Al-Hisab: Journal of Islamic Astronomy | e-ISSN: 3046-8515
Vol.1, No.3, September 2024, pp. 148 - 153

The Role of Observatory in Observing and Teaching Astronomy to Students

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Article Info

Article History
Received 07-08-2024
Revision 19-08-2024
Accepted 06-09-2024

Keywords:
Observatory,
Students,
Astronomy

ABSTRACT

The Sultan Zainal Abidin University Observatory (UniSZA) plays an important role in teaching students astronomy and celestial body observation. This observatory seeks to increase students' interest and understanding of astronomy through various interactive programs and activities. Modern facilities such as state-of-the-art telescopes and miniature planetariums allow students to observe celestial bodies in detail and take part in simulations of various astronomical phenomena. This study uses observation and interview methods to collect data from activities organized by the observatory and interviews with students, teachers, and teaching staff at UniSZA. The educational programs offered, including educational visits, astronomy workshops, and astronomy classes, are designed to introduce the basic concepts of astronomy in an engaging and fun way. This article examines the contribution of UniSZA observatories in educating children about astronomy, the methods used to teach astronomy, and the impact of these programs on students' interests and understanding. Thus, this observatory is a centre for observing celestial bodies and an effective educational means for school children. This research also identifies the challenges faced and solutions that can be implemented to improve the effectiveness of existing programs. The UniSZA Observatory is expected to continue to create a younger generation interested in and understanding astronomy and encourage the development of science in Malaysia.

To cite this article:

I. Introduction

Astronomy is a science that studies celestial bodies and the phenomena of the universe. Education about astronomy in school children is often challenging because of its abstract nature and is difficult to understand without visual aids and direct experience. The UniSZA Observatory is here as a solution to introduce and teach astronomy [1] to school children interactively and interestingly.

Astronomy is unique as a science that can inspire a sense of wonder and natural curiosity in humans. Since ancient times, humans have been interested in the night sky and the phenomena they observe. According to [2] astronomy teaches students to think critically and analytically and encourages them to ask questions about their place in the universe. Thus, astronomy is important from a scientific point of view and an educational and cultural perspective.

However, astronomy is often a very small part of many school curricula. As [3], teaching astronomy can improve students' understanding of scientific concepts. Astronomy education can develop critical thinking and problem-solving skills, crucial in STEM (Science, Technology, Engineering, and Mathematics) education.

Although important, the teaching of astronomy faces various challenges. First, many concepts in astronomy are abstract and cannot be directly observed without the help of special tools. For example, phenomena such as star formation, galactic structure, and the universe's expansion require a deep understanding of physics and mathematics. According to [4], students often feel intimidated by this complexity. They may lose interest if the material is not delivered in an engaging and easy-to-understand manner.

In addition, the limited facilities in schools are also an obstacle. Not all schools have telescopes or access to planetariums, which can help students see celestial bodies firsthand. As stated by [5], visualization is essential in teaching complex scientific concepts, and a lack of access to these tools can hinder students' comprehension.

Observatory, with its state-of-the-art facilities and structured educational programs [6], can be a solution to address these challenges. The observatory allows students to observe celestial bodies firsthand and learn through practical experience. According to a report from [7] this hands-on experience can increase students' interest in science and deepen their understanding of scientific concepts.

The Observatory of Universiti Sultan Zainal Abidin (UniSZA) in Malaysia has become one of the main centres for teaching and observing astronomy. With various modern facilities, such as state-of-the-art telescopes and a mini planetarium, the observatory provides a means for students to observe celestial bodies and understand the basic concepts of astronomy. UniSZA utilizes this observatory as an educational institution to offer an interactive and immersive learning experience, which aims to increase students' interest in astronomy and deepen their understanding of the universe [8].

One of the flagship programs at the UniSZA Observatory is educational visits. The program is designed to provide students hands-on experience observing celestial bodies through telescopes. In each visit, students are invited to observe planets, stars, and other celestial objects while getting explanations from the teaching staff regarding the characteristics and phenomena observed. These educational visits improve students' understanding of astronomy and arouse their sense of amazement and curiosity towards science [3].

In addition to educational visits, the UniSZA Observatory also organizes astronomy workshops that involve students in practical activities. The workshop includes various activities, such as modelling the solar system, understanding the moon's phases, and learning the basic principles of operating telescopes. These practical activities are designed to help students understand scientific concepts through hands-on experience, which has proven effective in improving their understanding of astronomy [9]. The workshop also encourages active student engagement so they can learn in a more fun and immersive way.

Astronomy classes are another program offered by the UniSZA Observatory. This class explains astronomical phenomena in-depth, including planetary movements, star structures, and other celestial phenomena. Using an interactive and visual approach, astronomy classes help students understand complex concepts in a way that is easier to follow. According to [10], using visual methods in teaching astronomy is very effective in increasing students' understanding and interest in the topics being taught.

These programs' influence significantly increases students' interest and understanding of astronomy. The study results showed that students participating in these observatory programs increased their interest and knowledge of astronomy. The support of modern facilities and the interactive approach applied by the UniSZA Observatory have succeeded in creating an inspiring learning environment and supporting effective learning. By continuing to innovate and develop existing programs, the UniSZA Observatory is expected to continue to contribute significantly to astronomy education in Malaysia [4].

II. Method

This study uses a qualitative approach with observation and interview methods. Data were collected through direct observation of activities organized by the observatory and interviews with students, teachers, and teaching staff at UniSZA. Analyzing the programs used to help students understand astronomy. The results would be categorized into programs requiring student participation in these observatory programs.

III. Results and Discussion

The UniSZA observatory is a good example of an institution using its facilities to support astronomy education. With state-of-the-art telescopes, a mini planetarium, and an educational room equipped with teaching aids, this observatory can provide a comprehensive learning experience for students. The programs organized by the observatory, such as educational visits, astronomy workshops, and astronomy classes, are designed to make astronomy interesting and easy to understand. The UniSZA Observatory organizes a variety of educational programs designed specifically for school children, including:

Educational Visits

The educational visit program at the UniSZA Observatory is designed to provide students with hands-on experience in observing celestial bodies. According to [3], this hands-on experience is crucial in science learning because it helps students relate theories

to real observations. During this visit, students were invited to observe celestial bodies through telescopes and listen to explanations from teaching staff about the objects observed. This program improves students' understanding of celestial bodies and fosters their sense of wonder and curiosity. The program also helps children develop critical and analytical thinking skills. Through direct observation and practical activities, children learn to observe, analyze, and draw conclusions based on the collected data. This ability is very important in science education and can be applied in various areas of life [11].

Astronomy Workshop

The astronomy workshop at the UniSZA Observatory engages students in practical activities that help them understand the basic concepts of astronomy. For example, students can model the solar system, study the moon's phases, and understand the basic principles of operating telescopes. According to a study by [9], practical activities can improve students' understanding of scientific concepts because they can see firsthand how theory is applied in practice.

The workshop involved practical activities such as modeling the solar system, direct observation through a telescope, and simple experiments explaining astronomical phenomena. According to a study by [10], practical activities like this can increase students' understanding and interest in science because they can see firsthand how theory is applied in practice. The workshop is also designed to encourage active participation from children so that they can learn while playing and experiment.

Astronomy Classes

Astronomy classes organized by the UniSZA Observatory provide an in-depth explanation of various astronomical phenomena. This class covers the movement of planets, stars, and other celestial phenomena. These classes use an interactive and visual approach to help students understand complex concepts more easily and engagingly. According to a study by [10], using visual methods in astronomy teaching can increase students' understanding and interest.

The regular Children's Astronomy class covers basic topics such as the solar system, moon phases, stars, and planets, presented in an engaging and easy-to-understand way for children. Interactive teaching methods, such as solar system models, pictures, and videos, help children understand concepts that may be difficult to understand through text alone [9].

In addition, the observatory also provides training for science teachers to improve their understanding of astronomy and how to teach it. By providing adequate training, teachers can feel more confident and ready to teach astronomy, improving the quality of astronomy education in schools.

Impact of UniSZA Observatory Educational Program

The educational programs at the UniSZA Observatory have positively impacted students' interest in and understanding of astronomy. Observational studies and interviews

with students and teachers show that students who participate in these programs increase their interest and understanding of astronomy. According to the results of research conducted by the observatory, many students who were previously not interested in science become more enthusiastic after participating in these programs. The findings of [2] state that direct experience in astronomical observations can foster long-term interest in science.

The astronomy learning program conducted by the UniSZA Observatory has shown a significant positive impact on children's interest and understanding of astronomy. Based on the results of research conducted by the observatory, students who participated in these programs showed an increase in their interest and knowledge of astronomy. Children become more enthusiastic about science and more interested in learning more about astronomy.

Challenges and Solutions

Although the programs at the UniSZA Observatory have succeeded in increasing students' interest and understanding, several challenges need to be addressed. One is the limited time and number of participants in each visit session. To address these challenges, the observatory can expand the visit schedule and increase the number of telescopes available. In addition, developing digital learning materials can be a solution to reach more students more flexibly. According to [11], using digital technology in science education can expand students' access to learning resources and increase their engagement.

By continuing to innovate and develop existing facilities and programs, the UniSZA Observatory is expected to contribute significantly to astronomy education in Malaysia. This observatory functions as a centre for observing celestial bodies and is an effective educational means for schoolchildren. With the support of the government and the community, the observatory can play a key role in creating a younger generation interested in and understanding astronomy and encouraging the development of science in Malaysia.

IV. Conclusion

The Observatory of Universiti Sultan Zainal Abidin (UniSZA) is essential in teaching astronomy and celestial body observation to school children. This observatory has increased students' interest and understanding of astronomy through various interactive educational programs. By continuing to innovate and develop existing facilities and programs, the UniSZA observatory is expected to contribute significantly to astronomy education in Malaysia.

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