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APT JSO-10: A Successful Odyssey for Young Scientists

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〈Abstract〉

The APT JSO-10 was a physical event held in Siem Reap, Cambodia, from July 22 to 26, 2024. Organized by the Cambodian Ministry of Industry, Science, Technology, and Innovation, in partnership with the ASEAN Center for Gifted Studies (ACGS) and supported by ASEAN, the event brought together a diverse group of young minds.

A total of 194 participants, including 92 female students, attended the event. The participants were divided into mixed-nationality groups, with two groups per country (except for ASEAN Plus Three country and Cambodia, which had three and four groups each, respectively). This diverse composition fostered cross-cultural exchange and enriched the learning experience.

The theme of APT JSO-10 was "Racing Up Against Climate Change" reflecting the global urgency to address environmental challenges. The event aligned with several Sustainable Development Goals (SDGs), demonstrating its commitment to addressing pressing issues.

The primary objective of the event was to enrich the scientific, technological, and innovative solutions for climate change and sustainable development among junior scientists from ASEAN member states and advanced countries. By providing a platform for collaboration and knowledge sharing, APT JSO-10 aimed to equip these young minds with the tools they need to become future leaders in the field of science and technology.

Key Highlights and Outcomes:

· The event fostered a welcoming and inclusive atmosphere, allowing participants to

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connect with peers from different backgrounds and cultures.

· Participants engaged in a variety of activities, including scientific experiments, group projects, and site visits, providing them with practical experience and a deeper understanding of scientific concepts.

· Experienced scientists and mentors provided valuable guidance and support to participants, inspiring them to pursue their academic and career goals.

· The group projects and competitions encouraged participants to work together to solve complex problems, developing essential teamwork and problem-solving skills.

· The event offered opportunities for participants to experience different cultures, broaden their horizons, and build lasting friendships.

Overall satisfaction, the APT JSO-10 was a resounding success, with participants expressing high levels of satisfaction. A significant majority of participants rated the event positively, highlighting the valuable experiences and opportunities it provided.

For the conclusion, the APT JSO-10 was a transformative event that empowered young scientists to develop their skills, explore their passions, and contribute to addressing global challenges. By fostering collaboration, innovation, and a love for science, the event has laid the foundation for a brighter future for the region.

key words: gifted students, science, technology, SDG, APT JSO, climate change

I. Introduction

Established in 2012 by the ASEAN+3 Center for the Gifted in Science (ACGS), the ASEAN Plus Three Junior Science Odyssey (APT JSO) aims to encourage and challenge gifted middle high-school students in ASEAN Member States (AMS), China, Korea and Japan to excel in the field of science and technology, stimulate their intellectual curiosity, and motivate them to pursue careers in the field of science and technology*. The odyssey also provides students the opportunity to form friendships and networks in the APT region.

The APT JSO is an annual educational event established by the ACGS in the Republic of Korea. The program serves as a platform to bring together the gifted and talent youth in the field of science and technology between the age of 13 and 15 years old from the ASEAN+3 to exchange knowledge and experiences in science and technology whereby preparing them for future endeavor in becoming competent future engineers and scientists**.

APT JSO has a rich history of fostering scientific curiosity and collaboration among young minds, Table 1. The 1st APT JSO took place from June 10-17, 2012, in Brunei Darussalam, focusing on the theme "Science and the Dynamics of Tropical Rainforest" with 83 participants. The 2nd event, held from June 24-July 1, 2013, in the Republic of Korea, revolved around "Science Research on Seaboard & Wetland" and attracted 106 participants. Thailand hosted the 3rd event from June 23-29, 2014, with the theme "Innovative Agriculture for Global Sustainability" and 80 participants. Indonesia hosted the 4th APT JSO from August 24-29, 2015, under the theme "Biodiversity towards Innovative, Smart & Green Society," drawing 121 participants. The 5th event, held from June 12-18, 2016, in the Philippines, centered on "Climate Change and the Rainforest" and saw 115 participants. The 6th APT JSO took place in Vietnam from July 10-15, 2017, focusing on "Application of Renewable Energies for a Better Life" with 102 participants. The 7th event, held from July 29-August 4, 2018, in Malaysia, was themed "Science and Innovation for Good Health and Societal Wellbeing," with 79 participants. The 8th APT

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https://astnet.asean.org/2025/01/20/the-18th-asean3-center-for-the-gifted-in-science-acgs-board-of-directors-bod-meeting/

JSO returned to Thailand from June 9-15, 2019, with the theme "The Role of Youth in Communicating Science for Sustainable Development Goals in the Regions," involving 113 participants. Singapore hosted the 9th event from June 20-23, 2022, which was conducted online due to the pandemic, with the theme "Building an Environmentally Sustainable Future."

Table 1. APT JSO's history with hosting country, theme and number of participants

N	Date	Hosting State	Theme	Participants
01	June 10-17, 2012	Brunei Darussalam	Science and the Dynamics of Tropical Rainforest	83
02	June 24-July 1, 2013	ROK	Science Research on Seaboard & Wetland	106
03	June 23-29, 2014	Thailand	Innovative Agriculture for Global Sustainability	80
04	August 24-29, 2015	Indonesia	Biodiversity towards Innovative, Smart & Green Society	121
05	June 12-18, 2016	Philippines	Climate Change and the Rainforest	115
06	July 10-15, 2017	Vietnam	Application of Renewable Energies for a Better Life	102
07	July 29 - Aug 4, 2018	Malaysia	Science and Innovation for Good Health and Societal Wellbeing	79
08	June 9-15, 2019	Thailand	The Role of Youth in Communicating Science for Sustainable Development Goals in the Regions	113
09	June 20-23, 2022	Singapore	Building an Environmentally Sustainable Future	Online
10	July 22-26, 2024	Cambodia	Racing Up Against Climate Change	194

The 10th ASEAN Plus Three Junior Science Odyssey (APT JSO-10)

The Ministry of Industry, Science, Technology & Innovation (MISTI) is thrilled to lead the 10th ASEAN Plus Three Junior Science Odyssey (APT JSO-10), sparking the curiosity of young scientists across the region. This prestigious event will be held in person from 22-26 July, 2024, in Siem Reap Province, Cambodia. This APT JSO-10 aims to challenge and inspire participants in their scientific and technological abilities, encouraging exploration through hands-on experiments and studies at various institutions. Activities will include poster creation and presentation, honing laboratory skills, field trips, and group project assignments. Beyond the technical aspects, the program also provides a

valuable opportunity for young people from participating countries to share experiences, form new friendships, and expand their networks, collectively fostering positive future impacts.

The duration of the program is set to be one-week including traveling days. A number of institutional and various activities are planned to engage participating youth preferably science and technology related institutions such as science museum and laboratories where students can actively participate in activities such as experiments, science & technology shows/competition.

· To broaden junior's science cooperation among AMS and beyond

· To engage youth among the AMS and APT Nations on Science and Technology

· To showcase Cambodia's current science and technology opportunity for future development

· To gain new insights and exchange of knowledge among Junior Scientists

· To promote mutual understanding and friendship among participating youth and teachers

In addition, this APT JSO-10 included gender mainstreaming sessions and sought to empower women through science to help the ASEAN community address global issues such as climate change, energy shortages, and poverty. Specifically, this involved promoting the participation and leadership of women and youth at various levels—ranging from science initiatives and networks to policy dialogues—by fostering champions and addressing barriers to meaningful participation. The relevance to the APT JSO-10 is underlined by:

1. ASEAN Economic Community (AEC) 2025 Consolidated Strategic Action Plan (CSAP)*

◎ Characteristic 2: A Competitive, Innovative and Dynamic ASEAN

○ Element: B4. Productivity-Driven Growth, Innovation, Research and Development, and Technology Commercialization.

○ Objectives: To improve labor productivity and total factor productivity performance.

○ Point 43: Promote strategic partnerships among academia, research institutions, and the private sector towards developing capabilities and creating an effective

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* https://asean.org/wp-content/uploads/2012/05/Updated-AEC-2025-CSAP-14-Aug-2018-final.pdf

channel for technology transfer and commercialization.

◎ Characteristic 3: An Enhanced Connectivity and Sectoral Cooperation

○ Element: C9. Science and Technology.

○ Objectives: ASEAN's sustained economic growth and global competitiveness would be supported by appropriate science, technology, and innovation (STI) applications.

○ Point 122: Raise public awareness of the various achievements derived from ASEAN cooperation in STI.

2. Synergy with the ASEAN Plus Three Work Plan on Youth 2021-2025*

◎ Priority Area C: Promotion of the spirit of youth volunteerism to foster a stronger ASEAN Plus Three community spirit by involving youth in community development projects.

○ Activity C.1: Mobilizing youth's contribution to climate change adaptation and disaster risk reduction, in line with the ASEAN Declaration on the Adoption of the ASEAN Youth in Climate Action and Disaster Resilience Day.

Figure 1. Aligned to SDGs for APT JSO-10

This APT JSO-10 aims to advance gender equality and empower women in STEM fields within the ASEAN community, aligning with the broader goals laid out in the AEC

* https://asean.org/wp-content/uploads/2022/08/APT-Cooperation-Work-Plan-2023-2027.pdf

2025 CSAP* and the ASEAN Plus Three Work Plan on Youth**. By fostering strategic partnerships, raising public awareness, and mobilizing youth involvement, the project seeks to create a more inclusive and dynamic region that leverages the full potential of its youth and women to tackle global challenges. The theme is: **'Racing Up Against Climate Change'**, with the Target SDGs, Figure 1:

· Quality Education (4)***

· Gender Equality (5)****

· Clean Water and Sanitation (6)*****

· Life under water (14)*

· Partnerships for the goals (17)**

The APT JSO-10 event addresses global challenges, particularly climate change, through a multi-faceted approach with the commitment to a broader global agenda by directly aligning its activities with specific by in Figure 1. It emphasizes strategic partnerships, working collaboratively with various organizations to maximize impact, while simultaneously raising public awareness by educating and informing people about critical issues. Crucially, the event prioritizes youth involvement, empowering young individuals, especially women, to actively participate in developing and implementing solutions. By integrating these strategies, the project seeks to cultivate a stronger, more inclusive region capable of effectively tackling complex problems like climate change.

II. Key Activities

This APT JSO-10 held physically on 22-26 July, 2024 at Siem Reap Province. APT JSO-10 is co-host with the esteemed ACGS and support from ASEAN, and with total of

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* https://asean.org/wp-content/uploads/2012/05/Updated-AEC-2025-CSAP-14-Aug-2018-final.pdf
** https://asean.org/wp-content/uploads/2022/08/APT-Cooperation-Work-Plan-2023-2027.pdf
*** https://www.globalgoals.org/goals/4-quality-education/
**** https://www.globalgoals.org/goals/5-gender-equality/
***** https://www.globalgoals.org/goals/6-clean-water-and-sanitation/
* https://www.globalgoals.org/goals/14-life-below-water/
** https://www.globalgoals.org/goals/17-partnerships-for-the-goals/

194 participants, Table 2. The format of APT JSO-10 was divided into two main categories: Science Challenges and Science & Social Programs. Science Challenges included:

· Video Competition: Participants worked in their respective country teams to create videos on climate change.

· Lecture Courses and Lab Experiments: Participants engaged in theoretical and practical learning activities.

· Pitching Projects: Participants presented their project ideas to a panel of judges.

For the Science Challenges, participants were divided into their respective country teams for the video competition, while the lecture courses, lab experiments, and pitching projects required collaboration in mixed-country teams.

Science & Social Programs were designed to foster networking and interaction among participants. These programs emphasized discussion and exchange of ideas, allowing participants to share knowledge and learn from each other's experiences.

The program aimed to deepen participants' understanding of environmental sustainability. The mixed-country groupings provided an opportunity to explore the diverse approaches and challenges faced by different countries in addressing environmental issues. By participating in these activities, the committee hoped that participants would acquire new knowledge, develop valuable skills, and build lasting friendships with peers from across the ASEAN region and the Republic of Korea and China.

Table 2. APT JSO 10's participants

N	Country	Teams	BoD Secretariat	LO	Teacher	Student	Total Participants
1	BN - Brunei Darussalam	2	1	1	2	6	10
2	KH - Cambodia	4	1	1	4	12	18
3	CH - China	3	1	1	3	9	14
4	ID - Indonesia	2	1	1	2	6	10
5	JP - Japan	3	1	1	3	9	14
6	KR - Korea	3	1	1	3	9	14

7	LA - Lao PDR	2	1	1	2	6	10
8	MY - Malaysia	2	1	1	2	6	10
9	MM - Myanmar	2	1	1	2	6	10
10	PH - the Philippines	2	1	1	2	6	10
11	SG - Singapore	2	1	1	2	6	10
12	TH - Thailand	2	1	1	2	6	10
13	VN - Viet Nam	2	1	1	2	6	10
14	ASEC		5				5
15	ACGS		3				3
16	KH Committee		36				36
	Total	31	57	13	31	93	194

· The criteria for student and team application include that each country can send up to 2 teams, with each team consisting of 3 students, while the host country, Cambodia, can send up to 4 teams. Participants must be at least 13 years old during the event year and no older than 15 years and 11 months at the event time, ensuring similar maturity and academic understanding levels. Each team promotes teamwork and significant contribution from all 3 students. Selected students should have science research or competition experience, good English proficiency, and a willingness to network, ensuring full engagement and benefit.

· Accompanying teachers should be science educators or senior school personnel with the necessary knowledge to guide students. A maximum of one teacher per team, totaling two teachers per country, provides adequate supervision and guidance. Teachers should possess good English proficiency, share learning points, implement teaching ideas, and network with peers and students to fully engage and pass on their learning.

· A Liaison Officer assists with registration, facilitates evaluation processes, collects and addresses feedback, and leads their country's delegation during the event.

· The BoD/Secretariat is responsible for reviewing curriculum activities and assessments, providing lecture support, facilitating discussions, answering questions, and participating in planning and decision-making activities related to the course.

There are several activities, including:

Pre- Activities: Video Competition on Climate Change

The video competition aimed at raising awareness about climate change. Participants from various ASEAN+3 countries formed teams and created videos that highlighted the urgency of addressing climate change and the need for collective action. A total of 30 videos were submitted by participating teams (around 3~4 minutes length). These videos showcased the creativity and knowledge of young ASEAN youth on the topic of climate change. BoD and Cambodia committee members from AMS and APT judged the videos based on criteria such as relevance to the theme, originality, effectiveness in conveying the message, and overall production quality. These videos were expected to incorporate a range of elements to effectively communicate the message about climate change.

Meet and Talk with Scientists

This meet and talk with scientists provided an opportunity for young scientists to interact with esteemed experts and gain valuable insights into the field of climate change research. The keynote speakers shared their experiences and expertise, inspiring the younger generation to pursue scientific endeavors. The goal was to inspire young, aspiring student scientists by fostering strong connections and motivation. The students and all participants learned with their fresh perspectives and boundless energy, and they have the potential to make significant contributions to the world.

Knowledge Sharing on Climate Change

The lecture provided a detailed understanding of climate change, encompassing its scientific underpinnings, wide-ranging environmental impacts, and potential solutions. Students gained a solid grasp of fundamental climate science concepts, such as the greenhouse effect and the role of greenhouse gases. The interactive nature of the lecture allowed students to actively engage with the material and apply their knowledge to real-world scenarios. Students were able to identify and analyze the impacts of climate change on various aspects of society, including the environment, human health, and economy.

Knowledge Sharing on Water Resource Management

The lecture highlighted the challenges posed by climate change on water resources,

such as increased water scarcity and decreased water quality. Students learned about the vital role of water in sustaining life and supporting human activities. The lecture explored potential solutions to address water scarcity and quality issues, including water conservation measures, efficient water use practices, and technological advancements. Students were able to apply their knowledge to real-world scenarios and understand the importance of water resource management in the context of climate change.

Knowledge Sharing on Water Treatment Technology

The lecture provided insights into the various processes involved in water treatment, ensuring its safety for public consumption and environmental protection. Students learned how water treatment technology contributes to sustainable water management and supports economic and industrial activities. The lecture emphasized the importance of understanding water treatment technology in the context of climate change to develop adaptive strategies for ensuring a stable and safe water supply.

Knowledge Sharing on Preservation of Historic Sites and Rehabilitation of Ancient Hydraulic Systems

The lectures explored the historical and cultural importance of Angkor's water management systems, highlighting their significance as UNESCO World Heritage Sites. Students learned about the challenges faced in preserving these ancient sites and the need for rehabilitation to ensure their long-term sustainability. The lectures provided insights into the traditional water management practices used in the Angkor region, offering valuable lessons for modern-day water resource management.

Experiment Practice: JAR TEST

The JAR TEST is a laboratory procedure used to simulate the coagulation and flocculation processes in water treatment plants. Samples of water are treated with varying doses of chemicals to determine the optimal dosage for effective solid settling. The JAR TEST helps operators optimize chemical usage, improve water treatment plant performance, and ensure water quality.

Knowledge Quiz

The quiz was designed to assess students' understanding of the lecture courses and lab experiments. The quiz served as a tool to evaluate students' learning and identify areas where they may need further support or clarification. By participating in these lectures and activities, students gained a comprehensive understanding of climate change, water resource management, and related topics. The practical experience of the JAR TEST provided valuable insights into water treatment processes.

Institutional Visit

To complement the theoretical knowledge gained from the lectures and lab experiments, students participated in field trips to explore relevant sites in Siem Reap. These field trips provided students with valuable opportunities to apply their theoretical knowledge in a real-world context. By visiting the SRWSR Chreav facility, students gained insights into the practical aspects of water treatment and distribution. The Khmer Ceramics Fine Arts Center allowed students to explore Cambodian culture and learn traditional crafts.

Cultural Visit

The students, teachers, LOs, and BoDs of the APT JSO-10 participants embarked on an enriching site visit to the iconic Angkor Wat temple in Cambodia. This visit aimed to provide a comprehensive understanding of the historical and scientific marvels of this majestic temple. The participants were divided into small groups, each led by an experienced guide. These guides meticulously introduced the groups to the intricate history, architectural brilliance, and the scientific advancements that were employed in the construction of Angkor Wat. The participants were captivated by the detailed carvings, the grandeur of the temple complex, and the stories that have been preserved through centuries. By combining a cultural visit to Angkor Wat with a tree planting initiative, all participant and student experience the beauty of Cambodia's heritage while also making a positive impact on its environment. It's a rewarding way to explore the country's rich culture and contribute to its sustainable future.

Pitch Presentation Competition

One of the most anticipated events of the program was the pitch presentation

competition, featuring 18 groups of students. Each group consisted of 4 to 5 members from different countries, randomly matched to ensure diversity and gender balance. Each group was assigned a climate change-related topic and tasked with identifying a problem and proposing creative solutions, Table 3. They were required to present their ideas on handmade posters, which they designed and explained in detail. The presentations were structured to allow each group 5 minutes to present their project, followed by 5 minutes to answer questions from a panel of 14 judges representing all APT countries. This competition was considered the most important among all the activities, as students had been diligently working on their respective projects since the beginning of the event.

Table 3. Grouping students by mixed nationality into 18 groups, with 9 topics

Topic	Title/Project	SDG Alignment
Topic 1	From Trash to Treasure: Turning Food Waste into a Climate Change Solution	SDG 4, SDG 6, SDG 17
Topic 2	A Case Study in Plastic Pollution	SDG 4, SDG 6, SDG 17
Topic 3	Waste Warriors: Empowering Youth to Revolutionize Solid Waste Management	SDG 4, SDG 6, SDG 17
Topic 4	The Looming Water Crisis and Innovative Solutions	SDG 14, SDG 17
Topic 5	From Wastewater to Wonder: Transforming Sewage into a Sustainable Resource	SDG 6, SDG 14
Topic 6	Strategies for Combating Air Pollution in Our Cities	SDG 6, SDG 17
Topic 7	Growing Problem of Electronic Waste and Sustainable Solutions	SDG 4, SDG 17
Topic 8	Fashion's Dirty Laundry: The Environmental Impact of the Clothing Industry and Eco-friendly Alternatives	SDG 4, SDG 17
Topic 9	Unlocking the Hidden Potential of Complex Biowaste for sustainable biowaste management	SDG 4, SDG 6, SDG 17

The competition was intense and showcased the students' creativity, teamwork, and problem-solving skills. The final five winners were awarded medals for their outstanding presentations: two bronze medals, two silver medals, and one gold medal. This event not only highlighted the students' hard work and dedication but also emphasized the importance of addressing climate change through innovative and collaborative efforts.

III. Outcomes

The outcome result was crucial in bringing the APT JSO-10 to a successful conclusion. The video competition on climate change showcased the creativity and knowledge of young participants, highlighting the urgency of addressing climate change and fostering a collective sense of responsibility among ASEAN youth. The meet-and-talk session with scientists allowed young scientists to gain valuable insights and inspiration from climate change experts, emphasizing the importance of mentorship. Knowledge-sharing sessions provided comprehensive insights into climate change, water resource management, water treatment technology, and historic site preservation. The knowledge quiz assessed students' understanding of various topics, reinforcing their knowledge, highlighting their strengths, and identifying areas for improvement. Institutional and cultural visits offered practical insights into water treatment and distribution, explored Cambodian culture, and connected theoretical knowledge to real-world applications. Lastly, the pitch presentation competition allowed students to demonstrate their creativity, teamwork, and problem-solving skills in addressing climate change.

To showcase the results for each activity, the outcomes were presented as follows:

Video Competition on Climate Change

This activity highlighted the creativity and knowledge of young participants, as evidenced by the 30 submitted videos from various ASEAN+3 countries. It emphasized the urgency of climate change and the need for collective action, engaging youth in showcasing their understanding and innovative solutions. The judging criteria included relevance to the theme, originality, effectiveness in conveying the message, and production quality.

Meet and Talk with Scientists

The session provided a valuable platform for young scientists to interact directly with climate change experts. Keynote speakers shared their experiences and expertise, inspiring participants to pursue scientific endeavors and emphasizing the importance of mentorship. This interaction helped nurture the next generation of scientists by fostering strong connections and motivation.

Knowledge-Sharing Sessions

These sessions covered comprehensive topics, including climate change, water resource management, water treatment technology, and the preservation of historic sites. Students gained an understanding of interconnected challenges by integrating historical, scientific, and practical perspectives, preparing them to address real-world issues effectively.

Knowledge Quiz

The quiz assessed students' understanding of lectures and lab experiments, reinforcing their knowledge in climate change, water resource management, and related topics. It provided a benchmark for their progress, highlighting strengths and areas for improvement, thereby ensuring a thorough understanding of the material.

Institutional and Cultural Visits

Participants visited pertinent sites in Siem Reap, gaining practical insights into water treatment and distribution at the SRWSR Chreav facility, and exploring Cambodian culture and traditional crafts at the Khmer Ceramics Fine Arts Center. The cultural visit to Angkor Wat, combined with a tree planting initiative, enriched their theoretical knowledge and fostered a connection to real-world applications while contributing to environmental sustainability.

Pitch Presentation Competition

This competition showcased the students' creativity, teamwork, and problem-solving skills on climate change-related topics. Divided into 18 groups, participants proposed innovative solutions and presented their ideas on handmade posters, judged by a panel of 14 experts. The final five winners were awarded medals, recognizing their hard work, dedication, and the importance of collaborative efforts in addressing climate change challenges.

Summary for key highlights and outcomes:

◎ The APT JSO-10 successfully created a warm and inclusive environment where participants from diverse backgrounds and cultures felt comfortable and connected. This facilitated meaningful interactions and peer-to-peer learning.

◎ Participants actively engaged in a wide range of activities, including:Conducting scientific experiments: This provided them with valuable practical experience in scientific methodology and data analysis.

○ Collaborative group projects by working together on challenging projects enhanced their teamwork, communication, and problem-solving abilities.

○ Educational site visits offered real-world insights into scientific applications and inspired participants.

○ Mentorship and guidance to experienced scientists and mentors provided invaluable support and guidance to participants. This mentorship not only helped participants deepen their understanding of scientific concepts but also inspired them to pursue their academic and career goals in science.

○ Developing essential skills by focusing on group projects and competitions encouraged participants to work collaboratively to overcome challenges and find creative solutions. This fostered essential teamwork, problem-solving, and critical thinking skills.

◎ The APT JSO-10 provided a unique opportunity for participants to:

○ This broadened their perspectives and understanding of the world.

○ Connections formed during the event fostered a sense of global community and lifelong friendships.

Survey Assessement

To gather feedback on the event, participants were invited to complete an online survey. The survey included a combination of rating questions (on a scale of 1-5) and open-ended prompts. A total of 49 students, 14 teachers, 8 country liaison officers, 9 BoD, and 19 other participants responded to the survey, Table 4.

Table 4. Summary of survey assessment and average ratings from APT JSO-10's participants

Statement	Average Rating (Students)	Average Rating (Teachers)	Average Rating (Liaison Officers)	Average Rating (Others)
How satisfied was the hospitality of the event?	4.55	4.56	4.66	4.66
Overall, how satisfied was the logistics during the event?	4.42	4.38	4.66	4.66
After the event, how inspired did you feel?	4.39	4.69	4.50	5.00
How satisfied was the event overall?	4.60	4.46	4.66	4.66

· Overall Satisfaction: Approximately 65% of participants expressed satisfaction with the event, indicating its overall success.

· Hospitality and Logistics: 66% of participants were satisfied with the hospitality services, while 52% were pleased with the logistics.

· Inspiration: 59% of participants felt inspired by the event's activities.

· Site Visits: The site visit sessions were the most popular aspect of the event, providing participants with opportunities to engage in various activities.

· Experiments and Assessments: Over 40% of participants found the experiments and assessments interesting and entertaining, and 37% felt inspired by these activities.

Based on the survey results, the following recommendations can be made for future events:

· Maintain High Standards: Continue to prioritize hospitality and logistics to ensure a positive experience for participants.

· Enhance Inspiration: Explore new and innovative ways to inspire participants, such as incorporating more interactive elements or guest speakers.

· Focus on Site Visits: Leverage the popularity of site visits by offering a wider variety of options or providing more in-depth experiences.

· Expand Experiment and Assessment Activities: Develop more engaging and thought-provoking experiments and assessments to cater to diverse interests and learning styles.

Ultimately, the best parts of the APT JSO 10 depended on the individual preferences and interests of the participants, Table 5 and Figure 2.However, the combination of these activities offered a diverse and engaging experience that could be valuable for both personal and professional development.

Table 5. Suggestions and Points of Interest from Each Activity of APT JSO-10

Activities	Suggestion and Point of Interest
Venue/Site Visit:	· Hands-on experience: Participants could directly observe scientific or technological applications in real-world settings. · Inspiration: Visiting cutting-edge facilities could spark new ideas and research interests. · Networking: Opportunities to connect with professionals in the field were available.
Meet and Talk with Scientist:	· Insights: Direct interaction with experts could provide valuable insights into their work and the field. · Inspiration: Hearing personal stories and experiences could motivate participants. · Mentorship: Potential for building relationships and seeking guidance existed.
Lecture Session:	· Knowledge acquisition: Participants could learn about the latest advancements and trends in science and technology. · Inspiration: Thought-provoking lectures could stimulate creativity and critical thinking. · Networking: Opportunities to connect with other attendees with shared interests were available.
Experiment and Assessment Session:	· Hands-on experience: Participants could apply theoretical knowledge to practical tasks. · Problem-solving: Developing problem-solving skills through experimentation was possible. · Collaboration: Working together in groups could foster teamwork and communication.
Group Country	· Creativity: Participants could express their ideas and

Video - Competition:	creativity through video production. · Collaboration: Working together to create a high-quality video was possible. · Cultural exchange: Showcasing the unique aspects of their country and culture was a goal.
Group Collaboration - Competition:	· Teamwork: Participants could develop teamwork and communication skills. · Problem-solving: Working together to solve a challenge or problem was possible. · Competition: The competitive element could add excitement and motivation.
Welcome Dinner:	· Socializing: A relaxed atmosphere for participants to meet and interact with each other was provided. · Networking: Opportunities to connect with like-minded individuals were available. · Cultural experience: Enjoying local cuisine and hospitality was possible.
Awarding Ceremony:	· Recognition: Acknowledging the achievements of participants and teams was a highlight. · Motivation: The awards could inspire future participation and excellence. · Celebration: A festive atmosphere to celebrate the success of the event was created.

Overall satisfaction, the APT JSO-10 was a resounding success, with participants expressing high levels of satisfaction. A significant majority of participants rated the event positively, highlighting the valuable experiences and opportunities it provided.

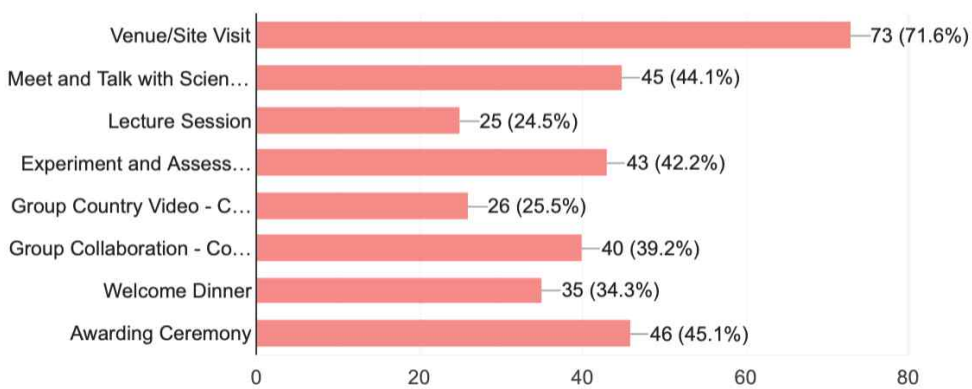

Figure 2. Evaluation list from APT JSO-10's activities (N=102)

Follow-up studies and alumni tracking are crucial for evaluating the long-term impact of programs like APT JSO-10, serving multiple purposes: they measure the lasting effects on participants' scientific interest and career paths by assessing if event goals are met and if acquired skills are applied in academic or professional settings; they evaluate program effectiveness by identifying strengths and weaknesses, providing valuable evidence to stakeholders; they build an alumni network that fosters ongoing collaboration and support; and they track career trajectories, understanding how participation influences educational and professional choices and identifying significant contributions to STEM fields. These studies employ various methods, including regular surveys, in-depth interviews, data analysis of academic and professional records, alumni events for networking and feedback, and online platforms for communication. The information collected encompasses educational attainment, career paths, research and innovation contributions, skills development, changes in attitudes and aspirations, and networking activities. Ultimately, long-term tracking provides valuable data for program improvement, demonstrates impact to stakeholders, strengthens the alumni network, and inspires future participants. innova:on

Discussion on Key Challenges

Organizing an international event like APT JSO-10 presents a complex array of challenges, demanding a nuanced approach. Logistical difficulties form a significant hurdle, requiring intricate coordination of travel, accommodation, and schedules across diverse time zones. Effective communication is paramount, necessitating clear information dissemination to all stakeholders, while resource management demands meticulous planning to secure funding, materials, and on-site support. Furthermore, ensuring reliable technology and infrastructure is crucial, with contingency plans needed to mitigate potential disruptions.

Curriculum differences pose another set of challenges, stemming from the diverse educational backgrounds and varying levels of scientific knowledge among participants. Designing an engaging and accessible curriculum requires careful consideration of prior knowledge, balancing theoretical and practical learning. Language barriers can hinder communication and collaboration, necessitating language support. Moreover, cultural differences in learning styles demand adaptable teaching methods to maximize participant engagement.

Participant diversity introduces its own set of complexities. Bringing together individuals from diverse cultural backgrounds can lead to both enriching experiences and potential misunderstandings, requiring proactive measures to promote cultural

sensitivity and inclusivity. Ensuring gender equality and creating a safe, supportive environment for all participants is paramount, addressing any potential power imbalances. Furthermore, accommodating varying skill levels and interests requires providing opportunities for exploration and development, balancing the needs of both advanced and less advanced students.

Addressing these challenges is essential for enhancing the effectiveness and impact of events like APT JSO-10. By acknowledging and proactively mitigating logistical hurdles, curriculum disparities, and the complexities of participant diversity, organizers can create a more enriching and equitable experience for all involved, fostering a truly transformative learning environment.

Ⅳ. Conclusion

The APT JSO-10 served as a vital platform for young scientists from across the ASEAN region and beyond. Its primary objective was to empower these aspiring minds with the knowledge and skills necessary to tackle pressing global challenges, particularly climate change. By fostering collaboration and knowledge exchange among participants from diverse backgrounds, the event aimed to nurture the next generation of scientific leaders.

A key aspect of the APT JSO-10 was its commitment to gender inclusivity. With a substantial female representation among participants, the event actively sought to empower women in science and technology, aligning with ASEAN's vision for a competitive and innovative region. This focus on gender mainstreaming is crucial for addressing global challenges effectively, as diverse perspectives and approaches are essential for finding sustainable solutions.

The event's success was evident in the enthusiastic participation and positive feedback from attendees. Participants actively engaged in a variety of activities, including hands-on experiments, collaborative projects, and informative site visits. These experiences provided them with valuable practical skills and a deeper understanding of scientific concepts. Moreover, the mentorship provided by experienced scientists served as a significant source of inspiration and guidance, encouraging participants to pursue their academic and career goals in science.

The APT JSO-10's focus on "Racing Up Against Climate Change" emphasized the urgency of addressing environmental challenges. By aligning with several Sustainable Development Goals, the event demonstrated its commitment to creating a more sustainable and equitable future.

In conclusion, the APT JSO-10 proved to be a transformative experience for young scientists. It not only equipped them with valuable skills and knowledge but also fostered a sense of community and a shared commitment to addressing global challenges. The APT JSO-10's success underscores the importance of international collaboration and youth empowerment in driving scientific progress and creating a more sustainable future for the ASEAN region and beyond.

V. Acknowledgements

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