
schools. He did however, hope that the problems arising from the RPG would be resolved as he felt it was an original idea worth exploring.

The French students had a different set of problems. Most of them did not have a good command of the English language. The teacher advisor would normally translate their work into English before e-mailing. This however, excluded personal correspondence that involved introducing each other and getting to know each other's culture.

The French were also unfamiliar with the use of technology. In fact, they did not even know how to e-mail prior to the contest. One of the reasons for this lack of experience with e-mailing was difficulty in accessing the server. Thus, web page design posed a monumental task for them.

Consequently, the teacher advisor inquired whether it was possible for any of the American or Malaysian students to be responsible for the creation of the front page and the management of the entire website.

The decision

The Malaysian students were less afraid of the technical aspect of web page design as they had the lecturers and the facilities of Universiti Telekom, a nearby university, to depend on. Hence, if there were any problems that they could not handle, then there would be people to refer to. As such, they agreed to be the managers or webmasters of the site as well as be responsible for creating the common front page.

Conclusion

Although the French counterparts were initially reluctant to undertake the role-playing game, they eventually agreed. Impressed with their Malaysian partners' spirit in undertaking the monumental task of web page design, they too decided to ask a technical expert from outside their school to help them.

Assured by these complementary partners, Universiti Telekom and the French technical expert, the role-playing game was developed. Even more heartening was the fact that these groups of students won fourth place in the international contest because of the originality of their role-playing game. It was a triumph for them as both the French and Malaysian students were not skilled in web page design prior to the contest.

As such, collaboration in networked classrooms not only allayed fears regarding the use of new technology but also opened doors for future collaboration and learning. Once they had tasted the sweet taste of success,

they wanted more on-line experiences and were eager to participate in future contests. They were no longer bound by a fear of the unknown and of failure. Instead, they were eager to learn.

Question 1 (vii): Did collaboration in networked classrooms create a supportive learning environment for writing by facilitating delegation of tasks?

The team leader, the French teacher advisor, suggested that a more definite scenario for RPG incorporating information regarding the environment and water pollution be decided upon in order to proceed more efficiently. She further listed the tasks assigned to each subgroup in France. These included organising the results of the tests done on water and writing a scientific article on the causes and consequences of these results. Another area they were considering for inclusion were a quiz on the environment posted to one hundred people in order to form an opinion poll.

Other suggestions were a green chart, the do's and don't's in protecting the environment, poems on the air, land and water, an open letter to the Minister of the Environment and an essay regarding the possible solutions and the future prospects of water/environment conservation.

She suggested that the Malaysian and American students should also list what each subgroup was doing. This would enable each school to have an overview of the suggestions presented thus far. Therefore, it would be easier to decide how the proposed ideas could be integrated. She believed that

things would be clearer when the storyline was agreed upon and the final text was written.

In this matter, she showed leadership qualities. She had foresight in planning, and was realistic about time management. In addition, she was able to communicate her fears and suggestions in a manner that was constructive and not domineering nor authoritative.

This planning finally resulted in everyone being aware of what the others were doing. Thus, it facilitated the formation of an integrated story line that took into consideration suggestions proposed by all three schools. An example of this integration was the detailed draft story in Question 1 (iii).

Conclusion

The French and Malaysian students constantly kept in touch with each other. They knew the value of their collaboration in attempting to win the contest. This provided a supportive environment for constructive delegation of tasks, as all parties were aware of the importance of working efficiently to meet the dateline.

Question 1 (viii): Did collaboration in networked classrooms create a supportive environment for writing by stimulating students' interest to learn more by carrying out their own research?

The Malaysian students and four teachers set off for a trip to the Raga River in Yan, Kedah, the Kuala Gula estuary in Perak and the Michu river in

Ulu Langat, Selangor. Their objective was to familiarise themselves with the problems and solutions to water pollution and matters regarding mangrove swamps. This would help them in writing more substantially and more accurately about water pollution and mangrove swamps.

It was a fruitful trip. The villagers showed them pictures of the Raga River, one of Malaysia's most polluted rivers a few years ago. The great contrast in the rehabilitated river today was a total surprise to them. The voluminous amount of rubbish littered all over the river had seemed immovable. They found it almost impossible to believe that it could be so clean. It was therefore not surprising that the Raga villagers won first prize in the river cleanliness contest held throughout Malaysia.

Having seen for themselves the success of pollution control measures, they were further briefed on government efforts to keep rivers clean. An example of these measures is the 'Love your river' campaign. An officer with the Alor Setar Irrigation department also gave a talk on the causes of water pollution and the corresponding consequences from a scientist's point of view.

They were astounded what government initiative and a change in the residents' mentality could do towards solving the problem of pollution. The commendable collaborative efforts among the parties concerned impressed upon them that nothing was impossible if everyone tried hard enough toward achieving a common goal. This further motivated them in striving to create their web site.

Conclusion

The virtual classroom contest created a desire to present data more substantially and more accurately. In the process, they were exposed to water pollution problems in Malaysia from a practical and realistic perspective.

Another benefit in joining the virtual classroom was that it stirred up a sense of pride towards the Malaysian heritage of mangrove swamps. Eager to share the little known mangrove swamps with their collaborative partners and their would-be international audience, the students took many pictures of the mangrove swamps and jotted down notes. These pictures later served as the backdrop to web pages related to mangrove swamps.

Other benefits of joining the virtual classroom contest

Redefinition of the term collaboration

The contest secretariat stated that three marks would be awarded for content, three marks for web design appeal and four marks for the extent of collaboration. With this, the students began to view the meaning of collaboration from a different perspective.

Previously, the Malaysian students thought that the project merely required the Malaysian, American and French groups to put up their own contents on the Web. There was no need for extensive communication nor interdependence other than to determine who was responsible for which section. After reaching a consensus, all groups would carry it out separately

and then when the product was completed, merely combine them. This implied collaboration among the subgroups within their own school and not on a subgroup-to-subgroup basis among the three schools which would warrant intensive collaboration among schools.

Considering that four marks were allocated to the extent of collaboration, the Malaysian students realised that if they were to stand a chance of winning, they would have to increase the amount of participation and this could only be done if there was enough reason to do so. Since all e-mail correspondence was monitored by the secretariat, it would be meaningless to "talk" aimlessly. Talking should be meaningful and benefit both parties.

One of the Malaysian students was so excited with her new understanding that she e-mailed the French and the American students to ensure that everybody shared similar viewpoints. Both partners replied that they were not sure how all three schools were supposed to collaborate nor to what extent collaboration was supposed to exist. They were just waiting for future developments to decide the nature and the extent of their collaboration.

Considering that the quantity of e-mail would not benefit anyone unless the quality of communication was assured, the French and American students agreed with the Malaysian students' interpretation. Hence, the importance of carefully considering the nature of their product could not be dismissed. Other than an appealing story, the process that would bring about this product must also provide for, facilitate and encourage meaningful collaboration.

Exchange of culture

Another matter of interest stimulated by the networked classroom was the interest in their collaborative partners' culture. The French students introduced themselves, their hometown and their concern with the environment. The Malaysian students reciprocated with their perception of their school, the subjects they learn, and the kind of life they lead in boarding school.

The French students were also interested in the festivals celebrated in Malaysia. Two festivals which were mentioned were Hari Raya, and Deepavali. The French and Malaysian students also asked the American students about Thanksgiving and the school system there.

Conclusion

The students began to realise that collaboration actually involved meaningful exchange of ideas among the parties involved. Participating independently of each other did not qualify to be termed a collaborative effort. If it were so, then there would be no necessity for collaboration. Hence, they strove to actually communicate rather than to merely talk.

Collaboration in networked classrooms provided avenues for sharing cultures and aspects of life typical of a certain country. Although this information can be gained from travel brochures and books, the fascinating details that bring the facts to live through the eyes of a person actually in it were invaluable.

RQ 2: Did collaboration in networked classrooms face obstacles?

The results and discussion of RQ 2 will be carried out under the following headings:

a) Collaborative constraints
   i) Inconsistent contributions;
   ii) Age gap;
   iii) Holidays;
   iv) Time constraints

b) Cooperative constraints
   i) Internal conflicts

c) Technological constraints
   i) Server malfunctions

Question 2 a i) Did collaboration in networked classrooms face collaborative constraints in terms of inconsistent contributions?

The self-introduction session went on smoothly among the Malaysian and French students. However, there was initially no response from the Americans. After frequent requests and prompts for replies, the American teacher advisor finally broke his silence and apologised. He explained that prior to the recent reply, he was not teaching the students taking part in the project. As such, he could only meet them from time to time. However, he assured both the French and Malaysian teacher advisors that he would soon

take over the class concerned. Hence, his students would start using the e-mail to introduce themselves soon.

As promised, the American students started introducing themselves. However, after these introductions, they were again silent. In fact, they were silent even during the exchange of ideas in the initial stages. As work progressed, they rarely provided their views. This situation was so worrying that the French teacher advisor asked the Malaysian teacher advisor for advice. She asked whether she should just keep her fingers crossed and hope that the American students would respond ultimately or do something drastic. She had already sent the teacher advisor e-mails inquiring how the American students were progressing but there was no reply.

After repeated attempts by the French and Malaysian teacher advisors to communicate with the American group, they finally responded. The American teacher advisor said that he was not sure what subtopics meant. He inquired whether subtopics referred to water testing or the poems, riddles etc.. Apologising for his students' silence, he claimed that there was difficulty in accessing the Internet. Hence, he could not view the sample webpages put up by the Malaysian students. As such, he admitted that he was not sure how the role-playing game worked. What the American students were thinking of doing were water tests for nitrates, nitrites, pH, dissolved oxygen and phosphates. After clarification was given, the American group resumed their silence.

The inconsistent contribution from the American students resulted in a change of plans. Undoubtedly, all three schools had agreed on the role-playing game and the round-robin mode of writing. However, as the Americans were

late in sending in their scenarios, the French and Malaysian students feared that the round-robin mode of developing the story could be jeopardised.

Furthermore, time had to be allocated for the creation of web pages and troubleshooting which might occur due to improper design and/or difficulty in accessing the server in Japan. Linking files created by the three schools might also be problematic. In addition, the server might malfunction thus hindering them from putting their webpages up on the Internet. As such, the endless possibilities of things that might go wrong were tremendous.

Therefore, the Malaysian students suggested that since they had only three weeks before the dateline, each school should write their own episodes. It was thus much safer to be responsible for their own episodes and story line but have one common front page.

The French and American students were surprised as they thought that everyone had agreed with the integrated version proposed earlier. They sought confirmation whether each school was supposed to write its own stories.

Finally, both the French and American students agreed that it would be much easier to develop separate stories due to time and technical constraints. They concurred that it would be better to present something of reasonable standard rather than be flustered over the various links and technical difficulties and finally produce a messy product. Furthermore, having three scenarios would provide more choices to the person visiting the site. Hence, the player could choose to begin from three different starting points i.e. The French, American and Malaysian versions. Since time was a constraint, this arrangement was agreed upon.

Conclusion

The inconsistent contribution from the American group could be due to the teacher advisor's time constraint, as he did not have much contact with the participants until sometime near the dateline. Since the students were young (twelve to thirteen years old), they could have been depending on the teacher advisor to direct them what to do. Although this is understandable, the teacher advisor should have informed the other two partners of his students' progress from time to time. He should not have kept to himself and leave everyone else guessing.

Their unreliability could have jeopardised to whole project. Fortunately however, this problem was a blessing in disguise. If the three schools had kept to the round-robin fashion of writing without taking into consideration difficulties in accessing the server in Japan and the time needed to troubleshoot any technical problems that might arise, the whole project would not have met the dateline. The students were fortunate this time round. The success they gained in winning fourth place more than made up for the anxious moments. However, if unreliable and inconsistent partnerships were to be the norm in collaborative partnerships, then these unpleasant experiences might deter the students from joining future on-line learning opportunities.

RQ 2 a ii) Did collaboration in networked classrooms face collaborative constraints in terms of age gap?

The Malaysian students found the French students' ideas interesting and worth considering compared to the American students'. However, they (the Malaysian students) found the American students' ideas too diverse and slightly childish. Each American subgroup had presented its own ideas. This implied that the American students did not discuss their ideas among themselves first before e-mailing. Thus, the diversity of ideas presented posed another problem of deciding which ideas should be accepted and how these ideas could be integrated with the existing ideas. As such, they (the Malaysian students) preferred to consider the scenarios put forth by the French students.

Conclusion

Future collaboration should take age factors into consideration. It is undeniable that the maturity, amount of exposure and interests of different age groups differ. In the context of this contest, the older Malaysian and French students were comparable in age and could communicate and present their ideas well. The American students were however, more passive. In addition, their ideas were inclined towards scenarios often found in cartoons or television shows. Hence, the likelihood of the American students' ideas being rejected was higher.

Although the Malaysian students did not express on-line any agreements or disagreements with the American students' contribution, they were worried that the French group would accept them. Unable to visualise how the American students' ideas could be integrated with their own, they kept asking the French group for clarification how integration could be done.

This could have resulted in a quandary as to be fair to all, all the contributions put forth should have a part in the final product. Fortunately, the French teacher advisor, who also functioned as the team leader, managed to think of an integrated story that incorporated everyone's ideas. Although the proposed integrated version was long-winded, it was logical in organisation and flow of ideas. Therefore, everyone agreed to the integrated version.

RQ 2 a iii) Did collaboration in networked classrooms face collaborative cosntraints in terms of communication difficulty due to holiday constraints?

Since all three schools would be on holiday, only those with Internet-connected computers at home could communicate with their collaborative partners to keep track of each other's progress and to report any difficulties faced. As such, if there were any changes or improvements to be made, all three schools could be immediately notified.

The Malaysian students suggested using mIRC, a popular chat software. The AT & T Secretariat had provided a chat facility which contestants could use to chat with each other simultaneously. However, the instructions on how

to use them were too technical. In other words, a high level of computer knowledge and experience in using the graphic-based chat facility was expected but was not met. Therefore, the students had no choice but to use alternative forms of chat which did not involve so much technicalities. They used the one most familiar to them, the mIRC, a text-based Internet Relay Chat.

With this facility, the students could just type in their names, type in their messages and communicate. They did not have to bother with the objects on screen representing them nor with having to move around the screen.

Hence, the participants' low level of computer knowledge and experience should have been considered by the secretariat. They (the secretariat) could then point out other forms of chat software that these users could use. In fact, from the post-contest questionnaire posted by the secretariat, they found that most of the schools did not use the chat software provided for. Those who had minimal knowledge of other chat software were left stranded, as if their communication lines were cut off -- especially during the holidays.

Conclusion

The students' level of computer skills must be considered in any programme that required intensive use of information technology. In this case, communication was essential to enable the collaborative process to take place. Hence, when the means for communication was available only to the

minimal few who had Internet-connected computers at home, some students panicked.

Therefore, convenient and easy access to information and facilities should never be constraints in the learning equation. If the aim of education is to instil and stimulate the desire to learn and to direct their own learning, then sufficient facilities must be provided for.

RQ 2 a iv): Did collaboration in networked classrooms face collaborative constraints in terms of time constraints?

The Malaysian students had access to the computer only after school hours. This was because participation in the contest was regarded as a co-curricular activity. In other words, the contest was not a part of the syllabus or the curriculum. Hence, participation should not interfere with proper school activities. With the constraint of having to balance studies, assignments, homework and exams, the students were starting to panic as the dateline drew nearer. They found the technicalities involved in web page design unsettling. As stated before, this was their first attempt at web page design. Thus, they had to learn by trial and error.

The lecturers from Universiti Telekom and their teacher advisor were willing to help. However, the students wanted to create the web pages by themselves. To them, the difficulties were challenges that they could meet. They wanted to be proud of their self-made product. Thus, the web page design subgroup spent many sleepless nights trying to figure out how to create and design the various web pages.

Question 2 b (i): Did collaboration in networked classrooms face cooperative cosntraints in terms of the problems that may arise within subgroups?

Eager enthusiasm

All the participating students had converged together in high spirits and high expectations. They were eager to brainstorm and contribute their ideas. Hence, many students presented their ideas and expected their contribution to be appreciated and accepted.

Conflict arising

However, it ended up in a shouting session filled with dissatisfaction and anger. Most of them were not happy because they thought a few students were dominating the discussion. They questioned why these students should have the power to determine which idea was accepted or rejected. To them, discussion should involve mutual exchange and acceptance of ideas. Even if some ideas would inevitably be rejected, the reasons for rejection should be based on reasons that most of them could accept. Others remained quiet and some went to sleep, as they wanted to have no part in the seemingly endless squabbles.

The solution

In order to break the deadlock in discussions, one of the students suggested that they should disperse and get into their respective subgroups. The subgroup leader would then lead the subgroup in a brainstorming session aimed at creating a suitable introduction and the first episode of the story. After reaching a consensus within the subgroup, the subgroup leader would then present his or her subgroup's contribution to the other subgroups. This would be done in front of everyone. The final draft outline of the story would be decided upon by consensus.

The brainstorming and discussion of ideas in smaller groups proved to be successful. Members were given equal right to present their views. They were also happy to come to a conclusion that they found reasonable. It would seem that collaborative efforts in smaller groups narrowed the diversity in ideas and thus facilitated decision making.

In order to arrive at a final draft of their introductions and episodes, a few members were appointed to decide which ideas presented by the respective subgroup leaders should be accepted and which to be rejected. In the end, the contribution of each subgroup was given a part in the draft outline of the role-playing game. The subgroup members were appeased and insisted that whenever future decisions were made, no one member should hold the trump card. Decisions must be made with the members' full consent and foreknowledge. Since they did not like quarrelling, they decided to bury the hatchet and strove to be more tolerant. The subgroup leaders also took note of their weaknesses and apologised.

One of the students added that problems should be handled one by one with an open mind. There was no point proceeding to other matters if no conclusion was reached. As such, the leader of discussion groups should be wise in differentiating which matter was relevant to the matter being discussed and which should be discussed later.

Another student commented that collaboration was not easy although they had done collaborative work for class assignments and co-curricular activities. The problems faced reinforced their perception that collaboration required a lot of patience, respect, tolerance, and time to adjust to each other especially when it concerned collaboration between boys and girls. In other words, everyone should be open-minded and willing to consider others' ideas. Even if the idea was to be rejected, it should be done with grace. Furthermore, the leader should have good interpersonal and communicative skills so as to facilitate the decision-making process.

Realisation

Most of the students tried to steer away from conflicts. They wanted the whole process of discussion to be peaceful and smooth flowing. However, three students disagreed with this notion. They claimed that arguing and defending one's own ideas were healthy and constructive. The reason behind this belief was that vocalising one's thoughts would contribute to and enrich others' ideas.

Furthermore, if the final product could not meet the standards they had set for themselves, those who did not voice their opinions had no right to

blame others. Thus, not all arguments were unhealthy or destructive. After all, the leaders realised their mistakes, frustrations were dealt with and adjustments were made to accommodate each other's personality. Therefore, there was value in disagreements if they were properly managed.

Journal writings revealed that since then, collaboration among the subgroups as well as within these subgroups were better in terms of communication. The boys who were previously shy about working with girls became more outspoken and more at ease.

Conclusion

Being the nucleus of the team, the ability of the subgroup to contribute constructively to the group determined the group's success. Thus, in order to ensure a positive learning environment, team building and negotiation skills must be reinforced among the students prior to any task that requires intensive presentation and argument of ideas. Otherwise, feelings of rejection and being invaluable to the group may demotivate those whose ideas did not conform to the leader(s)' or the majority's. Thus, subgroup and group leaders must be reminded to handle discussions wisely.

Question 2 c i): Did collaboration in networked classrooms face technological constraints in terms of server malfunctions?

Server malfunction

Towards the end of the contest when everyone was trying to put up their web pages on the Internet, the server which housed all the web pages malfunctioned two to three times. Consequently, many web pages were deleted.

Furthermore, since all the participating schools were accessing the same server, the communication line was very busy. This resulted in difficulty in accessing the server. Since the students could not view whether their web pages were successfully put up on the Internet or not, they could not carry out the necessary remedial measures.

Lack of foresight in not equipping the server to accept sophisticated technology

Some schools which had more experience with web page design also requested certain software to be installed in the server so that their sophisticated web pages could be viewed to the best of effect. Hence, further complicated problems with the server.

The secretariat however, understood in this matter. They extended the dateline of the contest by four days. This enabled participating schools whose web pages were affected by the malfunction in the server to upload their web

pages again and do the necessary changes to ensure that the product was as what was created.

Conclusion

This problem indicated that problems with technology should always be foreseen and alternatives or backup be provided for. Otherwise, the students involved would not be able to derive any sense of satisfaction in completing their task. In fact, since effort had been put in, the inability to see the achievement of their goal by publishing their product on-line for the whole world to see would cause tremendous frustration. This would cause the students to be hesitant in getting involved in similar tasks involving technology in the future.

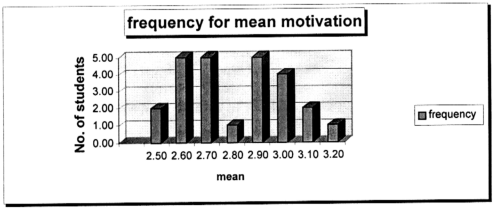
Proper maintenance of the server and related applications are imperative to enable positive experiences in using new technology. It is not adequate merely to provide a computer laboratory and sophisticated programmes if the computers are not able to run smoothly and the students are not able to achieve what they have aimed to do. Thus, budgetary allocations must provide for human resource to maintain the computer laboratory and server.

QUANTITATIVE DATA ANALYSIS

Pre-test analysis

In order to determine whether the majority of the students were positively or negatively-inclined towards the use of computers for communication and writing, each student's mean motivation score was calculated and compared to a neutral score of three on the five-point Likert scale.

The mean motivation score for each student ranged from 2.53 to 3.17. The standard deviation for these motivation scores from the overall mean motivation score, 2.80, was 0.19.



*n=25

Figure 9. Histogram of mean motivation score frequency

Scores for the thirty items were coded according to the Likert scale, ranged from one (1) to five (5). 'One' on the Likert scale indicated strong

disagreement with the item concerned and 'five' denoted strong agreement with the item.

As indicated in Figure 9, two students scored 2.50, five students scored 2.60, five students scored 2.70, one student scored 2.80 and five students scored 2.90 for mean motivation score. These students formed seventy two percent (72%) of the total number of students.

Scoring slightly below the average of three (3.00) suggested that they were slightly negative about the use of the Internet for communication and writing. A possible reason cited in their learning journal was that they were not sure how communication and collaboration would take place and were not sure what to write so as to attract an international audience.

Another group of students scored slightly above the mean motivation score. Four students (16%) scored 3.00, two students (8%) scored 3.10 and one student (4%) scored 3.20. These students accounted for only twenty eight percent (28%) of the total number of students.

Hence, overall, the majority of the students (72 %) were slightly negative and only a few (28 %) were enthusiastic about using the computer for communicating and writing.

In order to categorise the strength of the level of motivation, the researcher used a theoretical proposition that interpreted the motivation score of three as a neutral score on a scale of one (very weak) to five (very strong) similar to the Likert scale mode of scoring. The explanation-building strategy used by Nor Azilah (1996) was applied to explain the influence of the items understudied on the students' motivation. The strength of motivation for each of the thirty items was therefore categorised according to Table 1 as listed

below. A 0.5 distinction between levels is used to further sensitise the levels of motivation.

Table 1

Mean motivation scores and levels of motivation

Mean motivation score	Levels of motivation
0.00-1.00	Insignificant
1.00-1.50	Very weak
1.50-2.00	Weak
2.00-2.49	Moderately weak
2.50-2.99	Slightly weak
3.00	Neutral
3.01-3.49	Slightly strong
3.50-3.99	Moderately strong
4.00-4.49	Strong
4.50-5.00	Very strong

Items with mean scores significantly less than a neutral score of three

The items highlighted in Table 2 were phrased positively towards the use of the Internet for writing and communication. The mean score for these items were significantly less than the neutral score of three.

Table 2

Items with mean significantly less than a neutral three

Item number	Item	Mean	S.D.
13.	Writing to others by e-mail helps me to develop my thoughts and ideas.	2.64	0.49
7.	I enjoy using the computer to communicate with my classmates.	2.48	0.81
1.	I can write better essays when I do them on the computer.	2.40	0.71
2.	Revising my papers is a lot easier when I write them on the computer.	2.36	0.57
9.	I enjoy using the computer to communicate with my teacher.	2.08	0.81

*$p < 0.001$
†$n=25$

The mean score of 2.64 for item thirteen indicated a slightly weak level of motivation. As indicated in the preliminary study, twelve students (48%) lacked exposure and experience in using the e-mail. Therefore, they were not certain whether using the e-mail could help them to develop their ideas.

The mean of 2.40 and 2.36 for items one and two showed a moderately weak level of motivation in using the computer to write and revise their essays. Only seven students (28%) stated in the preliminary study that they preferred using the computer. Some of the students stated in their learning journal that they felt more comfortable with pen and paper as they could write any time and anywhere they chose to without being confined to the computer. As such, they did not feel pressured to produce a better piece of writing within the time allocated to them to use the computer in the computer laboratory. Only the final draft to be submitted would be typed out on the computer.

Using the e-mail to communicate with classmates scored 2.48. This indicated a moderately weak level of motivation. Considering that there was

only one-Internet connected computer in the MRSM, only those who had computer at home could communicate with their classmates. According to the preliminary study findings, this group of students comprised of only four students (16%). Thus, the number of students who could attest to whether they enjoyed using the e-mail to communicate with their classmates were too few to push the mean motivation score above the average of three.

Using the e-mail to communicate with teachers indicated a moderately weak mean motivation score of 2.08. The difference in status and roles created a respectful distance between the teacher and the students. Hence, using the e-mail to communicate with their teachers was seldom if ever done.

Confirmation of findings through reverse-coded items

In order to confirm the above findings, several items were reverse-coded. These items are listed below:

Table 3

Reverse-coded items with mean significantly less than a neutral mean of three

Item number	Item	Mean	S. D.
26.	Computers keep people isolated from each other.	2.44	0.65
5.	Writing essays by hand saves time compared to by computer.	2.36	0.81
21.	Using a computer is not worth the time and effort.	2.16	0.90
3.	I enjoy writing my paper by hand more than by computer.	2.12	0.93
30.	Computers make people weak and helpless.	1.96	0.61
8.	I am more afraid to contact people by e-mail than in person.	1.60	0.82

*$p < 0.001$
[a]$n=25$

A comparison between items listed in Table 1 and Table 3 was made and indicated in Table 4. Items one and two in Table 1 were contrasted with items three and five in Table 3. Similarly, item seven in Table 1 was compared with items eight and twenty six in Table 3. Finally, item thirteen in Table 1 was contrasted with items twenty one, twenty six and thirty in Table 3.

Table 4

Comparison between motivational factors in Table 1 and Table 3

Item no. Table 1	Table 3	Item	Mean	S. D.
1.		I can write better essays when I do them on the computer.	2.40	0.71
2.		Revising my papers is a lot easier when I write them on the computer.	2.36	0.57
	3.	I enjoy writing my paper by hand more than by computer.	2.12	0.93
	5.	Writing essays by hand saves time compared to by computer.	2.36	0.81
7.		I enjoy using the computer to communicate with my classmates.	2.48	0.81
	8.	I am more afraid to contact people by e-mail than in person.	1.60	0.82
13.		Writing to others by e-mail helps me to develop my thoughts and ideas.	2.64	0.49
	21.	Using a computer is not worth the time and effort.	2.16	0.90
	30.	Computers make people weak and helpless.	1.96	0.61
	26.	Computers keep people isolated from each other.	2.44	0.65

*$p < 0.001$
[a]$n=25$

The higher mean motivation score of 2.40 and 2.36 for items one and two in Table 1 (preference to write and revise using the computer) as contrasted to the mean motivation score of 2.12 and 2.36 for items three and five in Table 3 indicated that the students considered writing and revising by using the computer more motivating than by using pen and paper.

The mean score of 2.48 for item seven suggested that the students enjoyed communicating with each other. The reason cited in some of their learning journals was that e-mailing provided anonymity to the user. As such, he or she did not have to fear being judged based on his or her appearance, race or culture. A score of 1.60 for item eight further confirmed that very few students feared contacting people by e-mail.

The moderately weak score of 2.48 might be due to some students' lack of experience in using the e-mail. Seven students (28%) indicated in the preliminary study that they had never used e-mail. Furthermore, twenty one students (84%) did not have computers at home.

As discussed earlier, the slightly weak score of 2.64 for item thirteen showed that some of the students did not consider the usage of computers as a waste of time. They were aware of the value of acquiring computer skills through their previous experiences with word processing, spreadsheets and programming. As such, the mean motivation score for item thirty, 1.96, was very low. This implied that most of the students were receptive to the use of computers.

Item twenty six (computers keep people isolated from each other), received a score of 2.44. When itemed further in an informal meeting, some students indicated that although networked computers allowed communication, the person communicating could be so glued to the computer that he disregarded face-to-face communication. Hence, improper use of the computer could result in isolation.

Items with mean scores significantly higher than three

Items which scored significantly higher than three are listed in Table 5.

Table 5

Items with mean significantly higher than three

Item Number	Item	Mean	S. D.
24.	Learning how to use the computer is very important for my career.	4.24	0.83
23.	I enjoy the challenge of using computers.	3.56	0.65

*$p < 0.001$
[a]n=25

As indicated in Table 5, most of the students were aware that computer expertise would be a viable asset in their future career. This awareness was indicated during their English proficiency test administered at the very beginning of the study. They wanted to acquaint and familiarise themselves as much as possible with information technology. This was due to the publicity and importance placed on information technology as the primary tool for administrative, commercial and educational purposes in the future. Thus, they wanted to equip themselves with the competitive edge that information technology skills would provide them with.

The challenge of learning web page design, communicating and collaborating with foreign students served their above intention of equipping themselves with information technology skills. As such, both items twenty four and twenty three scored 4.24 and 3.56. These two scores (4.24 and 3.56) were considered strong and moderately strong levels of motivation respectively.

Other items with mean scores higher than three

Table 6 lists other items with mean scores higher than three.

Table 6

Items with mean scores higher than three

Item Number	Item	Mean	S. D.
12.	An advantage of e-mail is you can contact people any time you want.	3.48	0.77
19.	Using a computer gives me more chances to read and use authentic English.	3.44	0.77
28.	Using a computer gives me more chances to practice English.	3.24	0.60
15.	Using the e-mail and the Internet is a good way to learn more about different cultures and people.	3.20	0.50
20.	I want to continue using a computer for my English class.	3.20	0.76
10.	If I have a question or comment, I would rather contact my teacher in person than by e-mail.	3.16	1.31
14.	Using e-mail and the Internet makes me feel part of a community.	3.16	0.62
29.	Computers are usually very frustrating to work with.	3.08	1.04
11.	E-mail helps people to learn from each other.	3.04	0.79
16.	Communicating by e-mail is a good way to improve my English.	3.04	0.54

*$p < 0.01$
[a]$n=25$

The items in Table 6 dealt mainly with the advantages of using the e-mail. The mean motivation score of 3.48 indicated that the convenience of using the e-mail at any time was a moderately strong motivating factor in encouraging students to communicate. The reply could be within minutes or as soon as the reader read the mail. He could also take his time to think and construct his sentences before replying. As such, stress often associated with

face-to-face interaction, which demanded instant feedback while communicating with others was reduced.

Furthermore, frequency in communicating with others provided opportunities to read and write authentic English. As practise in using a language often resulted in improvement, these opportunities were invaluable. However, the students also realised that sometimes the English used on the Internet (during chat sessions) was not perfect English. Therefore, after weighing the pros and cons, more students decided that they stood to gain from exposure to English. This was because most Internet web sites used a respectable standard of English. In addition, not all chat sessions were damaging to their English proficiency.

Therefore, the mean motivation score of 3.44 for item nineteen and a score of 3.24 for item fifteen (both suggesting slightly strong motivation factors) indicated that the students were motivated to communicate with others. A possible reason could be that the context for usage was no longer merely for class assignment and assessment. Communication took on a social role of exchanging ideas, agreeing and disagreeing, and arriving at conclusions similar to actual social communication.

The conducive environment of communicating in a stress-reduced context as well as the provision for thinking and reflecting before replying were further enhanced by the availability of networked peer groups who could help each other learn. Hence, they need not rely on the teacher as their only source of information and help. Instead, they could determine their own learning needs and means of meeting that need. Therefore, the availability of

networked peer groups could be a motivating factor that made communication worthwhile.

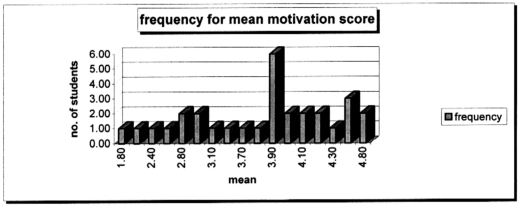
However, the extent of help that would actually be extended by these peer groups depended on the commitment of all parties concerned in the learning process to help each other. As a result, the mean motivation score of 3.16 (a slightly strong motivation score) for item fourteen (using e-mail and the Internet makes me feel part of a community), could indicate that the sense of being a part of a wider learning community outside their classroom motivated them in terms of the prospect of learning academically and culturally. However, they had their reservations regarding how much help they would obtain.

The mean scores for items twenty and sixteen support this finding. The mean score of 3.20 for item twenty (I want to continue using the computer) showed motivation to continue learning using computer-mediated communication. However, the score of 3.04 (communicating by e-mail is a good way to improve my English) for item sixteen, suggested that although the students were motivated by the prospect of learning, they were also cautious of whether networked peer groups could help them significantly in learning English.

With regards to using the e-mail to communicate with the teacher, the mean motivation score of 3.16 (a slightly strong mean motivation score) for item ten, indicated that the students were not eager to contact their teacher using the e-mail. The reason was that Malaysian students normally kept a respectful distance from their teachers.

Post-test analysis

As indicated in Figure 10, the mean motivation score for each student ranged from 3.13 to 4.20. The standard deviation of these scores from the overall mean motivation score, 3.69, was 0.31.



[a]n=25

Figure 10. Histogram of mean motivation score frequency

All items scored higher than a neutral mean of three. Items with significant mean motivation scores were classified according to four main motivational aspects similar to those in Warschauer's (1996) motivational study on the use of computers for writing and communication. These factors were: communication, learning, empowerment and achievement. Empowerment factors such as belief that using the computer would help people to overcome their weakness and powerlessness, overcome their sense of isolation, lessen the frustration of working with computers and become less afraid of contacting people by e-mail than in person did not feature in the top ten and so are not elaborated on.

Motivational communicative aspects

Table 7 lists the communicative aspects of using the computer for communication and writing.

Table 7

Communicative aspects in using the networked classroom for writing and communication

Item number	Item	Mean	S. D.
12.	An advantage of e-mail is you can contact people any time you want.	4.76	0.52
6.	I enjoy using the computer to communicate with people around the world.	4.60	0.71
15.	Using e-mail and the Internet is a good way to learn more about different cultures and people.	4.56	0.65
13.	Writing to others by e-mail helps me to develop my thoughts and ideas.	4.20	1.08
14.	Using e-mail and the Internet makes me feel part of a community.	4.16	1.14
16.	Communicating by e-mail is a good way to improve my English.	4.12	0.83
19.	Using a computer gives me more chances to read and use authentic English.	3.92	1.00
28.	Using a computer gives me more chances to practise English.	3.92	0.81
8.	I am more afraid to contact people by e-mail than in person. (reverse-coded)	1.84	0.21

* $p < 0.001$
[a] $n=25$

The networked classroom created a borderless community that opened endless opportunities for communicating and getting to know people from other parts of the world. The speed with which e-mails arrive at their destination further encouraged communication as they did not have to wait long for a reply as compared to snail mail. Thus, momentum in the matter of discussion was not lost and matters being discussed could be resolved quickly

if any problem should arise. There was no urgent need to meet face-to-face. However, the benefits of learning from each other could still be reaped.

Furthermore, appearances did not matter in communication via e-mail. This anonymity released students to freely express themselves. The initial messages from the Malaysian students were formal in tone as they felt shy about their English. However, as they progressed into the idea development stage, the tone became less formal with expressions such as "Hi", "what do you think?" and "welcome back" being repeatedly used. The personality of the person writing the message shone through. The message was no longer just to inform, but to present suggestions in an open and friendly manner.

In addition, they reread their messages before sending them in order to ensure that the messages they wanted to convey were expressed accurately. Some even asked their friends' opinion on the messages that they had written. As such, they learnt from each other's feedback. This reflection and receptiveness to feedback was brought about by e-mail's asynchronous feature which allowed communication as and when the person was ready to do so. Hence, stress often encountered in face-to-face communication was reduced.

Motivational learning aspects

As indicated in Table 8, using the e-mail enabled quick and convenient communication. Hence, it encouraged the students to exchange ideas. This in turn helped them to develop their own thoughts and ideas. As stated earlier, what was initially an on-line magazine evolved into a role-playing game. The on-line magazine had seemed a good idea. However, after considering the

subtopics proposed by all parties concerned, the students realised that the on-line magazine might not be appealing enough to the audience. This implied that they would lose out in terms of originality. A change was thus necessary.

Therefore, in the process of deciding what to do for their web pages, using the e-mail facilitated the exchange of ideas that enhanced creativity. If each school were to do an individual project, the product would not be as interesting as the role-playing game. The courage needed to undertake the development of such a game would also have discouraged many. However, as they were partners with a common goal, they felt more assured of each other's help should any problem arise. This indicated that using the e-mail not only facilitated the sharing of cognitive load, but also the development and revision of ideas.

Prior to the use of e-mail, students were less reluctant to revise their ideas. However, with the word processing features involved in web page design (via Netscape Composer, a web design tool), its ephemeral quality enabled them to cut, copy and paste, align and format as they deemed fit. Since changes could easily be made and saved, revision became focused on content. In other words, revision became not merely rewriting of words and sentences -- a tedious task by any standard especially when it involved a game with no apparent story line that could be understood at first glance.

Table 8

Learning aspects of using the networked classroom for writing and communication

Item number	Item	Mean	S. D.
25.	I can learn English more independently when I use a computer.	4.12	0.97
11.	E-mail helps people to learn from each other.	3.96	1.06
2.	Revising my paper is a lot easier when I write them on computer.	3.92	1.22
18.	Writing by computer makes me more creative.	3.92	0.76
22.	Using a computer gives me more control over my learning.	3.72	1.69

*$p < 0.001$
*n=25

The finding further suggested that as the students became more immersed in developing and refining the role-playing game, they took charge of their own progress. They decided for themselves what they should do, whether they agreed with the suggestions proposed and how they could resolve any problem that arose. An example was the clarification given in the form of comparing and contrasting the initial proposal of an on-line magazine and the role-playing game. Assurances were further provided stating that there were actually few changes. What had been suggested earlier were incorporated in the game. Thus, they needed to develop the game. They stressed that their suggestions were not a rejection of what others had suggested earlier.

As such, the students took the initiative to determine their course of action. This in turn gave them a sense of power, as they were no longer reliant on the teacher. They were the people in charge. They were the

decision-makers. Their sense of independence gave them more control over their own progress.

Motivational achievement aspects

Finally, Table 9 lists the achievement factors that enhance the value of networked classrooms. When the web pages were finally published on the Internet, the students felt a tremendous sense of pride for they had managed to master web page design. Furthermore, when contrasted with the web pages of other teams, their role-playing game was the most original. In fact, they won fourth place out of the two hundred schools, which participated in this contest. This sense of achievement was so strong that they decided to participate in the future contests.

The opportunity to learn new skills and to collaborate with others who were equally committed to the task and willing to explore various options, the task became something to look forward to. It was no longer a chore meant merely for assessment and practice. Instead, they wholly put their hearts and mind into it. Hence, rising up to the challenge posed before them provided intrinsic motivation. It was therefore not surprising that they wanted to continue using the computer in their English class.

The most notable intrinsic motivational aspect was the awareness that computer skills would equip them with a competitive edge in the job market. Thus, they were keen to acquaint and familiarise themselves with any form of technological application.

Table 9

Achievement aspects of using the networked classroom for writing and communication

Item Number	Item	Mean	S. D.
24.	Learning how to use the computer is very important for my career.	4.760	0.83
4.	I enjoy seeing the things I printed.	4.600	0.71
23.	I enjoy the challenge of using computers.	4.560	0.77
20.	I want to continue using the computer in my English class.	4.320	0.99
17.	Learning to use the computer gives me a sense of accomplishment.	4.000	0.76

*$p < 0.001$
[a]$n=25$

Having considered the various significant motivational aspects in using the computer for writing and communication, the following table (Table 10) indicates the top ten motivational aspects in order of rank with mean motivation scores significantly higher than a neutral score of three.

Table 10

Top ten motivational aspects with mean scores significantly higher than three:

Item number	Item	Mean	S. D.
	Communicative aspects		
12.	An advantage of e-mail is you can contact people any time you want.	4.76	0.52
6.	I enjoy using the computer to communicate with people around the world.	4.60	0.71
15.	Using e-mail and the Internet is a good way to learn more about different cultures and people.	4.56	0.65
13.	Writing to others by e-mail helps me to develop my thoughts and ideas.	4.20	1.08
16.	Communicating by e-mail is a good way to improve my English.	4.12	0.83
	Learning aspects		
25.	I can learn English more independently when I use a computer.	4.12	0.97
	Achievement aspects		
24.	Learning how to use the computer is very important for my career.	4.76	0.83
4.	I enjoy seeing the things I printed.	4.60	0.71
23.	I enjoy the challenge of using computers.	4.56	0.77
20.	I want to continue using the computer in my English class.	4.32	0.99

*$p < 0.001$
[a]$n=25$

Communicative aspects appeared to be the strongest motivational factor with five of the top ten scores being in this category. Another four of the top ten scores were in the achievement aspect category and one was in the learning category.

Other motivational aspects with mean scores significantly higher than three are listed in Table 11.

Table 11

Other motivational aspects with significant mean scores

Item Number	Item	Mean	S. D.
14.	Using e-mail and the Internet makes me feel part of a community.	4.16	1.14
17.	Learning to use the computer gives me a sense of accomplishment.	4.00	0.76
11.	E-mail helps people to learn from each other.	3.96	1.06
2.	Revising my papers is a lot easier when I write them on computer.	3.92	1.22
18.	Writing by computer makes me more creative.	3.92	0.76
19.	Using the computer gives me more chances to read and write authentic English.	3.92	1.00
28.	Using a computer gives me more chances to practise English.	3.92	0.81
22.	Using a computer gives me more control over my learning.	3.72	0.94
30.	Computers make people weak and powerless.	1.92	1.22
8.	I am more afraid to contact people by e-mail than in person.	1.84	1.21

*$p < 0.01$
[a]n=25

Questions with significant pre and post-test scores

There was a significant increase in the post-test mean motivation scores compared to the pre-test results. The aspects covered were similar to the top ten motivation scores -- communicative, learning and achievement aspects. Out of the seven motivation scores, three of the scores were in the communicative aspects, two in the achievement aspects and two in the learning aspects. Table 12 shows the contrast:

Table 12

Items with significant contrast between pre-test and post-test mean motivation scores

Item number	Item	Pre-test mean	Post-test mean	Significance of correlation coefficients
13.	Writing to others by e-mail helps me to develop my thoughts and ideas.	2.64	4.20	0.00
15.	Using e-mail and the Internet is a good way to learn more about different cultures and people.	3.20	4.56	0.00
16.	Communicating by e-mail is a good way to improve my English.	3.04	4.12	0.00
20.	I want to continue using the computer in my English class.	3.20	4.32	0.00
22.	Using a computer gives me more control over my learning	2.72	3.72	0.00
23.	I enjoy the challenge of using computers.	3.56	4.56	0.00
28.	Using a computer gives me more chances to practise English.	3.24	3.92	0.00

*$p < 0.001$
*$n = 25$

As indicated in Table 12, the students rated communicative aspects such as item thirteen (writing to others by e-mail helps me to develop my thoughts and ideas), item fifteen (using e-mail and the Internet is a good way to learn more about different cultures and people) and item 16 (communicating by e-mail is a good way to improve my English) as the most dominant motivational aspect.

This finding suggested that the interactivity inherent in meaningful communication provided a purpose for them to reflect, analyse what they read and inquire further in order to know more about others as well as about matters surrounding them related to their real life. The presence of an actual audience

further made the communicative activity worthwhile. This was because the feedback obtained indicated that others were seriously weighing and considering their ideas. This gave value to their effort to think and encouraged them to develop something original such as the role-playing game.

As they were immersed in the communicative act, using English became a natural process as English was the common language among the three schools. Therefore, the students were provided with opportunities to practise using the language. They could not rely on their mother tongue if there was any lapse in communication. Instead, they had to search for appropriate words that would express their intended meaning. They also had to construct their sentences as clearly as possible. Furthermore, if their communicative counterparts used words, which were unclear or did not communicate clearly, then they had to request for clarification. As such, the communicative activity became similar to real-life communication. The context for communication was no longer examination-based. In this sense, the networked classrooms provided more opportunities for students to improve their English.

Motivated by the prospect of improving their English, the students welcomed future opportunities to participate in networked activities. They stated in their learning journal that they were keen to have other opportunities to collaborate with others. Since they were free to decide what they wanted to develop and how to do so, using a computer provided them with more control to their learning process. They recognised that besides learning more about matters outside their curriculum, they also had more opportunities to practise their English. Undoubtedly, the English on the Internet might not be perfect.

However, the students should not be denied the opportunity to practise the language in actual real-life situations.

Being able to obtain fourth place out of two hundred schools was a great achievement especially since these students did not have any knowledge in web page design. Although their web pages were not terrific in that only the basics of web page design was used instead of state-of-the-art software or programs, they won in terms of the originality of their ideas. The students claimed in their learning journals that they had a very proud sense of satisfaction as the hard work they had put in was acknowledged.

Furthermore, their product would be accessible to a global audience. Hence, their product was not a once-for-all matter that would be forgotten after the contest. It was as is they had left their mark on the Internet. As a result, the students indicated that they enjoyed the challenge of using computers. In addition, they indicated that since collaboration had brought about this proud achievement, they would welcome future opportunities to participate in similar contests. They were also eager to continue using the computer in their English class. Hence, networked classrooms do motivate students to not only communicate, but also to learn and to strive to achieve.

Correlation between mean motivation scores and the overall mean motivation scores

The above findings were supported by a correlational study between the mean motivation scores of the thirty items and the overall mean motivation score. The findings are represented in Table 14.

The strength of correlation was based on Cohen's (1988) guidelines for small, medium and large correlation coefficients as indicated in Table 13 below.

Table 13

Cohen's (1988) guidelines for small, medium and large correlation coefficients.

Correlation coefficients	Strength of correlation
- .29 to -.10 $\leq r \leq$ .10 to .29	Small
- .49 to -.30 $\leq r \leq$ .30 to .49	Medium
-1.00 to -.50 $\leq r \leq$ .50 to 1.00	Large

Table 14

Correlation between the mean and the overall mean motivation score greater than 0.3

Item	Correlation	Significance of correlation coefficients (p)
I enjoy the challenge of using computers.	0.66	0.00
I want to continue using the computer in my English class.	0.64	0.00
Using a computer gives me more chances to read and use authentic English.	0.63	0.28
Using a computer gives me more chances to practise English.	0.54	0.20
Writing to others by e-mail helps me to develop my thoughts and ideas.	0.50	0.03
Learning how to use computers is important for my career.	0.47	0.00
I enjoy writing my papers by computer more than by hand.	0.43	0.01
Using a computer gives me more control over my learning.	0.43	0.88
I can learn English faster when I use a computer.	0.40	0.26
Communicating by e-mail is a good way to improve my English.	0.36	0.02
I can learn English more independently when I use a computer.	0.36	0.04
E-mail helps people learn from each other.	0.33	0.23
I enjoy seeing the things I write printed out.	0.32	0.00
I can write better essays when I write them on computer.	0.30	0.02

*$p<0.01$
n=25

The first four items were highly correlated with a correlation of more than 0.5. However, only the first two items, i.e. enjoying the challenge of using computers and wanting to continue using the computer in the English class were significant at $p< 0.001$. Both items were in the achievement aspect category.

CONCLUSION

Collaboration in networked classrooms did create a supportive learning environment by increasing awareness of the value of writing clearly and effectively to communicate actively and meaningfully with a real-life audience. In addition, collaboration enabled partners to complement each other in terms of development of ideas, use of technology new to them and delegation of tasks. Hence, it is worthwhile to consider the integration of technology to meet educational needs.

As determiners of technology use, teachers should therefore first be convinced of the value of technology integration and be equipped to deal with the change from a teacher-centred classroom which directs students what to do to a student-centred classroom which encourages more responsibility for one's own learning.

According to Lee and Reigeluth (1994), future teachers must be able to encourage the students to think critically in order to find alternative solutions to problems, develop competence to meet the technological age, and collaborate and/or co-operate in teams. Hence, teachers will function as facilitators in enhancing the learning process as well as managers of technology. It is therefore imperative that teachers are first equipped to deal with the future challenges of the classroom, the rapidly changing demands of society and the dynamic job market.