

# THE EFFECTIVENESS OF THE INTERNATIONAL OBSERVE THE MOON NIGHT (INOMN) ACTIVITY IN INCREASING STUDENT INTEREST AND COMMUNITY PARTICIPATION IN OBSERVING THE MOON.

Khairunnisa Nazwa B<sup>1\*</sup>  
Rizky Suci Ayunda<sup>2</sup>  
Muhammad Abdul Aziz<sup>3</sup>  
Ahmad Arrafif Hamdy<sup>4</sup>

<sup>1,2,3,4</sup>Universitas Muhammadiyah Sumatera Utara

\*Email: [nazwa.ac07042024@gmail.com](mailto:nazwa.ac07042024@gmail.com)

---

**Abstract:** *The International Observe the Moon Night (InOMN) is a global outreach program aimed at increasing public interest in astronomy through direct lunar observation. This study examines the effectiveness of the InOMN activity organized by the Astronomy Observatory of the University of Muhammadiyah North Sumatra (OIF UMSU), held on October 4, 2025, at Maimun Palace, Medan, in enhancing student interest and community participation in Moon observation. The activity involved collaboration with astronomy students and encouraged active interaction between participants and organizers. Data were collected from 26 students who attended the event and were analyzed using descriptive statistical methods, including frequency distribution tables, bar charts, pie charts, histograms, and ogive curves. The results show that the dominant score range was 43-45, obtained by six respondents, followed by the ranges of 40-42, 46-48, and 49-50 with four respondents each. Overall, 69.2% of respondents gave scores of 40 or above, indicating a generally positive assessment. The mean score of 42.1 reflects a good level of effectiveness, while the standard deviation of 5.65 suggests relatively stable responses among participants. Although several technical and facility-related aspects still require improvement, the findings indicate that InOMN was effective in fostering student interest and encouraging positive engagement from the community. This study highlights the role of OIF UMSU in supporting astronomy education and public understanding of celestial phenomena.*

**Keywords:** *International Observe the Moon Night (InOMN), astronomy education.*

---

## INTRODUCTION

Astronomy plays a significant role in science, culture, and religion, especially within Islamic civilization where observation of celestial bodies is deeply connected to religious practices such as determining prayer times, the Islamic calendar, and the qibla direction. Historically, Muslim scholars developed advanced observational techniques and astronomical tables to determine celestial positions with high precision, highlighting astronomy's essential role in daily life and religious observance (Saliba, 1994; King, 2004). Beyond religious

contexts, astronomy also contributes to broader scientific knowledge by fostering skills in observation, measurement, data interpretation, and critical reasoning, skills fundamental to scientific literacy and inquiry (Percy, 2014). Astronomy outreach activities play a key role in bridging scientific knowledge and society. Empowering learners through direct astronomical observation and interactive communication has been shown to increase public understanding and interest in science (Pompea & Russo, 2020; Zainon, 2025). Research indicates that immersive astronomy programs featuring hands-on engagement and community interaction can enhance motivation and deepen conceptual understanding compared to formal classroom instruction alone (Buxner et al., 2011; Zainon, 2025). Public observation events, in particular, translate abstract celestial concepts into meaningful experiences that spark curiosity and active participation across age groups.

In the Indonesian context, higher education institutions contribute strategically to astronomy education and outreach. For example, observatories such as Bosscha in Lembang conduct regular public engagement programs that include community visits, educational material distribution, and celestial observation events for informal learning opportunities (Observatorium Bosscha, 2025). The astronomy infrastructure also extends to regional observatories that integrate research, education, and community service under the tri-dharma of higher education (OIF UMSU, 2020). One prominent global outreach program is International Observe the Moon Night (InOMN), an annual event initiated by NASA designed to encourage people worldwide to observe and learn about the Moon through direct observation and scientific discussion (Bleacher et al., 2015; NASA, 2023). However, empirical studies evaluating how such initiatives influence student interest and public participation remain scarce. Based on this background, the present study aims to evaluate the effectiveness of the InOMN activity organized by the Astronomy Observatory of Universitas Muhammadiyah Sumatera Utara (OIF UMSU) in increasing student interest and community engagement in lunar observation. By analyzing participant responses using descriptive statistical methods, this research seeks to assess the extent to which the activity achieves its educational objectives and contributes to strengthening astronomy literacy.

## LITERATURE REVIEW

Astronomy outreach has been widely recognized as an effective approach to promoting scientific literacy and engaging the public with science. Astronomy inherently encourages curiosity and observational skills through direct interaction with celestial phenomena, making it suitable for both formal and informal educational programs (Percy, 2014; Zainon, 2025). Many studies show that direct involvement in observing celestial objects increases student motivation and enhances comprehension compared to classroom-only instruction. Immersive experiences such as telescope observations or community star parties provide meaningful contexts for learners to connect scientific concepts with real observations. International outreach programs like InOMN exemplify how astronomy events can enhance public engagement. InOMN provides an accessible platform for learners to participate in lunar observation, helping them to connect scientific data with cultural and historical perspectives (Bleacher et al., 2015). Evaluating large outreach events like InOMN involves unique challenges due to diverse participation and informal event settings, but evidence suggests they can foster interest and awareness in scientific disciplines (Buxner et al., 2011).

Astronomy education research also emphasizes the broader impact of outreach on STEM engagement. Studies have found that astronomy programs can serve as “gateway experiences” that inspire learners to pursue additional science learning and careers in STEM fields (Simon, 2025). Community initiatives, such as astronomy clubs and participatory outreach models,

demonstrate how sustained interaction with astronomical activities can strengthen scientific communication and public understanding (Toyib et al., 2024). Within Indonesia, astronomy outreach through amateur and institution-based programs is growing, highlighting the importance of evaluating how these activities contribute to science literacy and community participation. Therefore, based on global research and local initiatives, astronomy outreach events like InOMN hold significant potential to enhance student interest and public engagement in astronomy. Yet, localized evaluations are needed to measure their specific impacts within Indonesian communities, motivating the present study to assess the effectiveness of the InOMN activity conducted by OIF UMSU.

## **METHOD**

This study employed a descriptive quantitative research design with a survey approach. The research aimed to evaluate the effectiveness of the International Observe the Moon Night (InOMN) activity organized by the Astronomy Observatory of Universitas Muhammadiyah Sumatera Utara (OIF UMSU) in increasing student interest and public participation in Moon observation. The population of this study consisted of students who participated in the InOMN activity held on October 4, 2025, at Maimun Palace, Medan. From this population, 26 students were selected as respondents based on their active involvement in the activity and willingness to complete the questionnaire.

Data were collected using a structured questionnaire that measured participants' perceptions of the activity's effectiveness. The questionnaire included statements related to interest, engagement, understanding of astronomical concepts, and overall satisfaction. Each statement was scored using a Likert-scale system. The collected data were analyzed using descriptive statistical techniques. Frequency distribution tables were generated to summarize the scores, while visualizations including bar charts, dot diagrams, pie charts, histograms, and ogive curves were used to illustrate the distribution of responses. Measures of central tendency and dispersion, such as mean and standard deviation, were also calculated to provide a clear overview of the overall effectiveness of the activity.

## **RESULT AND DISCUSSION**

The International Observe the Moon Night (InOMN) activity organized by the Astronomy Observatory of Universitas Muhammadiyah Sumatera Utara (OIF UMSU) was conducted on October 4, 2025, at Maimun Palace, Medan. This location was intentionally chosen due to its historical and cultural significance, which helped create an engaging atmosphere for public astronomy outreach. The activity was carried out in collaboration with NASA and supported by students of the Department of Ilmu Falak, who played an active role as facilitators during the event.

Before presenting the statistical analysis, visual documentation of the InOMN activity is provided to illustrate the real conditions of the event. The photographs show participants observing the Moon through telescopes, students assisting visitors, and the general atmosphere surrounding the observation area. These images demonstrate active public engagement, orderly participation, and direct interaction between students and the community. The presence of long queues and enthusiastic responses from participants indicates a high level of interest and curiosity toward the Moon observation activity. Figure 1 presents the documentation of the International Observe the Moon Night (InOMN) activity.



**Figure 1. Documentation of the InOMN Activity**

The images show students actively participating in Moon observation, using telescopes and other observational instruments provided during the activity. The documentation captures various moments, including students recording observations, interacting with instructors, and engaging in discussions about celestial phenomena.

These visual records highlight the level of enthusiasm and involvement of students, indicating a high degree of engagement. Overall, the documentation provides a qualitative perspective that complements the quantitative data collected through evaluation scores. Based on the questionnaire data, the results are summarized in a frequency distribution table to provide a clearer overview of student responses. The table shows that the dominant score range is 43-45, obtained by six respondents. Other high score ranges, such as 40-42, 46-48, and 49-50, were each selected by four respondents. Lower score ranges were chosen by fewer respondents, indicating that only a small number of students provided moderate evaluations. Overall, the frequency distribution suggests that most students perceived the InOMN activity positively.

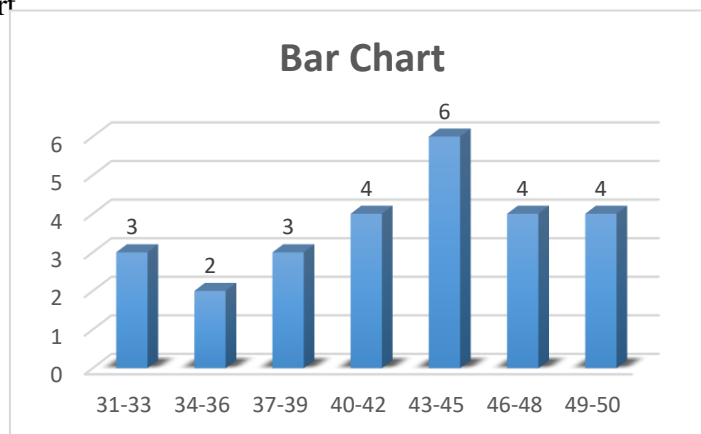
Table 1 shows the distribution of student evaluation scores of the InOMN activity in the form of a frequency table

NILAI DATA	BANYAK MAHASISWA (fi)
31-33	3
34-36	2
37-39	3
40-42	4
43-45	6
46-48	4
49-50	4
JUMLAH	26

**Table 1: Frequency Distribution of Student Scores**

The table reveals that the majority of students achieved scores in the higher intervals, particularly between 43 and 50. Lower score intervals are represented by only a few respondents, suggesting that negative or moderate perceptions were minimal. By summarizing the number of students in each score category, the frequency table provides an initial understanding of overall performance and student satisfaction. This foundation will be further clarified through visual representations in subsequent charts. The frequency distribution is further explained through a bar chart, which visually represents the number of respondents in each score interval. The tallest bar appears in the 43-45 interval, confirming that this range has the highest frequency. The bars representing higher score intervals are generally taller than those of lower intervals, showing a clear tendency toward positive evaluations. This visualization strengthens the interpretation that student responses are concentrated in higher score categories.

Figure 2 illustrates the distribution of student evaluation scores of the InOMN activity in the form of a bar chart

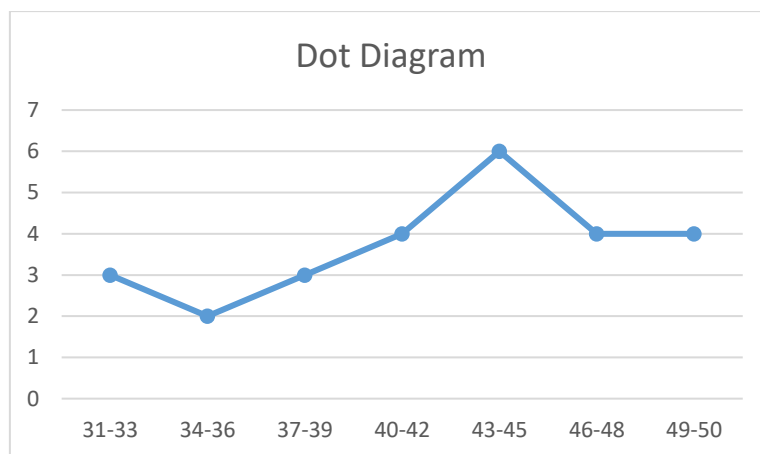


**Figure 2. Bar Chart of Student Evaluation Scores**

The bar chart clearly shows that the highest frequency of responses is found in the 43–45 score interval. This interval has the tallest bar, indicating that more students selected this range compared to other score categories. High score intervals such as 40–42, 46–48, and 49–50 also display relatively high frequencies, suggesting a generally positive evaluation of the activity. In contrast, lower score intervals are represented by shorter bars, which means only a small number of respondents gave moderate scores. This pattern demonstrates that students' assessments are concentrated in the higher score ranges. Overall, the bar chart supports the

findings from the frequency table by visually confirming that the majority of students perceived the InOMN activity positively. In addition, the dot diagram presents the distribution of individual student scores in more detail. Most data points are clustered in the higher score ranges, while only a few points appear in the lower ranges. This pattern indicates that student perceptions of the InOMN activity are relatively consistent and predominantly positive. The dot diagram helps illustrate the spread of scores without grouping them into intervals.

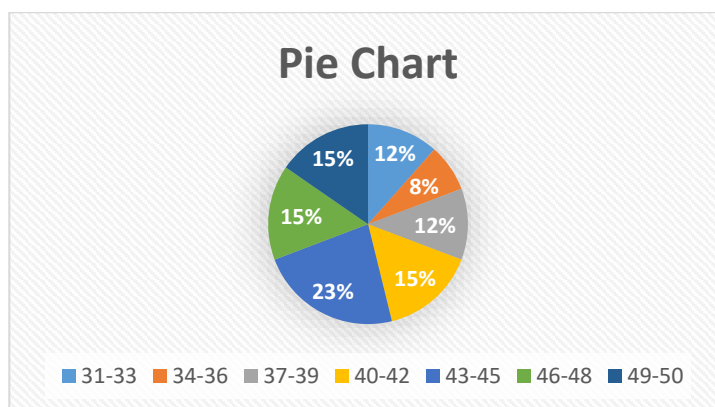
Figure 3 presents the distribution of individual student scores using a dot diagram.



**Figure 3. Dot Diagram of Student Scores**

The dot diagram shows that most data points are clustered within the higher score ranges, particularly between 43 and 50. Only a limited number of points appear at lower score values. This indicates that most respondents provided high evaluations, while relatively few students expressed moderate perceptions. Additionally, the clustering of points suggests consistency in students' responses. There are no extreme outliers that significantly differ from the general trend. This consistency reflects that students shared similar positive experiences during the InOMN activity, strengthening the reliability of the collected data. The distribution of scores is also presented in the form of a pie chart, which shows the proportion of respondents in each score category. The largest portion of the chart corresponds to the 43-45 score range, followed by other high score ranges. Lower score categories occupy smaller portions of the chart. This percentage-based presentation confirms that positive evaluations dominate the overall responses.

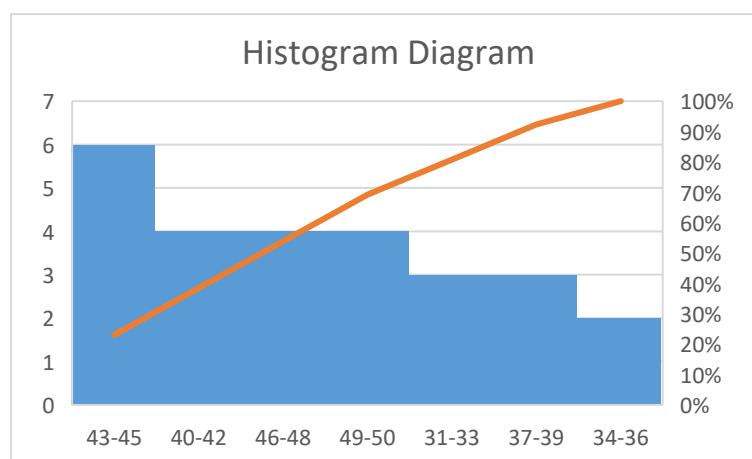
Figure 4 shows the proportion of student scores presented in a pie chart.



**Figure 4. Pie Chart of Student Evaluation Scores**

The largest segment of the pie chart corresponds to the 43-45 score range, indicating that this category represents the highest percentage of respondents. Other high score categories also occupy substantial portions of the chart, while lower score ranges appear as much smaller segments. This proportional distribution confirms that positive evaluations dominate the overall assessment. The pie chart complements the bar chart and frequency table by emphasizing, in percentage terms, that most students rated the InOMN activity favorably. Furthermore, the histogram illustrates the overall pattern of score distribution. The tallest bar is located in the 43-45 interval, indicating the highest frequency of responses. The histogram shows that most scores are concentrated in the higher intervals, with fewer responses in the lower ranges. This pattern suggests that student evaluations of the InOMN activity tend to be skewed toward higher values.

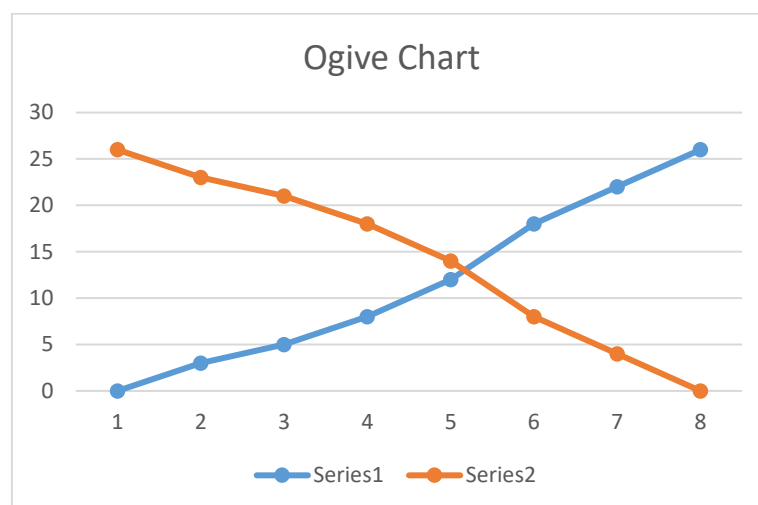
Figure 5 displays the distribution of student scores using a histogram.



**Figure 5. Histogram of Student Scores**

The histogram shows that the tallest bar appears in the 43–45 interval, indicating the highest frequency of responses. Most scores are concentrated in the higher intervals, while lower score intervals have fewer observations. This pattern suggests a distribution that is skewed toward higher values. The dominance of high scores indicates that students generally had positive perceptions of the InOMN activity, with minimal dissatisfaction. The histogram provides a clear visual confirmation of the overall trend observed in the frequency table and other charts. As the final graphical analysis, the ogive curve presents the cumulative frequency of student scores. The curve rises gradually at lower score intervals and increases sharply toward higher intervals. This indicates that the majority of respondents achieved scores above the average level. The ogive curve reinforces the conclusion that most students evaluated the InOMN activity positively and considered it effective in increasing their interest in Moon observation.

Figure 6 illustrates the cumulative frequency of student scores using an ogive curve.



**Figure 6. Ogive Curve of Student Scores**

The ogive curve increases gradually at lower score intervals and rises sharply at higher intervals. This indicates that a large proportion of respondents achieved scores above the average level. The steep rise of the curve toward the upper score ranges confirms that most students evaluated the InOMN activity positively. This cumulative pattern reinforces the conclusion that the activity was effective in enhancing student interest and engagement in Moon observation.

## CONCLUSION

Based on the analysis of the InOMN activity, it is clear that students' responses were predominantly positive. Most scores are clustered in the upper range between 43 and 50, indicating that the majority of participants evaluated the activity favorably. This pattern reflects strong engagement, high satisfaction, and a consistent positive perception across the student cohort. The cumulative trends and proportional dominance of higher scores further emphasize that most students achieved above-average ratings. This consistent pattern demonstrates that the activity effectively fostered student interest in lunar observation and encouraged active participation, confirming that the educational objectives of InOMN were successfully met.

These findings align with academic guidance on research conclusions, which emphasize synthesizing results and highlighting their significance rather than merely repeating data (Adobe Express, 2025; ITS Academic Writing Center, 2025). For future research, it would be valuable to incorporate qualitative insights, such as interviews or reflective feedback, to better understand which aspects of the activity most influenced student perceptions. Overall, the study shows that structured observational activities like InOMN can meaningfully enhance learning experiences and student engagement in astronomy education.

## REFERENCES

- Bleacher, L. V., Jones, A. J. P., Shaner, A., Day, B., Buxner, S., & Wegner, M. (2015). International Observe the Moon Night: An effective model for public engagement with NASA content. NASA Technical Reports Server (NTRS). Diakses dari <https://ntrs.nasa.gov>

- Buxner, S. R., Wenger, M., Jones, A. J. P., Hsu, B. C., & Hessen, K. (2011). The challenge of evaluating large outreach events and recommendations from evaluation efforts. 22nd Lunar and Planetary Science Conference. Diakses dari <https://www.lpi.usra.edu>
- Dang, L., & Russo, P. (2015). How astronomers view education and public outreach: An exploratory study. arXiv preprint. Diakses dari <https://arxiv.org>
- Farahi, A., Gupta, R. R., Krawiec, C., Plazas, A. A., & Wolf, R. C. (2018). Astronomers' and physicists' attitudes toward education & public outreach: A programmatic study with the Dark Energy Survey. arXiv preprint. Diakses dari <https://arxiv.org>
- King, D. A. (2004). *The Astronomy of the Mamluks*. Brill.
- NASA. (2023). International Observe the Moon Night. NASA Goddard Space Flight Center. Diakses dari <https://www.nasa.gov>
- Observatorium Bosscha. (2025). Penjangkauan publik dan materi edukasi astronomi. Bosscha Outreach Programs. Diakses dari <https://bosscha.itb.ac.id>
- OIF UMSU. (2020). Empat observatorium di Kawasan Sumatera. OIF Universitas Muhammadiyah Sumatera Utara.
- Percy, J. R. (2014). *Astronomy Education: An International Perspective*. Springer.
- Pompea, S. M., & Russo, P. (2020). Astronomers engaging with the education ecosystem: A best-evidence synthesis. *Annual Review of Astronomy and Astrophysics*, 58, 313–361. Diakses dari <https://www.annualreviews.org>
- Pujianto, P., Husna, S., Azzahra, T. R., Setiaji, B., Aziz, K. N., Maharani, D. P., & Nugroho, K. A. (2025). Network astronomy for school education based on ethnoastronomy for astronomy learning: A literature review. *Jurnal Inovasi Pendidikan IPA*. Diakses dari <https://jurnal.uny.ac.id>
- Saliba, G. (1994). *Islamic Science and the Making of the European Renaissance*. MIT Press.
- Toyib, M. (2024). Enhancing public engagement and science communication through participatory astronomy: Surabaya Astronomy Club (SAC) practice insight. *JCOM: Journal of Science Communication*. Diakses dari <https://jcom.sissa.it>
- Toyib, M., Pramesti, G. A., & Herachwati, N. (2024). Enhancing public engagement and science communication through participatory astronomy: Insights from the Surabaya Astronomy Club's star party model. *JCOM: Journal of Science Communication*. Diakses dari <https://jcom.sissa.it>
- Zainon, O. (2025). Fostering STEM interests through astronomy outreach initiatives in secondary education. *International Journal of Research and Innovation in Social Science*. Diakses dari <https://rsis-international.org>