

# Astronomy Co-Curricular Students Engagement With Primary School Student Using Service-Learning Approach

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## ABSTRACT

Astronomy is a very interesting knowledge because involving concepts that related to everyday phenomena. Astronomy combines the disciplines of physics, space science, mathematics, optics, jurisprudence, geography and others branch of science discipline. The science of astronomy is often referred to as the queen of science in almost every human culture. Nowadays, astronomy topic has been adapted as one of the sub topic in primary school's science and mathematics syllabus. Astronomy is also about the science of celestial observation and evaluation involving celestial objects and events that happened outside the earth's atmosphere. However, some primary students have problem to understand some basic concept of astronomy. Therefore, Universiti Teknologi Malaysia Astronomy Co-Curricular students have carried out a Service-Learning approach for transferring the astronomy knowledge to the primary school students. This innovative astronomy service-learning approach consists of five activities namely Astronomy Talks, Workshop, Exhibition, Space Explorace and Stargazing. Pre-result shows that more than 60% of respondents did not understand the basic knowledge of astronomy before the project were carried out. The post-results show that more than 80% of respondent have understand the basic knowledge of astronomy after they join the service-learning project.

**Keywords:** *Astronomy, Co-curricular, Students, Service Learning, Primary School*

## 1. INTRODUCTION

Astronomy is the science of celestial observation and evaluation involving celestial objects and events that happened outside the earth's atmosphere. However, some students have problem to understand some basic concept of astronomy. Therefore, there is a need to have an innovative approach for transferring the astronomy knowledge to the primary and secondary school students to get better understanding the knowledge of astronomy. Knowledge of astronomy is often referred to as Queen in science (queen of science) almost in all human culture.

Therefore, an innovative NALI approach has been utilized to transferring the astronomy knowledge through Service Learning to the primary school students. This project was presented for transferring the knowledge of astronomy by using service-learning approach. Service Learning is a teaching and learning method that integrates community involvement and service with academic coursework. It focuses on critical and reflective thinking. Students gain a deeper and more practical understanding of the course content through participation in service related to current social problems and critical reflection of the experiences. Through service-learning, students learn not only from the instructor and the text, but also from the clients served, from the community agency personnel, and from

themselves. As part of the service-learning experience, students work with both individual clients and the agency itself. This project was presented for transferring the knowledge of astronomy by using Service-Learning approach.

The objectives of this project are first to increase understanding of the theoretical issues being addressed in the classroom. Second to stimulate critical thinking about the social arrangements discussed in the classroom and third objective is to gain a comprehensive view of the needs of the community being served. This Service-Learning approach can motivate the student to get better understanding the knowledge of astronomy.

## 2. BACKGROUND

Astronomy is very unique discipline, which combines the disciplines of physics, space science, theoretical mathematics, optics, jurisprudence and others branches of science discipline. The science of astronomy is often referred to as the queen of science in almost every human culture. People in ancient times were observed celestial objects, especially the Sun and Moon for the purpose of determining the time, day and season. Astronomy is a very interesting field because involving concepts that related to everyday phenomena. This has resulted the creation of equipment such as sundial to measure time, telescope for

observation and quadrant for measuring angle. However, according to [3], [4] and [7] not all suffered can provide a clear picture to the observer because the concepts involved in the phenomena of nature difficult to understand but very difficult explained scientifically. Reconciliation and the combined ideas of everyday phenomena observation with the concepts learned in the classroom usually produce misunderstandings concept or misconception. However, there is still no appropriate teaching and learning approach for school students and higher learning institution students to get a better understanding in the field of astronomy.

### 3. METHODOLOGY

According to [10], service-learning program must be an academic activity. The service-learning implementation can be divided into three phases [5], namely, Phase 1: Service-Learning Planning, Analysis and Design, Phase 2: Service-Learning Delivery and Phase 3: Service-Learning Evaluation, Reflection and Monitoring.

Phase 1 involves planning, identifying and analyzing problems or opportunities and incorporates the service learning and information systems development processes and activities. Firstly, students were given the basic knowledge of astronomy and skills for about 9 weeks of curriculum schedule. The service learning will be conducted at the 12 or 13 weeks of the semester. At the same time, students were also given a freedom to discuss the committee members. They also given a time to identify and analysis the problem or opportunities to conduct service learning at a selected community. The students must integrate the service learning within the curriculum, based on the requirements, needs and direction of the faculty programme.

The nature of project should reflect the contents of the syllabus, community needs, and reflection on service-learning activities. Next the students were required to attend the Briefing Session with Service-Learning Committee and Lecturers involved in the course during the second week of semester. During the session, they were given the details of service learning and its implementation including service-learning requirements, guidelines and ethics, insurance coverage, driving license and UTM safety precautions, list of villages, list of schools involved, list of SL supervisors and list of Community supervisors. After the briefing, each group of student needs to write a full proposal include the financial requirement, which normally determined by size and nature of the project, a size of class and scale of service-learning implementation. Budget plan should be conducted to ensure service-learning project can be implemented effectively and efficiently within the community.

The students also must make sure that the technical support and IT requirements (software and hardware) of student, faculty and community. As part of the fieldwork for SL program, students are required to conduct 3 visits: (1) early semester, (2) middle semester and (3) end of semester. The first visit is important meeting between students, community and supervisor or instructor because

students will be introduced to community by supervisor and students will collect data from community regarding their collaboration project before students accomplish the task. In the second visit, students will present their works to community and get feedback for improvement. In the final visit, students will hand over the products/modules to community and project closure.

Phase 2 is focusing more on the service-learning implementation of faculty course within the community. This innovative astronomy service-learning project normally is implementing for one or two days programme. The project consists of five activities namely Astronomy Talks, Workshop, Exhibition, Stargazing and Space Explorace as shown in Figure 1. First activity is the astronomy talks usually presented at one hour talks by expert or student Figure 2.



**Figure 1** Astronomy service-learning activities



**Figure 2** Astronomy talks activity

Second activity, the student will give about one hour to look and get some information at the mini astronomy exhibition and the participant will give a short quiz – see Figure 3. The third activity is the community will expose about one hour to the hands-on workshop on astronomy (Figure 4).

At the fourth activity as shown in Figure 5, the students were given a chance to deliver the knowledge of astronomy that they have absorbed from the three activities before in the space explorace games. The students will divide in a group and then they have to solve and complete the problem that given at four or five checkpoints. Finally, fifth activity involve the interesting part is the stargazing activity using the telescope to observe the moon and planet at the night sky.



**Figure 3** Mini astronomy exhibition activity



**Figure 4** Hands-on workshop activity



**Figure 5** Space exploration games activity

Next, Phase 3 is the final task, reflection and evaluation stage. The students were asked to complete their tasks and reflect in terms of learning units they have learned, individual development, soft skill, communication skill, technical skill. Students are required to complete their student reflection form and student log book. The student reflection acquires information such as experience and responsibility as a citizen, knowledge and skills gained during service learning, the impact of service learning to community, the degree of understanding of the course and character traits. Students also need to present their works at university and lecturers will evaluate their works. Lecturers who are teaching the course can also reflect on the contribution of service learning to the course content and faculty program. The participation also required to do reflection in terms of community impact and university-community relationships.

#### **4. RESULTS AND FINDINGS**

During the last visit by the students, the supervisor and community supervisor will evaluate the students in terms of various aspects including student-community relationship, communication skills, quality of work and performance, knowledge and skills. The participation is given a set of questionnaires for them to fill-in on the knowledge delivery and output of the service learning. The participant and community supervisor also need to give their reflection about the service-learning implementation. This project has been implemented at few primary and secondary schools. Table 1 shows some reflection from the participant who has participated in the project. Besides, the students who involve as the facilitators also need to give their reflection on the implementation and their experience in handling the SL project. Following are the reflections given by the students and the community:

*“Astronomical Literacy camp has successfully implemented on the date of 19.04.2019 up to 20.04.2019. On that date we have collaborated with the Museum of Kota Tinggi. The purpose of this camp is conducted to provide and improve the understanding and awareness of the knowledge of astronomy to students, especially primary school students. The purpose of the camp was held also to open the mind and knowledge to the students to explore the knowledge of astronomy. The objectives of these camp students acquire and apply the knowledge and techniques learned during the Camp Program Literacy astronomy and capable of producing students who have "soft Skills" are high.”*

*“I would like to take this opportunity to thank all parties involved in the success of a service-learning program entitled "Space Exploration Mission". If without the cooperation of all parties, this programme will not be carried out smoothly and successfully. The program was held at the Kota Tinggi Museum for two days, from 18 April until 19 April 2019. Before the program, there is a lot of preparation has been made by the group members. My responsibility was entrusted to create posters and banner and involved in the exhibition session. I feel lucky to be able to apply their knowledge in the field of knowledge-creation of graphics. Not only that, I have worked with two other group members in providing video and exhibition to showcase session later.”*

*“Congratulations and thank you to UTM! This SL project is good, and we are very happy and looking forward to having more projects in future. SL project should be taken as a good example not only to local universities and private universities should incorporate this as well in their studies.”- Guru Besar SK Pengkalan Raja*

**Table 1 Participation responds on the implementation of the project**

| School name             | No. of participant | Q1                     | Q2                     | Q3                     |
|-------------------------|--------------------|------------------------|------------------------|------------------------|
| District of Kota Tinggi | 34                 | 9% (Yes)/<br>91% (No)  | 47% (Yes)/<br>53% (No) | 89% (Yes)/<br>11% (No) |
| SK Pengkalan Raja       | 60                 | 31% (Yes)/<br>69% (No) | 80% (Yes)/<br>20% (No) | 90% (Yes)/<br>10% (No) |
| SK Taman Universiti 3   | 80                 | 29% (Yes)/<br>71% (No) | 85% (Yes)/<br>15% (No) | 95% (Yes)/<br>5% (No)  |

Q1 – measurement of the level of knowledge of the participants about this technology/knowledge

Q2 – Do after the project is carried out, the participant have mastered the skill of part or whole of this method/technology

Q3 – This Project is very necessary

### 3. CONCLUSION

Conclusively, this project shows that the understanding of the theoretical issues being addressed in the classroom of astronomy course was increase. It also has enhanced the

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critical thinking about the social arrangement discussed in the classroom. It has achieved the needs of the community being served. This project has the potential to commercialize to others Higher Education Institutions that offers astronomy courses or programme.

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