International Environmental Problem Discussion by Using Moodle

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Abstract *— Environmental Problems are going to be an important and critical issue on global scale. Therefore, it is very informative for students to learn and discuss the topic internationally. For the purpose, time differences, costs and language differences might be a sort of potential barriers. In this study, a course management system based on Moodle was applied to the international discussion about an environmental problem. Students in the USA (Hawaii), Fiji and Japan tackled with the discussion in teams in virtual reality. Each country had a team, respectively, and they presented their own daily environmental problems by posting to the CMS located in Suzuka National College of Technology, Japan. Then they discussed about the problems in the CMS. After the several weeks long project, a questionnaire was distributed to the participants and the educational effectiveness was discussed by analyzing the results.*

Index Terms *— Moodle, Course Management System, CMS, Environmental Problem, e-learning, International Cooperation.*

INTRODUCTION

Environmental Problems are going to be an important and critical issue on global scale. Youngsters who will be active in the 21st century should be aware of the importance and the significance clearly to change our world in better direction. Since the environmental problem is shared with each other on global scale, and also since we can understand our own problems better from different viewpoints, it is very meaningful generally to survey other countries' situations and to understand them. Generally speaking, to understand others is to know yourself. Even though we have many common environmental problems on global scale, the details of them differ from country to country generally. From the background, it is very important for youngster to discuss each other for their own environmental problems.

When you come to think about the way to discuss, you realize soon that you have many obstacles to carry out the discussion internationally. Particularly geographical and temporal problems are serious. And the difference of languages may work negatively as an obstacle to some extent. And we cannot deny the existence of cultural difference for the discussion. To overcome those obstacles, we can expect that e-learning tools would become operative, since students from different countries which have time differences and are apart far away geographically could discuss on those topics each other, being independent of time and space. As for the language and cultural differences, they might be solved by tackling with the problems in a team asynchronously.

In this study, the course management system (CMS) by Moodle established in Suzuka National College of Technology was used for the discussion on environmental problem and some students from the USA, Fiji and Japan joined the discussion on the web to exchange their ideas, so that they could get perspective views on the problem globally. From the viewpoint, the project can be considered a sort of international Problem Based Learning[1]-[5] with asynchronous e-learning style[7]-[10]. The educational and technical effects were discussed and analyzed after the project.

EXPERIMENTAL

The course management system based on Moodle was used for this project[11],[12]. In the system, the course entitle "International Discussion for Environmental Problems" was made for the project. And the forum entitled " Environmental Forum" was prepared. The subtitle was written in the following way:
"Environment Forum - Let's exchange ideas for serious environmental problems on a daily basis for our own countries and think over our planet and the future together!"
. Participants came from three higher organizations. One was composed of the students of Suzuka National College of Technology, Japan, where the server was located. The second was composed of those in the University of the South Pacific, Fiji, and the third was composed of those in College of Engineering, University of Hawaii at Manoa. All participants tackled with the problem in teams based on each organization. Concretely speaking, each organization had one team for this project, even though the number of members might have been different each other.
Firstly, the problem was proposed on line posting by one of the teachers as follows:

Hello All!
Greetings from Japan!
Thank you to join us for this international discussion about environmental problem!
I am Hide Kanematsu, the moderator of this discussion forum.
Hope all of you will enjoy this project!
I am now delivering the opening speech and at the same time, I am presenting a problem which you should solve in groups.
Here it is.
"What is the most concerned environmental problem on a daily basis which you encounter in your country?
Please discuss about the problem in groups and post your answer as a reply to this message in the forum as soon as possible.
Thank you in advance for your great contribution!
Have a great day!
Hide Kanematsu

The message was posted on Janaury 28, 2010. According to the Each team should have posted its own daily environmental problem. After they read the posted messages and discussed on them each other , all teams were required to ask a question per post. Then all teams should have answered the questions. The fixed procedure mentioned above were distributed to all members, so that the discussion on the CMS would have been going smoothly. The project was finished at the end of March 2010, even though some procedure were not completed yet. For Japaense school year ended then and an important member graduated.

RESULTS AND DISCUSSION

Each team posted its own environmental problem, respectively.
The following message belonged to Japanese team and it was the first one for this project.

----------Japanes team's environmental problem ----------

Recycling, is it really needed?

The argument whether recycling is essential or not is increasing in Japan. Some says recycling is not needed because it seems annoying and it is not efficient in view of economy and time, others says it is important to Japan because of lack of natural resorces. It is critical for Japan not having enough natural resorces, but it is really needed to classify into many categories? In Japan, a lot of local self-governing bodys let resident neatly separate rubbish. Some of the bodys are strict on the rule of separating those. Actually, people in our city Suzuka have to separate those into seven categories. And some of Japanese companies separate those into 30 categories. We really saw a Japanese sweet company separating rubbish into many categories. But, is it really needed? We think it is better that we burn all refuses than we recycle them. Recycling is not so much needed. We propose that we should build waste combustor that can burn refuses with a high temperature. That we have to mention is dioxin is given when refuses are born with a low temperature. But when they are born with high temperature, they don't give dioxin but CO_2. So, we have to have a necessary condition like these kind of things. The place having waste combustor have to be in the forest in order that forests can absorb much of CO_2. And the inhabitants of the place have to approve the combustors' building. It is long-running plan to make the cycle of photosynthesis which we told above. Amid arising a lot of environmental problems, can the earth wait for growth of trees?

From Suzuka team, Japan

----------end ----------

Several days later, Fiji group posted their environmental problem as follows:

---------- Fiji team's environmental problem ----------

Bula Vinaka all! The most concerned environmental problem on a daily basis that we face in Fiji is the 'plastic product' and its disposal. Plastic product in any form, be it plastic bag, plastic bottles (mineral water, soda etc), plastic cups etc is seen as litter commonly. While a major supermarket company has started using biodegradable plastic bags as an effort to minimize the problem, a lot of other businesses (big or small) continue to use the non-environmental friendly plastic. Thus, we still have a lot of non-biodegradable plastic product in use which is quite worrying. What make the matter worse is the lack in civic sense amongst some of us when we carelessely throw the plastic product whereever we please instead of disposing it off sensibly in the designated bins. Plastic product remains a major environmental threat to marine life too as the beaches are not being spared because of our careless disposal of plastic product on the beach! Over to you all in Hawaii and Japan.

From: The USP Team, Fiji

---------- end ----------

On the other hand, the following message was sent to the server by Hawaiian team.

---------- Hawaii team's environmental problem ----------

Thank you all again for the wonderful opportunity to participate in this discussion. Both the USP team and Suzuka Team had very insightful ideas. We would have to agree with both teams that refuse disposal is a crucial environmental problem that is confronted daily. So far much of the solution has been to incinerate most of the waste. This greatly reduces its volume and the heat has been used in turbines to generate electricity. The largest problem that still remains is the safe disposal of the ash. Landfills continue to reach capacity and the potential of harmful chemicals leaching out of the ash is still another issue in itself. The fact that population density continues to increase only intensifies the problem and makes finding a solution more urgent. We believe that a solution needs to involve effectively reducing the amount of material entering the system as well as developing an efficient way to reuse/recycle whatever remains. Along with the ever-present problems posed by refuse disposal and the use of non-biodegradable materials, we believe that Hawaii also faces a large issue with its dependency on fossil fuels. This makes the economy extremely vulnerable to inflation in gas/oil prices and reducing the use of these fuels would help Hawaii to become more sustainable. Though efforts have been made to increase the use of renewable energy sources, mainly solar and wind, it has not been enough to cause a significant impact.

-Team Hawaii

---------- end ----------

At the point, where all environmental problems were posted, the questions among teams were proposed and the question and answer session continued in about 8 weeks to finish all of the projects. There were many questions and answers among all of participants in teams or personally. After the project, questionnaires were dstributed to all of the particpants as follows:

---------- questionnaires ----------

Questionnaires for students and teachers

Your team: Hwaii Fiji Japan

(please circle one of them mentioned above.)

Please circle your answer for the question 1 – 5.

1 . Did you have difficulty to use the Moodle?

1. Very much 2. Pretty much 3. Neutral 4 Not so much 5 Not at all

2. Did you have difficulty to discuss in a team?

1. Very much 2. Pretty much 3. Neutral 4 Not so much 5 Not at all

3. Did you have difficulty for language you used?

1. Very much 2. Pretty much 3. Neutral 4 Not so much 5 Not at all

4. Did you prefer real life discussion to virtual one?

1. Very much 2. Pretty much 3. Neutral 4 Not so much 5 Not at all

5. Were you interested in the ideas from other countries?

1. Very much 2. Pretty much 3. Neutral 4 Not so much 5 Not at all

6. Did you feel there would be other effective tools for the discussion among different countries?

1. Very much 2. Pretty much 3. Neutral 4 Not so much 5 Not at all

7. If you answer "Very much" or "Pretty much" for the question 6, please mention the tool(s) concretely.

Thank you for your kind cooperation!

---------- End ----------

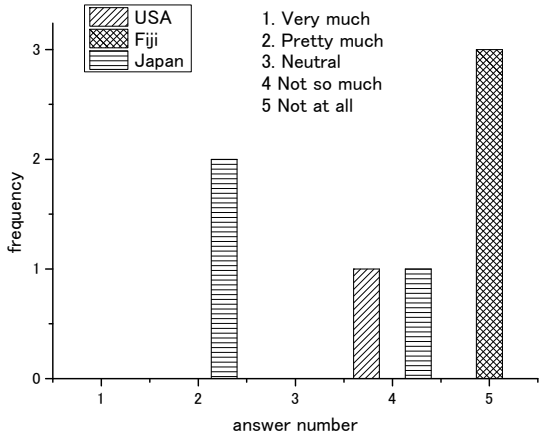

Fig.1 Question 1: Did you have difficulty to use the Moodle?

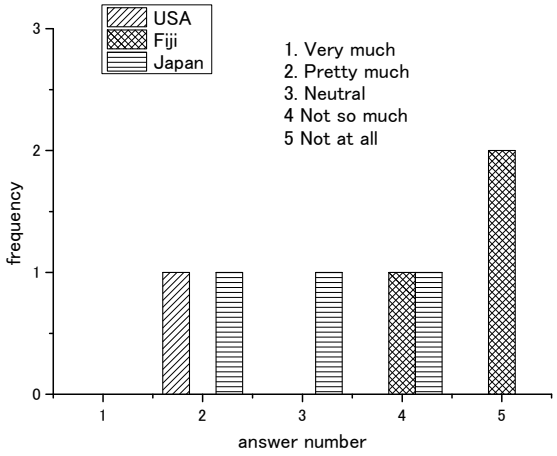

Fig.2 Question 2: Did you have difficulty to discuss in a team?

Sadly, the answer ratio was not so high. Particularly, there was only one answer from Hawaii, USA. This should be attributed to the insufficient arrangement by the moderator.

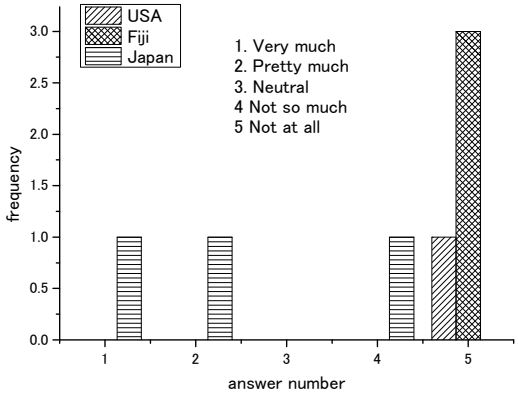

Fig.3 Question 3: Did you have difficulty for language you used?

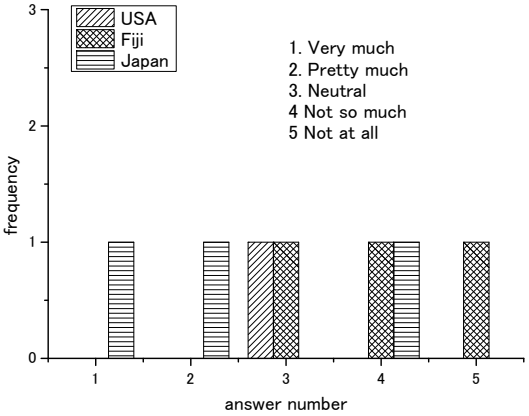

Fig.4 Question 4: Did you prefer real life discussion to virtual one?

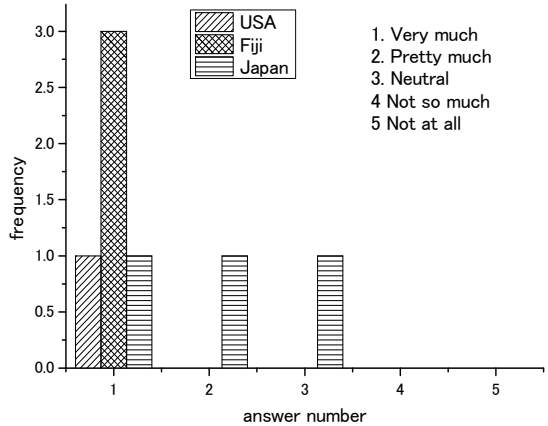

Fig.5 Question 5: Were you interested in the ideas from other countries?

Fig.1 shows the result for the question 1. It indicates that Hawaii and Fiji team mebers were good at handling Moodle, while there were some Japanese students being not good at it.

Fig.2 shows the result for the question 2. It indicates the USA team had the most difficulty for their team activity. Probably, the reason could be attributed to the number of the members. Totally, they had 6 originally, while other teams were composed of three members, respectively. Generally speaking, it is very hard to organize and lead the huge group. On the other hand, Fiji group seemed to be the most cohesive.

Fig.3 shows the result for the question 3. It reflects the langauge problem each team had during the discussion. The student in the USA did not show any problems about it. And it was very natural, since

the language was his/her mother language used on daily basis. Japanese students showed the highest difficulty among the participants generally. It suggests one of the generally problems for Japanese students, when they would be involved into global activities. Even though Fiji students were not English native speakers, they did not show any serious difficulty at all.

Fig.4 shows the result for the question 4. The results differed from country to country. Japan team members generally tended to prefer real life discussion to virtual one, while Fiji team members showed the opposite tendency. However, the tendency generally depends on individuals capability and like-dislike much more.

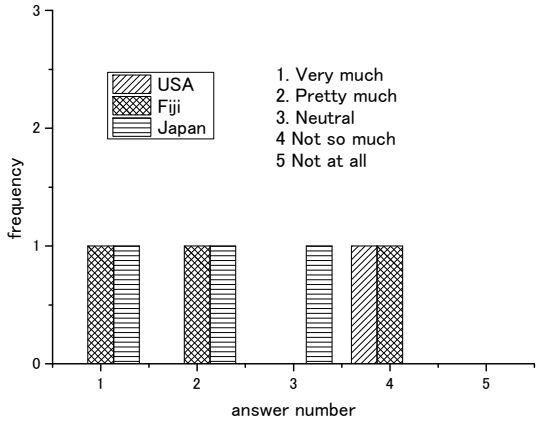

Fig.6 Question 6: Did you feel there would be other effective tools for the discussion among different countries?

Fig.5 shows the result for the question 5. The question, "Were you interested in the ideas from other countries?", relates closely to the final purpose of this project. The results show that most of the participants felt the opportunity positive to learn the environmental problems in other countries.

Fig.6 shows the result for the question 6. The results differed from person to person and it did not show any general tendency at all. As the potential effective communication tool in the future, skype and face-to-face meeting were mentioned by some participants. The ideas suggest that the appropriate combination of online and offline meetings or more realistic and dynamic communication would be effective for the mutual understanding. The utilization of CMS based on Moodle would be one of the effective tools for the discussion beyond time and space. However, the combination of different educational tools will achieve the educational effect supplementarily.

Many of the participants seemed to enjoy the opportunity very much. The discussion (questions and answers) continued beyond the preliminary expectations. Some excerpts for them are mentioned as follows:

---------- between Fiji and Hawaii teams ----------

(The Question)

Thank you for your post. The USP Team from Suva, Fiji would like to pose the following two questions to team Hawaii:
1. Could you elaborate on 'incinerating waste' in order to help us understand the complete process that is right from classification of waste (if any) to the final step?
2. What do you think are the reason/s for 'renewable energies not making a significant impact'?
Thank You.
(From a student in Fiji to Hawaii team)

(*The answer*)

1. An overview of the current method of incinerating Hawaii's waste is as follows: · Municipal solid waste is collected and all materials containing metals are separated for recycling, while non-combustible materials (ex. glass, dirt) are also separated if recyclable and what remains is removed to the landfill. · The remaining rubbish is shredded and incinerated in a boiler. Surrounding the boiler walls are tubes filled with water, which convert to steam and power a conventional steam turbine. · Electricity that is generated is then sold to Hawaiian Electric Company. · The by-products are ash and stack emissions from the boiler. Ash is removed to a separate landfill from the above mentioned rubbish, as it can be very toxic. Stack emissions are treated using an electrostatic precipitator, which helps to remove much of the pollutants from the gas and convert it into dry waste. This process is used for the majority of Hawaii's waste and helps to reduce the volume of incinerated rubbish by about 90%. Efforts are currently being made to expand the facility, improve the rubbish separation/preparation process and to find ways to reduce the by-products even more (ex. research is being done to reuse the ash for building materials, such as bricks).

2. We find that the main reason that renewable energy sources have not made a significant impact is costliness. The technology has simply not been developed enough for it to be an affordable option for most people/businesses. As mentioned by Team Suzuka, the government does play an important role in the situation and efforts have been made to increase the use of renewable energy, though so far it doesn't seem to be enough. We also agree that there needs to be a focus on continuing to improve technology, which should be able to reduce costs in the future.

---------- End ----------

---------- between Japan and Hawaii teams ----------

(***The question***)

Tank you for your interesting opportunity and I'm sorry to be late for the reply. We would like to ask team Hawaii two question. 1. If you think the way to reduce the amount of material entering the system,what kind of way will you propose ? 2. How is the saturation level of renewable energy sources in Hawaii? Tank you.

team Japan

(The answer)

Aloha, thank you for the questions team Japan:

1.Reducing the amount of material entering the system is definitely not a simple task and would likely meet a lot of opposition for reasons of costliness. For anything to make a substantial difference, we think that government involvement would be necessary. This could mean enforcing regulations related to recycling or possibly imposing a larger tax on disposal of waste. There could also be efforts made to force companies to use more easily recyclable materials or environmentally-friendly materials and cut down on plastics.

2. Renewable energy sources seem to be quite bountiful in Hawaii. Various types have been and are currently being researched, however solar energy seems to be most widely used. Wind and wave energy are two more examples as well. If suitable/cost-effective technology was available, we think that Hawaii would have a lot of useful sources.

---------- End ----------

Unfortunately, the project term between the end of January to the end of March, 2001, was not the best for all of participants. While a team was ready for the question and answer session, the other had holidays or had the examination term and so on. If the project term would have been prolonged or arranged appropriately, more excited and interesting session would have been realized. However, the preliminary project could bring the interesting results and tips to open the possibility for the future

CONCLUSIONS

The course management system (CMS) by Moodle established in Suzuka National College of Technology was used for the discussion on environmental problem and some students from the USA, Fiji and Japan joined the discussion on the web to exchange their ideas, so that they could get perspective views on the problem from the global viewpoints. The questionnares after the several weeks long project showed some characteristics for the project. The international discussion involves language barrier, time difference, geographical problems etc. Inevitably. To overcome these problems, the asynchronous e-learning tool became effective. Particularly, the CMS is one of the social media and oriented much more to cooperative works in virtual reality. At the beginning, the moderator s were required to fix the procedure for the discussion in advance, so that they would have been active. However, the discussion became very active among teams and indivitually. The project term was fixed as 8 weeks in advance, since the project was preliminary and temporary. Therefore, it was sometimes hard for the participants to pursue the discussion actively. However, the discussion would have been more effective with the prolonged period. At the same time, the comination of other e-learning components such as skype or face-to-face offline meeting with the CMS based discussion would enhance the usefullness of the international discussion in the future.

ACKNOWLEDGEMENT

We woud like to thank all of the students in the University of the South Pacific, Fiji, in College of Engineering, University of Hawaii at Manoa, and also in Suzuka National College of Technology, Japan for their voluntary effort and great contribution.

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