ANALYSIS OF ROLE OF ISLAMIC ASTRONOMY STUDENT ASSOCIATION IN FACILITATING ACADEMIC AND NON-ACADEMIC STUDENT DEVELOPMENT WITHIN FIELD OF ISLAMIC ASTRONOMY

Sandika Alfalaah[1]
Nasrul Azmi[2]
Aldi Muslim[3]
Wardatul Khairiah Hidayani[4]

[1,2,3,4]Universitas Muhammadiyah Sumatera Utara
alfalaahsandika53@gmail.com

Abstract: *The Astronomy Student Association (HMJ) is a student organization at the department level that serves as a forum for student academic and non-academic development. This study aims to analyze student perceptions of the effectiveness of the HMJ's role in supporting students' scientific competence and social skills. Data were collected through questionnaires distributed to 16 respondents and analyzed using frequency distribution tables, pie charts, mean values, and standard deviations. The results showed that the majority of students gave ratings in the range of 33–37 (37%), followed by a range of 38–42 (25%), indicating that HMJ is considered quite good in carrying out its functions. The mean value of 37.8 indicates a tendency for positive perceptions of HMJ's contributions, especially in hisab rukyat training activities, seminars, organizational development, and socio-religious programs. However, the standard deviation value of 6.3 indicates a fairly high variation in perceptions among members, especially regarding the distribution of benefits from activities. Overall, the Astronomy Student Association (HMJ Ilmu Falak) is considered to have played a fairly effective role as a facilitator of students' academic and non-academic development, although program optimization is still needed so that the benefits are more evenly distributed.*

Keywords: *Astronomy Student Association, Academic Development, Non-Academic Development*

Introduction

Student organizations play a significant role in developing students' civic skills and preparing them to engage with society (Kosasih 2016). The influence of student organizations on student achievement is an important topic in higher education studies (Arumdani 2025). Student organizations function not only as a means of self-development but also as a medium for enhancing academic and non-academic skills. Students are part of the academic community within a broader social dimension. In addition to being members of the academic sphere (scientific dimension), they also belong to the youth community (social dimension), which carries responsibilities and challenges for the future (Oviyanti n.d.). This is especially relevant in fields that require both theoretical understanding and practical skills, such as astronomy (ilmu falak). Participants' needs for self-development naturally differ; some seek academic and non-academic achievements, while others do not prioritize academic success (Luthfia and Triono Ali Mustofa 2024). Among the various branches of knowledge that developed within Islamic civilization, astronomy holds a strategic position. Historically, the rapid development of astronomy in the Islamic world reflects the efforts of Muslim scholars to advance science and

technology. It is not surprising that through this discipline, Islamic civilization achieved remarkable accomplishments (Luthfi 2022). However, these perspectives share a common understanding that astronomy cannot stand alone in addressing the issues within its scope. Advances in science and technology whether directly related to Islamic studies or no have made invaluable contributions to its development (Muthmainnah 2016). The Student Association of the Department of Astronomy (HMJ Ilmu Falak) serves as an institutional platform that facilitates scientific learning, skill enhancement, leadership development, and social engagement.

In facing the challenges of globalization, education must be able to adapt relevant methods and approaches (Berlianti, Abid, and Ruby 2024). Although the Student Association of the Astronomy Department (HMJ) holds a strategic role, the effectiveness of its programs as perceived by students may vary depending on individual experiences, levels of participation, and access to organizational resources. The importance of integrating astronomy into education is also reflected in efforts to develop a curriculum that is responsive to contemporary needs. Therefore, understanding students' perceptions becomes essential for evaluating the real impact of HMJ activities and identifying aspects that require improvement. Collaboration between schools and the community can create a richer learning environment that supports students' character development (Berlianti et al. 2024). This study aims to analyze students' assessments of HMJ's effectiveness in facilitating their academic and non-academic development. By evaluating responses from 16 participants through frequency distribution analysis, pie charts, mean scores, and standard deviation, this research provides an overview of collective student perspectives as well as the variation in their evaluations. The findings of this study are expected to serve as a basis for optimizing HMJ programs so that their benefits can be felt more evenly and effectively by all members.

As academic and non-academic needs continue to evolve due to technological advancements, curriculum development, and increasing demands for experiential learning, student organizations must continuously adjust their strategies and program designs. Students' academic achievement is influenced by two factors, namely internal and external factors (Nugroho, Santoso, and Murtopo 2023). The various academic demands that students must fulfill often lead them to experience academic stress. Students who are unable to adapt to these conditions tend to experience heightened stress levels (Harahap, Harahap, and Harahap 2020). By identifying activities considered most beneficial as well as aspects requiring improvement, the HMJ can formulate more targeted initiatives that align with students' needs and institutional goals. Some students believe that participation in student organizations is important for personal development, while others feel that organizational involvement may delay their academic progress or even regard it as unnecessary. This indicates a discrepancy between theoretical expectations and the reality observed in the field (Kosasih 2016). This continuous improvement process is essential to ensure that the organization remains relevant, effective, and capable of supporting holistic student development in the field of astronomy.

Literature Review

Student organizations play an important role in supporting the academic and personal development of students in higher education environments. The explanation above illustrates that the presence of student organizations in universities is essential for student self-development. This is reinforced by the Republic of Indonesia Law Number 12 of 2012 on Higher Education, Article 77, which regulates student organizations. These findings emphasize the importance of student involvement in supporting academic development. In addition to academic development, student organizations also contribute significantly to non-academic growth, particularly in leadership, teamwork, and social communication. According to an article from Kompas.com,

student achievement potential can be developed through various activities, one of which is participation in student organizations. Organizational activities allow students to develop their talents, interests, connections, and soft skills such as adaptability and creativity (Hakim1, Raisian2, and Molfi 2023). Leadership roles within organizations provide opportunities for students to cultivate responsibility, decision-making abilities, and organizational management skills. These non-academic competencies are highly important in preparing students to face professional and social environments beyond the campus.

In the context of astronomy (ilmu falak), student organizations hold a unique role because this field requires mastery of scientific knowledge as well as an understanding of Islamic legal principles related to celestial observation. Previous studies show that integrating astronomy into education can also support the development of broader scientific literacy. Scientific literacy not only includes understanding scientific concepts but also the ability to apply that knowledge in everyday life (Berlianti et al. 2024). Within the astronomy student association, the organization often serves as a bridge between theoretical curriculum and practical fieldwork, enabling students to participate in activities such as moon sighting (rukyatul hilal), astronomical simulations, and public education. These activities strengthen the practical relevance of astronomy while simultaneously enhancing students' social engagement.

Furthermore, studies on organizational effectiveness emphasize the importance of evaluating members' perceptions to determine whether the implemented programs truly achieve their objectives. Kosasih (2016) states that students' views regarding organizations vary widely. Several guiding questions can be used, such as those related to interest, benefits, positive and negative impacts, the perceived importance of the organization, and its relevance to students' academic activities. If students' perceptions show variations in the distribution of benefits, this may indicate the need for program optimization. Such evaluations help organizations improve their strategies, allocate resources effectively, and design activities that align with members' needs. Therefore, the literature shows that continuous assessment of student perceptions is essential for enhancing organizational performance, including within the HMJ Ilmu Falak.

Method

This study employs a quantitative descriptive research design aimed at analyzing students' perceptions regarding the effectiveness of the Astronomy Department Student Association (HMJ Ilmu Falak) in facilitating academic and non-academic development. The study population consists of active students in the Astronomy study program, and a total of 16 respondents were selected using a simple random sampling technique. Data were collected through a structured questionnaire developed based on indicators related to academic support, organizational development, training activities, and socio-religious programs. The questionnaire utilized a Likert scale to measure the level of agreement and students' perceptions of the HMJ's performance.

The collected data were processed using descriptive statistical techniques. A frequency distribution table was used to group score ranges and identify the dominant categories of student perceptions. A pie chart was employed to visualize the distribution of student responses for clearer interpretation. In addition, the mean value was calculated to determine the general trend of student perceptions, while the standard deviation was used to assess the level of variation and consistency among respondents. The results of this analysis serve as a basis for evaluating the effectiveness of the HMJ and identifying aspects that require further improvement.

Result and Discusion

Student organizations serve as an appropriate platform for fostering professionalism. Within an organization, each member has the responsibility to carry out work programs that have been structured as objectives for the organization's operation. In this context, the Astronomy Department Student Association (HMJ Ilmu Falak) is part of a departmental-level student organization that functions as a forum for self-development and as an activity center for astronomy students. As a discipline, Ilmu Falak or astronomy does not merely discuss celestial objects such as stars and planets, but is also closely related to human efforts to understand the order of the universe and their position within it. In the context of Islam, Ilmu Falak has significant practical functions, such as determining prayer times and the direction of the qibla (Sinaga et al. 2025). HMJ Ilmu Falak exists to encourage students not only to understand theoretical aspects, but also to apply their knowledge in academic settings and in community engagement.

In its implementation, the HMJ Ilmu Falak carries several important functions. First, the academic function, which includes organizing moon-sighting (rukyat hilal) training, calculation (hisab) workshops, qibla direction measurements in various mosques, Islamic astronomy seminars, and scientific discussions that support the development of students' expertise in astronomy. In the development of higher education in the digital era, the ability to write academic texts is one of the key skills students must possess (Nainggolan, Pasaribu, and Sembiring 2025). Second, the non-academic function, in which HMJ serves as a bridge between students and the department in communicating needs, feedback, or ideas to improve the quality of learning and practical facilities such as observatories or astronomical instruments. Various activities conducted outside the classroom such as organizational activities, sports, arts, and leadership programs provide students with opportunities to further sharpen their personal abilities (Indeks et al. 2025). In addition, HMJ also plays a role in developing students' interests and talents. Interest essentially refers to a desire that arises internally within an individual to engage in learning activities without external pressure or coercion (Burhan 2011). For example, HMJ organizes qibla direction competitions, calculation (hisab) contests, or recreational and educational sky-observation activities to support these interests.

Figure 1. Academic and Non-Academic Activities of the HMJ Ilmu Falak

Thus, to analyze the role of the HMJ Ilmu Falak in the development of Ilmu Falak students, accurate and well-structured data are required. The data are collected and presented through several forms of descriptive statistical analysis, namely: frequency distribution tables, pie charts, mean values, and standard deviations.

Table 1. Student Satisfaction Data – Ilmu Falak (Islamic Astronomy) Students

Score	Number of Students
28-32	3
33-37	6
38-42	4
43-47	1
48-52	2
Total	16

Based on the questionnaire distributed to members of the HMJ, data were obtained regarding students' perceptions of the organization's role in carrying out its functions. The scores given by the respondents were grouped into five ranges: 28–32, 33–37, 38–42, 43–47, and 48–52. Out of a total of 16 respondents, the majority assigned scores within the range of 33–37, with 6 students falling into this category. This indicates that most members perceive the role of the HMJ to be fairly good, although it has not yet reached its maximum potential. Academic ability refers to a set of capacities a person possesses in the learning process, including subject-matter knowledge, broad insights, language skills, and discussion skills. Therefore, academic ability can be interpreted as an individual's capacity to carry out learning activities effectively (Nugroho et al. 2023). As the function of the HMJ is not only focused on academic aspects but also on non-academic development, the organization aims to equip students with essential skills so that they are capable and prepared to meet workplace demands and contribute effectively within society.

The next score group with a relatively dominant distribution falls within the range of 38–42, with a total of 4 students. This assessment indicates that a portion of the members provided higher scores and felt the benefits of the HMJ's role in both academic and non-academic activities. Meanwhile, 3 students gave scores in the 28–32 range, suggesting that some members perceive the HMJ's role as not yet optimal or that certain aspects still need improvement in order to enhance the effectiveness of the organization's services and functions. In the higher score ranges 43–47 and 48–52 the number of respondents is 1 and 2 students, respectively. Although these numbers are small, they reflect members who believe that the HMJ has performed its role well, or even very well. Academic achievement is measured through course grades, while non-

academic achievement is assessed through various extracurricular activities and character development. Therefore, the management of both academic and non-academic achievements is crucial (Dinasyamin 2024). The positive assessments from this small group can serve as an indicator that certain programs or activities have been effective, even though they may not yet be perceived by all members. To provide a clearer visual representation, these data were then presented in the form of a pie chart.

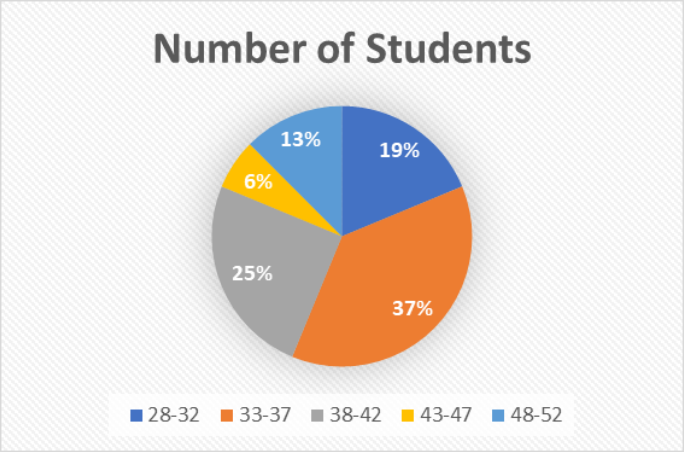

Figure 2. Pie Chart of Analysis Data on the role of the HMJ Ilmu Falak toward Ilmu Falak students

The data presented in the table and visualized through the pie chart indicate that the majority of HMJ members' perceptions fall within the "fair to good" category. The score range of 33–37 represents the largest group, accounting for 37% of respondents. This suggests that the HMJ is generally perceived as sufficiently effective in supporting both academic and non-academic development among students. Meanwhile, 25% of respondents fall within the 38–42 range, indicating a group that experiences greater benefits, particularly in areas such as teamwork, communication, and leadership skills. On the other hand, 19% of respondents assigned scores in the 28–32 range, implying that some students believe the performance of the HMJ is still less than optimal. This group may not yet feel the full impact of the work programs or guidance provided by the organization. Nevertheless, 6% of respondents fall within the 43–47 range and 13% within the 48–52 range, demonstrating that a portion of students express high appreciation for several HMJ programs that they perceive as delivering significant benefits, particularly in enhancing soft skills and organizational experience. When linked to the broader objectives of higher education institutions, the data suggests that the HMJ plays a meaningful role in facilitating students not only in terms of academic knowledge but also in character formation and social awareness. Overall, both the table and the pie chart illustrate that the HMJ's role is functioning well, though improvements are still needed. Enhancing program optimization and expanding the reach of activities would help ensure that the benefits are experienced more evenly across all members. Following the presentation of the pie chart, which shows the distribution of student assessments, the analysis continues with the calculation of the mean to determine the central tendency of the scores quantitatively.

Table 2. Mean of Analysis Data on the role of the HMJ Ilmu Falak toward Ilmu Falak students

Student scores	fi	xi	fi.xi
28-32	3	30	90
33-37	6	35	210

38-42	4	40	160
43-47	1	45	45
48-52	2	50	100
Total	16	200	605

Mean = 605/16 = 37,8

The calculation of the mean score from the overall assessments provided by HMJ members shows an average value of 37.8. This score falls within the 33–37 range and is slightly approaching the 38–42 range, which indicates that, in general, students' perceptions of the HMJ's role are at a moderately good level, trending toward a good category. This finding aligns with the distribution presented in both the frequency table and the pie chart, where the 33–37 category is the most dominant with 37% of respondents, followed by the 38–42 category with 25%. The average score of 37.8 suggests that most students perceive the HMJ as having made a fairly significant contribution in providing them with both academic and non-academic skills. This includes technical competencies, involvement in scientific activities, as well as the development of soft skills such as communication, teamwork, and leadership—skills that are essential for future professional and social engagement.

However, when connected to the presence of respondents who assigned lower scores within the 28–32 range (19% of the total respondents), this mean value also indicates that there are still students who feel that the HMJ's role has not been fully optimized. This gap serves as an important input for the HMJ to conduct a more in-depth evaluation of programs whose impact may not yet be evenly distributed among members. Meanwhile, the presence of a small number of students who gave higher scores in the 43–47 and 48–52 ranges shows that there are certain activities or experiences within the HMJ that are perceived as highly beneficial by specific groups of students.

Finally, the data are presented in the form of Standard Deviation. After obtaining the mean value that reflects the general tendency of students' perceptions toward the role of the HMJ Ilmu Falak, the analysis proceeds by calculating the Standard Deviation to determine the extent to which these perceptions vary among respondents. While the mean represents the average score, the Standard Deviation provides essential information regarding the level of dispersion or diversity in the students' assessments. In other words, the Standard Deviation enables the researcher to understand whether students' perceptions tend to be relatively uniform or highly varied. Presenting the results in terms of Standard Deviation is an important step in completing the analysis, as it offers a more comprehensive picture of the consistency of students' evaluations regarding the effectiveness of the HMJ in carrying out its academic and non-academic functions.

$$= \frac{\sqrt{3(30-37{,}8)^2 + 6(35-37{,}8)^2 + 4(40-37{,}8)^2 + 1(45-37{,}8)^2 + 2(50-37{,}8}}{16-1}$$

$$S = \frac{\sqrt{598{,}28}}{15} = \sqrt{39{,}8} = 6{,}3$$

Thus, the Standard Deviation is **6.3**.

Although the mean score of 37.8 indicates a generally favorable perception among HMJ members, the standard deviation value of 6.3 reveals a considerable degree of variation in students' assessments. This number reflects that the members' opinions are not homogeneous; some students assigned low scores (in the 28–32 range), while others gave high scores (in the 48–52 range). This disparity suggests that not all members experience the benefits of the HMJ equally. Several factors—such as level of participation, access to information, and individual

differences in needs—may contribute to this wide distribution of responses. Nevertheless, this variation can serve as important evaluative feedback for the HMJ. Programs that receive higher ratings can be expanded so that their positive impact reaches a larger number of members, while aspects that receive lower scores need improvement, whether in terms of communication, program relevance, or service innovation. Thus, the combination of a mean score of 37.8 and a standard deviation of 6.3 indicates that although the HMJ's role is generally good, there remains a need for improving the distribution and equity of program benefits so that students' positive perceptions can increase more consistently in the future.

Conclusion

Based on the questionnaire results from 16 respondents, it can be concluded that the HMJ Ilmu Falak plays a reasonably effective role in supporting the academic and non-academic development of students. The majority of assessments fall within the ranges of 33–37 (37%) and 38–42 (25%), further reinforced by a mean score of 37.8, indicating that overall perceptions are within the "good" category. Programs such as hisab–rukyat training, seminars, organizational development activities, and socio-religious programs are perceived to provide tangible benefits for enhancing students' competencies. However, the standard deviation value of 6.3 shows a relatively high degree of variation in the assessments, suggesting that the benefits of these activities are not yet felt equally by all members. This indicates the need for further evaluation related to information dissemination, student engagement, and program relevance. Overall, the HMJ Ilmu Falak has fulfilled its functions well, but it still needs to optimize its programs so that their impact becomes more evenly distributed and more effective in supporting students' academic, social, and professional development.

References

Arumdani, Alya Leci. 2025. "Strategi Organisasi Dalam Meningkatkan Prestasi (Akademik Dan Non- Akademik) Mahasiswa." *Jurnal Penelitian Ilmu-Ilmu Sosial* 3(2):214–23.

Berlianti, Dessy Fitria, Ashfa Al Abid, and Arcivid Chorynia Ruby. 2024. "Relevansi Ilmu Falak Dalam Pendidikan Globalisasi Pada Pengembangan Kurikulum Berbasis Literasi Sains." 7:1861–64.

Burhan. 2011. "Meningkatkan Minat Dan Pemahaman Mahasiswa Pada Mata Kuliah Ilmu Falak Melalui Penerapan Pembelajaran Eksperimen Bebas." *Tarbiyah* 27–46.

Dinasyamin, Arini. 2024. "MANAJEMEN PESERTA DIDK UNTUK PENINGKATAN PRESTASI AKADEMIK DAN NON AKADEMIK PESERTA DIDIK DI SEKOLAH MENENGAH PERTAMA ISLAM TERPADU INSAN PERMATA MALANG."

Hakim[1], Gani, Azriel Raisian[2], and Isaac Ibrahim Molfi. 2023. "Peran Organisasi Mahasiswa Dalam Mengembangkan Potensi Non-Akademik Di Universitas Muhammadiyah Jakarta." *Triwikrama: Jurnal Multidisiplin Ilmu Sosial* 2(12):2024–55.

Harahap, Ade Chita Putri, Dinda Permatasari Harahap, and Samsul Rivai Harahap. 2020. "Analisis Tingkat Stres Akademik Pada Mahasiswa Selama Pembelajaran Jarak Jauh Dimasa Covid-19." *Biblio Couns : Jurnal Kajian Konseling Dan Pendidikan* 3(1):10–14. doi:10.30596/bibliocouns.v3i1.4804.

Indeks, Terhadap, Prestasi Kumulatif, I. P. K. Mahasiswa, and P. K. N. Stan. 2025. "PENGARUH PENGALAMAN PRESTASI NON-AKADEMIK." 5(4):420–28.

Kosasih. 2016. "Peranan Organisasi Kemahasiswaan Dalam." *Pendidikan Ilmu Sosial* 25(2):64–74.

Luthfi, Ahmad. 2022. "MENGENAL SEJARAH DAN PERKEMBANGAN ILMU FALAK." *Al-Mizan : Jurnal Ekonomi Syariah* 5(II):18–27. doi:10.54459/almizan.v5iii.453.

Luthfia, Hasna Ukhti, and Triono Ali Mustofa. 2024. "Upaya Meningkatkan Prestasi Akademik Dan Non-Akademik Peserta Didik Melalui Manajemen Kesiswaan Di SMA Al-Islam 1 Surakarta." *Didaktika: Jurnal Kependidikan* 13(2):1609–16. doi:10.58230/27454312.622.

Muthmainnah. 2016. "Falak Dan Ilmu Yang Berkaitan Dengannya." *Ulumuddin : Jurnal Ilmu-Ilmu Keislaman: Jurnal Ilmu-Ilmu Keislaman* 6(1):49–59.

Nainggolan, Thesalonika, Putri Sairamaida Pasaribu, and Alfredo Sembiring. 2025. "Membangun Kemampuan Memahami Teks Akademik Dan Non Akademik Di Era Digital : Studi Literature." 9.

Nugroho, Bangkit Indarmawan, Nugroho Adhi Santoso, and Aang Alim Murtopo. 2023. "Prediksi Kemampuan Akademik Mahasiswa Dengan Metode Support Vector Machine." *Remik* 7(1):177–88. doi:10.33395/remik.v7i1.12010.

Oviyanti, Fitri. n.d. 2016 "PERAN ORGANISASI KEMAHASISWAAN INTRAKAMPUS DALAM MENGEMBANGKAN KECERDASAN INTERPERSONAL MAHASISWA." *Journal of Islamic Education Management* 2(1) 61–79.

Sinaga, Roynanda, Arwin Juli Rakhmadi, Hariyadi Putraga, Muhammad Sadam Andika, and Muhammad Thariq. 2025. "Model Komunikasi Sains OIF UMSU Dalam Pelatihan Ilmu Falak Di Vihara Vimalakirti." *Jurnal Ilmu Pemerintahan, Administrasi Publik, Dan Ilmu Komunikasi (JIPIKOM)* 7(2):320–27. doi:10.31289/jipikom.v7i2.6239.