INVESTIGATING CONSERVATION OF ENERGY THROUGH MODULE ORIENTED PROGRAMS THAT PROMOTE UNIVERSAL VALUES AMONG STUDENTS IN BLENDED LEARNING PLATFORMS

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Abstract

This study reports the school's involvement in the development of the module for Sustainable Energy for All (SE4ALL) that aims to promote the interest of learners to involve in real-life issues related to conservation of energy. The module incorporates the promotion of 21st century learning skills supported by blended-mode platforms. Learners are able to evaluate the issues from the social and moral aspects. The learners in this study were involved in conducting survey with sharing of ideas in many other free forum platforms before they share their ideas in bigger social learning platforms like Edmodo. This module has made the students realised how to conserve energy at home and are aware of moral issues involved in the use of energy saving bulbs. The module incorporates learning through reflective journal writing as evaluation. As the result of following the guide from the module, the students have set up a team to survey the use of electricity in their school. A task force was set up by students to ensure that all lights and fans are switched off after a certain time. This module also creates awareness for the students to share what they have learned from each other and accept constructive comments from others. From the survey that they have conducted using Google Form, it seems that many families still use far too many air-conditioners at home and most of their homes are lit by either fluorescent tubes or the conventional filament bulbs. The analysis from their reflective essays revealed that they have gained much intellectually and more importantly the practice of universal values in their lives to be better global citizens.

Keywords: Collaborative efforts; Universal values; Conservation of Energy; Blended learning; Global citizens

Introduction

Topics like conservation of energy, climate change and human values as well as sanitation are important issues which have been discussed and debated not only by scientists but also by world leaders around the globe. It is important that the X and Y-generations of today should be made aware about conservation of energy not only as part of the topic taught in science or physics but more so how the ignorance of it can lead to greater issues like climate change.

Background and Overview
As Malaysia is hurling towards the countdown of visionary 2020, our government is doing all that is possible to equip schools with all modern Information and Communication Technology (ICT) infrastructure. Under the new Malaysia Education Blueprint 2013 - 2025 (MOE, 2012) which is now entering the second phase, all students must not only be well versed in at least two to three languages, but they must also be taught to be leaders of the future with knowledge as a global player.

The Malaysian Government has provided many ICT infrastructures for the teachers to teach using 21st century skills and student-centred pedagogies. Virtual learning platform such as the Frog VLE and other learning portal have been set up for the schools to promote blended learning. Albeit all the efforts, there are still many limitations. The most significant limitation is that this learning portal provides Malaysian schools with communication channel within each school and not between schools, hence certainly not with the outside world. As such it cannot be considered as a learning portal that is provided with global classroom in mind.

Problem Statement and Rationale

With the consideration to create global classroom in mind as discussed above, the researcher was involved in developing the learning platforms incorporating Blended Learning (BL) activities guided by simple modules. The students were to respond to various online surveys prepared in Google apps that were hyperlinked to various resources in most parts of the modules.

This paper reports part of the BL output of the project that seeks to educate a group of Form 5 boys about conservation of energy at home, how they can change their lifestyle to conserve energy as well as to promote awareness on their moral obligations and how they can practise universal values to be better global players.

This paper aims to report on the creation of a different module oriented program that links with other learning platforms with the following objectives:

1. To create other forms of module oriented program that is able to send all the responses of the students to both the teacher and the students through emails.
2. To create a module oriented program which can link to free Forum sites that will further provide rooms for students to exchange ideas not only with peers within school but more so with students in other parts of the world. In order words, the module oriented program with cooperated Forum should promote a global classroom through blended-mode activities, involving both face-to-face and online learning.
3. To create a module oriented program that can incorporate videos, links and others without slowing down the bandwidth.
4. To link up the modules that are created with a bigger social learning platform such as *Edmodo*. With this, global learning and global classroom would be more realistic.
5. To know how the topic of conservation of energy is able to promote the realisation of universal values and be better global citizen.
6. To let most students easily relate universal and moral values with social issues as well as be able to apply or relate universal and moral values in science related issues.

Focus of Study and Research Questions

This blended-mode project aims to promote awareness among students with different socio-cultural backgrounds and level of academic achievement. It encourages social tolerance as well as creates opportunity for students to express their ideas and moral issues that are often taken for granted.

Students learn to collaborate with one another, learning from each other, as well as to understand the issue of conservation of energy in a wider scope of knowledge and skills. Students also learn to manage their time and to reflect what they have learned through writing reflective journals as advocated by Borich (2011).

However, a more long term objective of this project initiative is to illustrate the design and implementation of a module that promotes awareness among the school communities. The design of the module has to be easy to use both by the students and the teachers. Hence the following research questions are identified;

1. How could blended learning be introduced effectively to promote the awareness of conservation of energy and at the same time make students practise universal values for the common good as global players?
2. How could the development of suitable module and learning platform be able to promote blended learning activities among students in a borderless world and enable them to learn from one another within the region and beyond?
3. What digital learning tools can best be used to encourage 21st century learning which starts locally and then globally?

Review of literature for the development of framework of study

Review of literature was made with reference to the studies by Ch'ng et al. (2016), Ng, Devadason and Lay (2015) as well as Mohdamed Amin Embi (2011) prior to the conceptualisation of the research questions 1 to 3 respectively. A conceptual framework for the blended-mode activities involved in this study was summarised in Figure X of Appendix Part A.

Methodology

This study incorporates mixed-method research involving module oriented programmes supported by blended learning activities whereby students undergo traditional classroom approach, engaging in fair amount of independent self-paced study that employs Internet and other communicative digital tools outside schooling hours. During one of the learning phase, they were also given the opportunity to interact with international students as illustrated in Figure Y of Appendix Part A.

Both quantitative (survey) and qualitative (open-ended responses, interviews) responses were obtained and analysed. This mixed-research approach was employed by the researcher who wishes to investigate to what extent do these on-line learning activities able to promote learning and create social awareness. The module developed for this programme consists of several activities which require the students to complete online and offline. Seven Form 4 students were chosen for this project, while several more were contacted to participate in the Google Form survey.

The researcher feels that detailed description of the various stages of planning is important as it explains the complexity of the modules created since many of the students are not aware of what is included in module oriented programs as well as social learning platform and Forum are. The module also provides a fairly detailed step-by-step procedure for any researcher who wishes to follow with possible modification of use in their respective contexts.

The following are descriptions of the implementation procedures.

'Planning' Stage

The planning stage consists of two folds, that is, creating and modifying the present modules that are put up on the school website (URL: http://www.pfs.edu.my/SAW2014.htm). Firstly, the researcher redesigned the activities in the module so that the students can answer all the questions just like in the Google Form but their responses that they sent will be emailed directly to the researcher for evaluation. Secondly several free social forum platforms are created for the students to discuss as well as post their ideas and comments. For that purpose, the researcher uses a fairly good and free social forum platform which can be found in Padlet with URL https://padlet.com.

'Pre-test' Stage

A pre-test using Google Form is created with several questions to inquire about students' knowledge on module oriented programs and blended learning platforms as well as the difference between moral values and universal values. The link to the pre-test can be found here: https://goo.gl/forms/O2oCcqF4tuAkHaGT2

'Initiating' Stage

Once the preparatory stage is completed, the researcher needs to communicate with the chosen students using one common communicative platform that all students have, that is "Telegram Application" to create a "Champion School Award group" (The invitation link can be accessed here: https://t.me/joinchat/Ani9oQ0fgHNHmN_V62hYQA). Once that is done, all the links to the activities are posted in these platforms together with all the Forum topics that the students need to discuss and comment.

Below are the links of the activities of this mixed-mode module:
http://pfs.edu.my/2017/Champion%20School%20Awards/Activity%202%20(Web)/
http://pfs.edu.my/2017/Champion%20School%20Awards/Activity%204%20(Web)/
http://pfs.edu.my/2017/Champion%20School%20Awards/Activity%205%20(Web)/
http://pfs.edu.my/2017/Champion%20School%20Awards/Activity%206%20(Web)/

and the Forum sites set up can be accessed through the following links. To comment, just double click anywhere in the forum site that are all held in "Padlet.com". For example:

Activity 2 Forum link https://padlet.com/yeangsoon1960/mqz3gbqmnh2h
Activity 4 Forum link https://padlet.com/yeangsoon1960/1yypfjaxnsme
Activity 5 Forum link https://padlet.com/yeangsoon1960/i5sbul8y57li

There is also one activity where the students have to design their energy saving house and for each arrangement they need to comment why they arranged it that way. All these were posted up at *Edmodo* for sharing. The link to the activity can be found in the link below. http://www.pfs.edu.my/SAW2014/solar/drag_n_drop_energyhouse_new/index.html.

The overall view of the concept flow and process of this blended learning model can be seen in the Figure X of Appendix Part A. The last and most important activity would be a reflective write-up or reflective journal writing which requires them to write a summary report about 800 words, concerning what they have learned, from the academic stand point and from the social aspect including moral issues and how they can apply universal values related to these activities (Refer to Appendix Part B).

'Uploading the Content onto Learning Platform' Stage
The learning platform that the students are required to upload all their write-up and their reflective journals can be referred to in this link https://edmo.do/j/cu7hw9 at Edmodo.com The researcher created a class under the folder of Borderless group (4SustainbaleEnergyforAll,SE4ALL). The researcher had constantly communicated with the group either in Telegram group (Private issues) or through *Edmodo* (General issues).

'Post-test' Stage
The students are again asked to answer the same questions using Google Forms to see whether or not there were changes in their perspectives about module oriented programs, blended learning platforms and issues concerning universal values. The link can be found here: https://goo.gl/forms/ZiRsmOasLXXAj7j82

Findings and Significance

Pre-test and Post-test Findings
The results of the pre-test and post-test are shown below as analysed using Google Analytics. Most of the pre-test and post-test use Likert scale as shown in Figure 1. Here the students are allowed to tick the level of knowledge that they currently have from a scale of 1 (know very well) to a scale of 5 (no knowledge about it).

Key:		**1**	**2**	**3**	**4**	**5**
I know very well ( )	( )	( )	( )	( )	**I do not know anything about it.**	

Figure 1. The Likert scale.

There were several questions asked in the pre-test and post-test but below are some of the questions that the researcher wishes to highlight. Here, the researcher places the responses made by the students for the same questions before and after the programme.

In Question 1, the students were asked whether they know what a module oriented program is. The response shows that five out of seven students ticked that they do not know anything about module oriented programs. (Refer to Figure 2.)
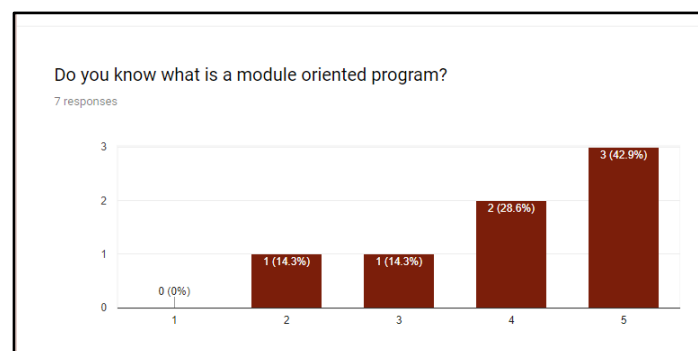

Figure 2. Pre-test response.

After the program, the same question was asked again, and this time all the seven students said that they know and understands better about the module oriented program. (Refer to Figure 3)
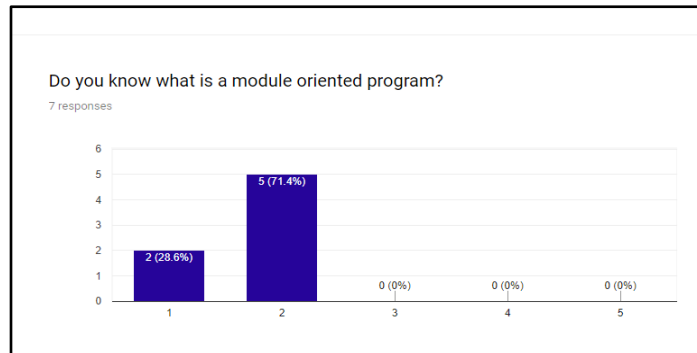
Figure 3. Post-test response.

In Question 2, the students were asked to list out three universal values that they are aware of and the pre-test shows that most students have no idea what these universal values are. (Refer to Figure 4).
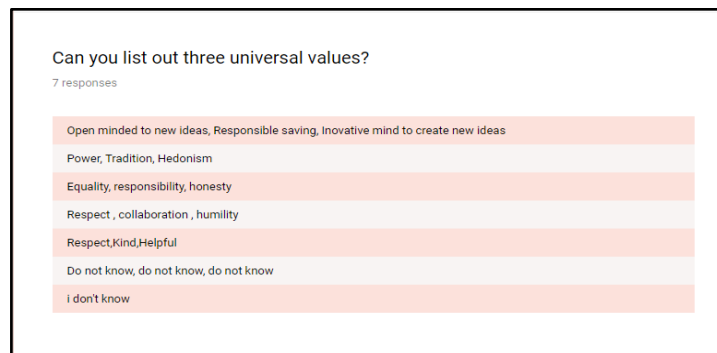

Figure 4. Can you list out three universal values?

After the program, the researcher noticed that students had started to list out some of the important components of universal values. The responses listed by some of the students include, "Love, Kindness and Wisdom". Although not all the universal values were listed but it was a good start. (Refer to Figure 5)
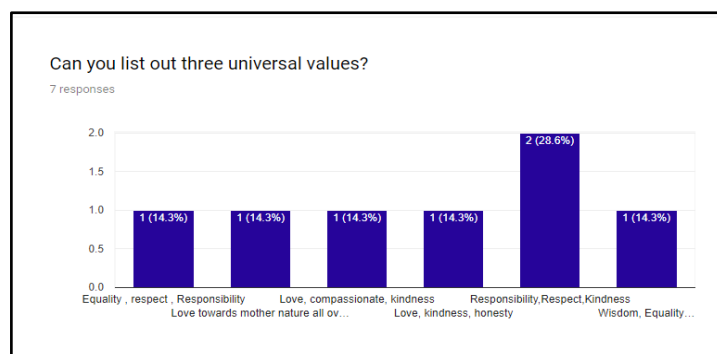
Figure 5. Love, Kindness and Wisdom are mentioned.

Question 3 sought to know whether the students were aware of the involvement of moral and universal values in the issue of conservation of energy. From the pre-test, it was noted that four out of seven students said that conservation of energy had nothing to do with moral and universal values. (Refer to Figure 6.)
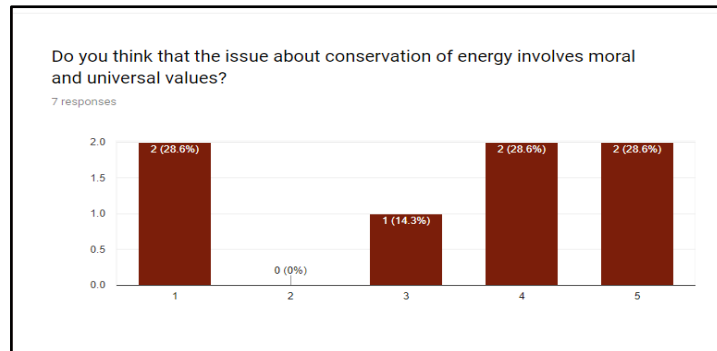
Figure 6. The survey showed that the students were not aware that conservation of energy involves moral and universal values.

Interestingly, after the program, when the same question was asked again, all students said that moral and universal values have a big part to play in conservation of energy. (Refer to Figure 7)
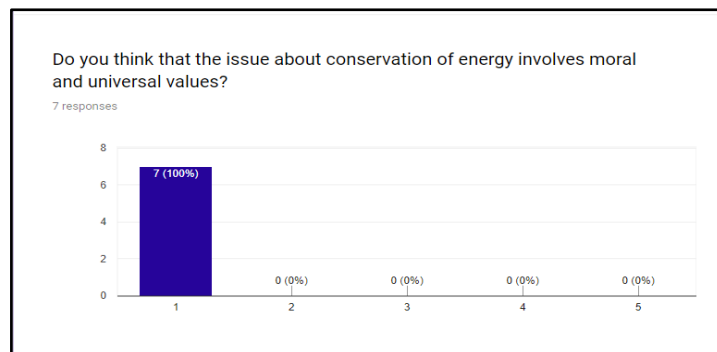

Figure 7. After the program, all students realised that conservation of energy involves values.

In Question 4, the students were asked to list out some social media that they are familiar with during the pre-test (Refer to Figure 8) and also after the post-test (Refer to Figure 9). It was noted that there was no change in their lists.
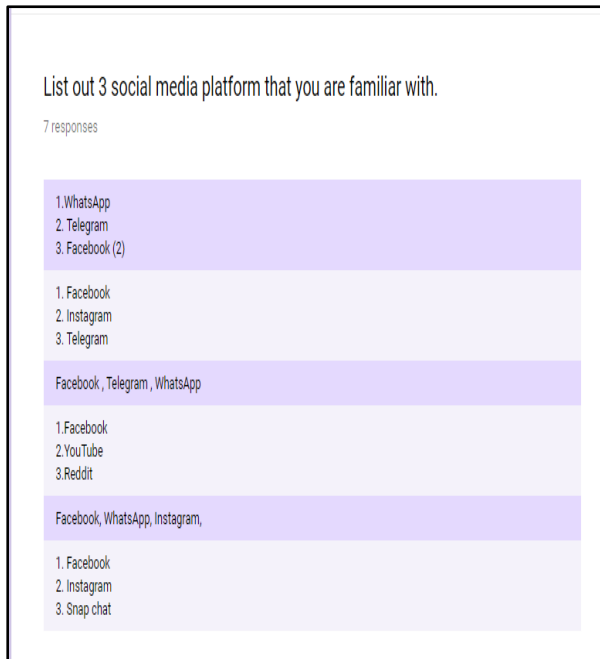
Figure 8. Pre-test.   *Figure 9.* Post-test.

Then the students were asked in Question 5 whether they were aware of social learning platforms. From the pre-test responses, it clearly showed that students were not really sure about what social learning platforms were and this was shown by their elaboration on these learning platforms (Refer to Figure 10)
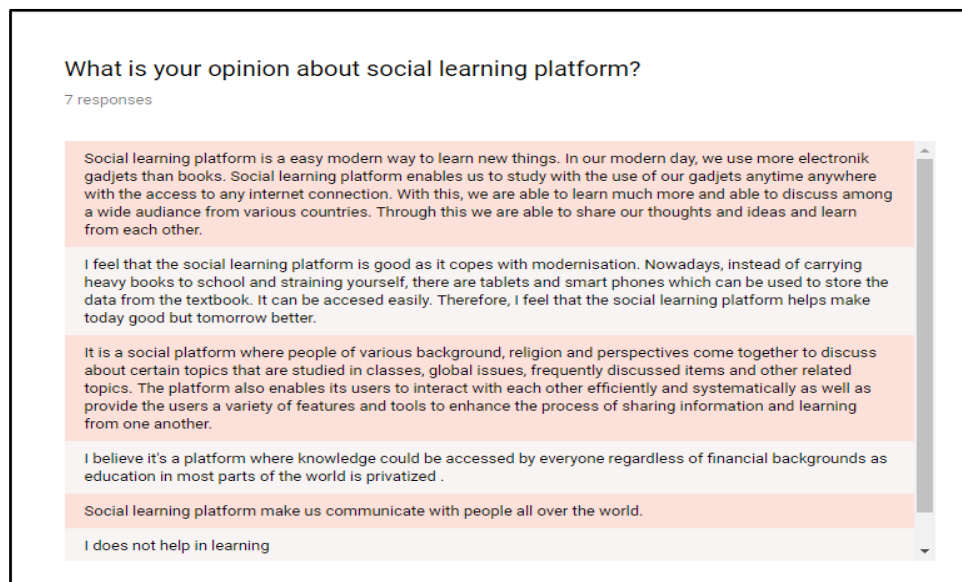

Figure 10. This showed that this group of students were not familiar with the platforms.

However after the program, it was noted that the students had a better and clearer picture of what social learning platform is. Here, the students were able to explain not only what these platforms were but how they could benefit from it. (Refer to Figure 11)
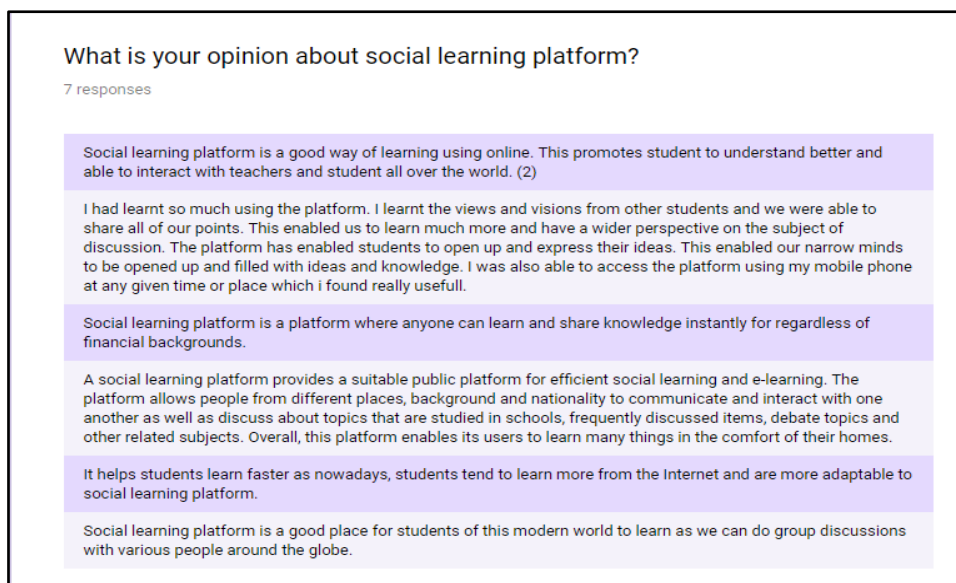
Figure 11. After the program, students became more familiar with social learning platform.

The rest of the analytics of the pre-test and post-test can be found in the Appendix. The analysis of pre-test and post-test indicates that a well-designed module oriented program is able to promote universal values even in science related issues. It is also interesting to note that none of the students mentioned Frog VLE as a learning platform.

Evidence of Cultivation of Universal Values

The other indication that the researcher can tell that universal values are being cultivated is through the students' reflective journals. Their reflective journals showed about what they have learned have been posted on *Edmodo* and the links were already given earlier.

An extract of one of the student's reflective journal posted on Edmodo is shown below:

> …Through my observation, I believe there's a moral issue in every issue. This leads to the moral issue in the conservation of energy. From my point of view, and begin to focus on the specific value issues involved in energy by reflecting on the nature of ethics itself. At the start of a dialogue on ethics, Socrates once said that "we are dealing with no small thing but with how we ought to live." There is no more fundamental ethical question than this: How ought we to live?
>
> But as Socrates understood, this question can be interpreted in two ways. "We" can mean each one of us individually, or it may mean all of us collectively. Taken in the first sense, ethics is concerned with how I should live my life, with the choices I ought to make, with the type of person I should be. We can refer to this sense of ethics as morality. Taken in the second sense, this question refers to how we ought to live together in society…

Here the student ended his thoughts that moral or universal issues depends on how we ought to live, and it depends on the choices of people to live peacefully together in society.

The researcher felt that through the reflective journal, student had begun to think deeply and realised that be it moral or universal values, these values are important

components that need to be taken into consideration for people in a society or world to live together peacefully. The link to the full journal of this student can be found in the Appendix.

Other Findings Including Face-to-Face Networking Activities

Other findings include the launch and use of this module through blended-mode where the responses were automatically sent to the coordinator through emails involving a small group of school students at its initial stage. Apart from interaction made on Edmodo to share the learning of science and mathematics with other students in the SEAMEO region and beyond, other blended-mode activities involving the exchange of learning experience with students from other countries. One of the face-to-face sharing and exchange activities was conducted during the visit by international student from Japan as shown in the Figure Y of Appendix Part A. The topic of discussion was on conservation as well as wise use of energy and other resources.

Hence this study revealed the feasibility of using blended-mode activities including the digital media to attract and cajole students' responses to learn as well as take part in the activities, survey, and forum including the writing of reflections.

A few observations were also gathered in this project such as the following:

1. It is possible to create well designed self-email activities that can be anchored in a learning portal to enhance teaching and learning without using a server. The researcher can monitor the students' responses and email them for rectification or correction.

2. As the module and forum are anchored to the learning platform and are accessible to the public, many more students from other places can participate, hence making a borderless classroom possible in blended-mode, both online and face-to-face.

3. The reflective journal is something new to the students of the researcher. They were apprehensive about it initially but when explanation was made through the group Telegram, they were willing to give it a try. It encourages students to think reflectively about what they have learned, and an opportunity to ponder about moral and universal values.

<div align="center">

Conclusions

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As this project is at its infancy stage, the cooperation and job description of individual team is crucial. The module and the activities can be further improved by having clearer instructions for the participants. The responses will not only be received by the coordinator but also by the participants. Although instructing the 7 students to perform each task can be a daunting one, it was done efficiently using the mobile application "*Telegram*"

The coordinator of this study needs to get more accustomed with learning platform *Edmodo* to further harness its functionality so that a more meaningful learning can occur. The researcher also discovered that many students lack ICT skills dealing with basic computing and editing despite the fact that they are so savvy playing computer games and engrossed in social learning platforms like Facebook and Tweeter. But one thing the researcher and his student learnt together is that in every aspect of life or issues that they faced, there are always

the moral or the universal issues to address. One thing that is very clear to both the teachers as well as students is that in every issue may it be social or science, as long as humans are involved, moral and universal values need to be addressed and be considered for a balanced outcome both for mankind and nature.

References

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Ch'ng, Y.S., Linda, T., Woo, H.L., Ng, K.T., Nur Jahan, A., & Nor Ruzaini, J. (2016). Reviving mathematics and science learning culture supported by digital platforms to promote Sustainable Energy Education for All. In K.T. Ng, R.P. Devadason, & Y.F. Lay (Eds.), *Learning Science and Mathematics Together (LeSMaT) in a borderless world using technology* (pp.177-129). Penang: SEAMEO RECSAM.

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Ng, K.T., Devadason, R. P., & Lay, Y. F. (Eds.). (2015). *Learning Science and Mathematics Together (LeSMaT) in a Borderless World using Technology*. Penang: SEAMEO RECSAM.

Appendix
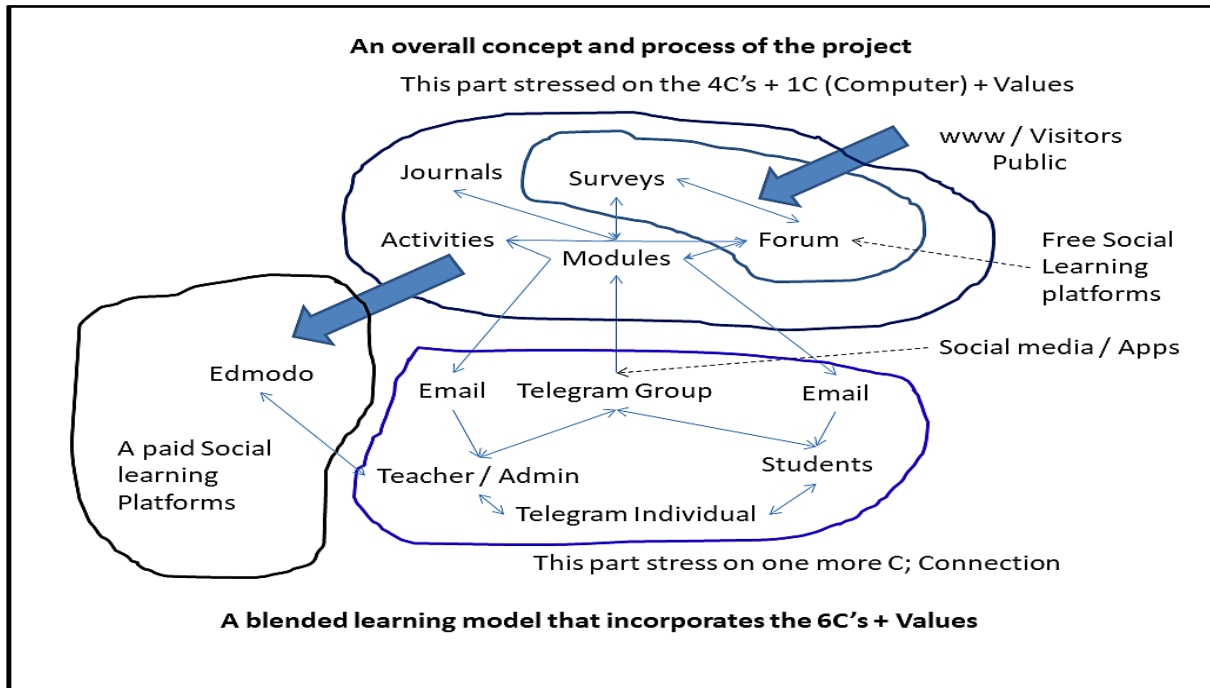
Part A: Overview of Blended Learning Activities

Figure X. A conceptual framework for blended learning that summarises all activities.

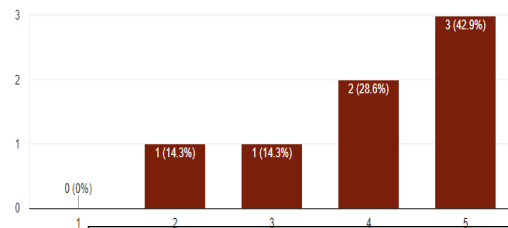*Figure Y.* Face-to-face exchange with international student from Japan on 14 August 2017.

Part B: Evaluation of Students' Blended-mode Learning

Pre-test

Post-test

Do you know what is a module oriented program?

7 responses

Do you know what is a module oriented program?

7 responses

Key:	1	2	3	4	5	
I know very well ( )	( )	( )	( )	( )	I do not know anything about it.

Can you list out three moral values?

7 responses

Resposibility, Cooperation, Inovative

Generosity, Honesty, Kindness

Toleration, kindness, considerate

Cooperation , Kindness , Sympathy

Conserve,kind,Wise

Indipendence, kindness, mercy.

Tolerance, Honesty, Moderation
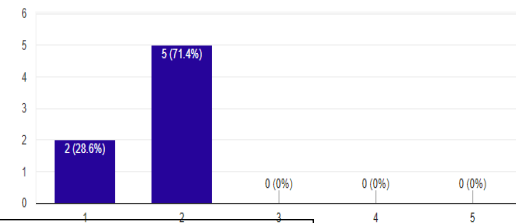
Can you list out three moral values?

7 responses
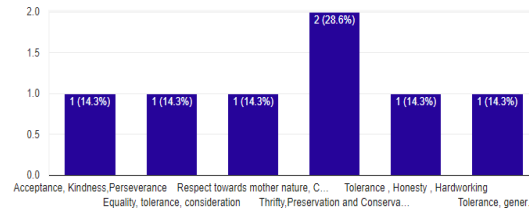
Can you list out three universal values?

7 responses

Open minded to new ideas, Responsible saving, Inovative mind to create new ideas

Power, Tradition, Hedonism

Equality, responsibility, honesty

Respect , collaboration , humility

Respect,Kind,Helpful

Do not know, do not know, do not know

i don't know

Can you list out three universal values?
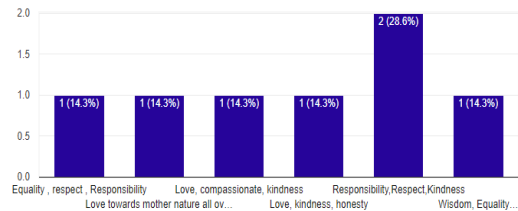
7 responses

What is the difference between moral values and universal value?

7 responses

Moral values is simply a lesson we can learn from whereby universal value explains the importance of the moral value in our daily life.

-Moral values help determine what is wrong and what is right
-Universal values however are general values that are present in every human.

1. Moral values are based on cultural perspectives whereas universal values are based on everyone's perspective
2. Not everyone would agree with moral values, while universal values are agreed by everyone
3. Universal values are mainly based on philosophy, sociology and psychology whereas moral values are mainly based on culture, beliefs and tradition.

Moral values is model that involves the examples of a perfect human or role model in an individual but universal values is a universal model that should be practiced by everyone regardless of religion or beliefs .

There is no difference between moral values and universal values.

I do not know

I'm not sure

What is the difference between moral values and universal value?

7 responses

Universal value is a standard value where universally accepted regardless of race and culture and moral value is a value depending on different culture and race. (2)

•Moral values are values that we learn in our nation's sociaties amd culture.
•Moral values are thought to us based on culture since we were first born.
•On the other hand, universal values are values that are accepted internationally in all parts of the world.
•Universal values are known throughout the world.
•Both values are the almost same, they only differ from the cultural perspective.

Moral value : Moral value is a philosophy which is acceptable by everyone but depending on the culture and race
Universal value : a philosophy that encompasses morality , human traits without limitations from cultures or race

1. Moral values depend on culture and race, while universal values are accepted universally across race and culture
2. Not everyone agrees with every moral values, but most people would agree with all universal values
3.Universal values are mainly based on philosophy, sociology and psychology whereas moral values are based on culture, beliefs and tradition

Moral values is almost the same as universal values. But Moral values depends on culture and race whereas universal values is accepted universally across culture and race.

-Moral values are values which are affected by culture while universal value are values that are accepted throughout the world
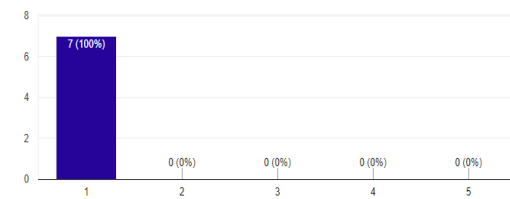
Do you think that the issue about conservation of energy involves moral and universal values?
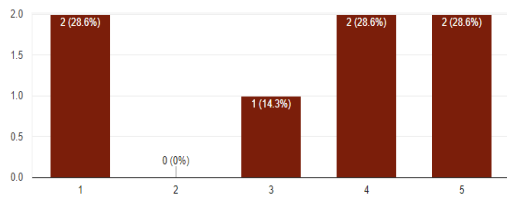
7 responses

Do you think that the issue about conservation of energy involves moral and universal values?

7 responses

Key:	1	2	3	4	5	
Yes it does a lot ( )	( )	( )	( )	( )	**( )**	**No it does not involve at all.**

List out 3 social media platform that you are familiar with.

7 responses

1. Facebook
2. Instagran
3. Snapchat

1. Facebook
2. Snapchat
3. Instagram

1.Facebook
2.Twitter
3. YouTube

Facebook , Telegram , WhatsApp

1. Facebook
2. WhatsApp
3. Telegram

Facebook, WhatsApp, wechat

1. Facebook
2. Instagram
3. Snap chat

List out 3 social media platform that you are familiar with.

7 responses

1.WhatsApp
2. Telegram
3. Facebook (2)

1. Facebook
2. Instagram
3. Telegram

Facebook , Telegram , WhatsApp

1.Facebook
2.YouTube
3.Reddit

Facebook, WhatsApp, Instagram,

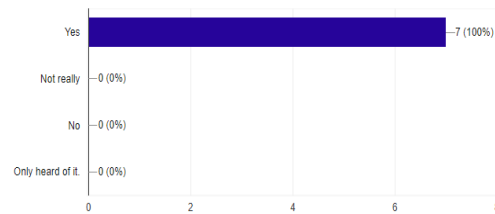1. Facebook
2. Instagram
3. Snap chat

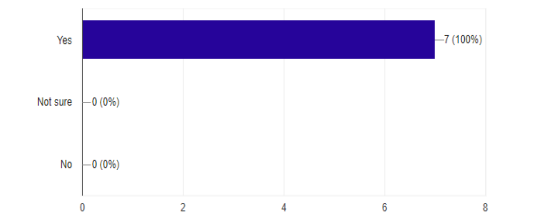Are you familiar with social learning platform?
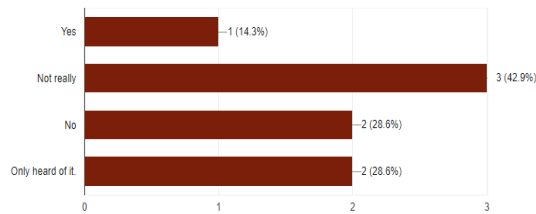
7 responses

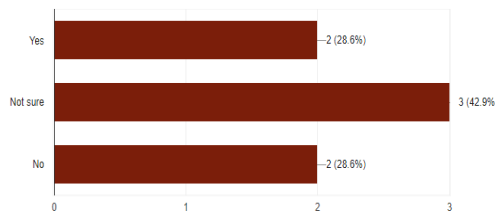Are you familiar with social learning platform?

7 responses

Do you know the difference between social media platform and social learning platform?

7 responses

Do you know the difference between social media platform and social learning platform?

7 responses

What is your opinion about social learning platform?

7 responses

Social learning platform is a good way of learning using online. This promotes student to understand better and able to interact with teachers and student all over the world. (2)

I had learnt so much using the platform. I learnt the views and visions from other students and we were able to share all of our points. This enabled us to learn much more and have a wider perspective on the subject of discussion. The platform has enabled students to open up and express their ideas. This enabled our narrow minds to be opened up and filled with ideas and knowledge. I was also able to access the platform using my mobile phone at any given time or place which i found really usefull.

Social learning platform is a platform where anyone can learn and share knowledge instantly for regardless of financial backgrounds.

A social learning platform provides a suitable public platform for efficient social learning and e-learning. The platform allows people from different places, background and nationality to communicate and interact with one another as well as discuss about topics that are studied in schools, frequently discussed items, debate topics and other related subjects. Overall, this platform enables its users to learn many things in the comfort of their homes.

It helps students learn faster as nowadays, students tend to learn more from the Internet and are more adaptable to social learning platform.

Social learning platform is a good place for students of this modern world to learn as we can do group discussions with various people around the globe.

What is your opinion about social learning platform?

7 responses

Social learning platform is a easy modern way to learn new things. In our modern day, we use more electronik gadjets than books. Social learning platform enables us to study with the use of our gadjets anytime anywhere with the access to any internet connection. With this, we are able to learn much more and able to discuss among a wide audiance from various countries. Through this we are able to share our thoughts and ideas and learn from each other.

I feel that the social learning platform is good as it copes with modernisation. Nowadays, instead of carrying heavy books to school and straining yourself, there are tablets and smart phones which can be used to store the data from the textbook. It can be accesed easily. Therefore, I feel that the social learning platform helps make today good but tomorrow better.

It is a social platform where people of various background, religion and perspectives come together to discuss about certain topics that are studied in classes, global issues, frequently discussed items and other related topics. The platform also enables its users to interact with each other efficiently and systematically as well as provide the users a variety of features and tools to enhance the process of sharing information and learning from one another.
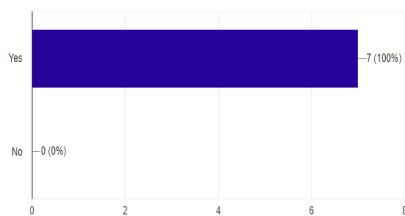
I believe it's a platform where knowledge could be accessed by everyone regardless of financial backgrounds as education in most parts of the world is privatized .

Social learning platform make us communicate with people all over the world.
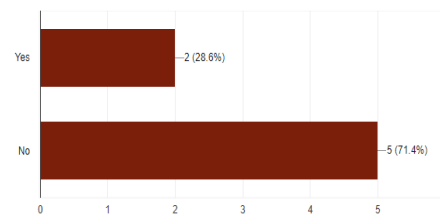
I does not help in learning

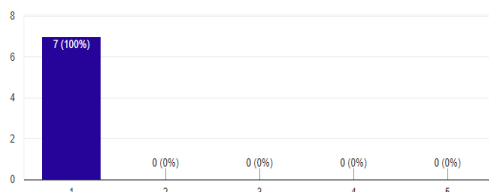**Have you heard about the social learning platform, "Edmodo"**

7 responses

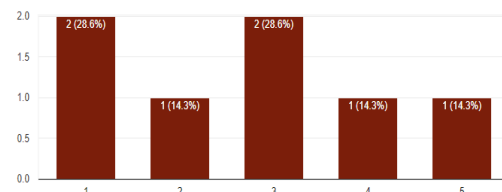**Have you heard about the social learning platform, "Edmodo"**

7 responses

Do you think social learning platform can promote students to learn from each other?

7 responses

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7 responses

Sample of a reflective Journal from one of the participant can be retrieved at this link. The rest can be found at *Edmodo* under 'Sustainable Energy for All' (SE4ALL) subtheme: http://pfs.edu.my/2017/Champion%20School%20Awards/Reflective%20journal_%20Norman%20Sim%20Conservation%20of%20energy.pdf