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Asia & ASEAN Center for Educational Research
Faculty of Education, Chiba University

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Spring Institute of
Asia & ASEAN Center for Educational Research

2026.02.08

International Research Session followed by the SDGs Workshop

Place	Time	Detail
Faculty of Education Building 2	09:00-09:15 (15 min)	Reception
	09:30-09:45 (15 min)	Opening Ceremony
	10:00-12:00 (120 min)	Oral Presentation
	12:00-13:00 (60 min)	Lunch
	13:00-16:00 (180 min)	SDGs Workshop ・ Poster Presentation
	16:00-16:30 (30 min)	Closing Ceremony

Greeting

Koutaro YOKOTE, MD, PhD, MBA

President of Chiba University

Chiba University, established in 1949 as one of Japan's newly restructured national universities, proudly traces its origins back approximately 150 years. Grounded in this long-standing tradition of academic excellence, we continue to evolve as a comprehensive university committed to education, research, and societal engagement on a global scale.

In recent years, Chiba University has taken decisive steps to strengthen its academic foundations for the future. The establishment of the Faculty of Informatics and the Graduate School of Informatics represents a major milestone in advancing education and research in information and data science. By integrating and further developing expertise cultivated within the Faculty of Engineering and related graduate programs, we seek to nurture professionals and researchers capable of contributing meaningfully to an increasingly digital and data-driven world.

At the same time, we are enhancing our research capabilities with a strong emphasis on translating academic knowledge into societal value. Our focused efforts in areas such as immunology, vaccine research, and preventive medicine reflect our commitment to tackling global and regional challenges. Chiba University's selection for the Program for Forming Japan's Peak Research Universities (J-PEAKS) further affirms our role as a research hub that connects regional strengths with international collaboration.

Guided by the newly established University Vision, Chiba University is further strengthening its global outlook. This vision emphasizes the expansion of international partnerships, interdisciplinary collaboration, and the cultivation of human resources capable of addressing global challenges. Educational initiatives such as ASCENT-6E, supported by the JST STELLA program, reflect our commitment to nurturing the next generation of researchers through close cooperation with domestic and international partners.

Chiba University remains firmly committed to contributing to a more sustainable, inclusive, and resilient global society. We sincerely value the continued support and collaboration of our partners and colleagues, and we look forward to further strengthening our ties—particularly within Asia and ASEAN-through shared dialogue, research, and educational exchange.

Greeting

Hiroaki OZAWA, Ph.D.

Executive Vice President, Chiba University

Chiba University is dedicated to cultivating talented individuals who can make significant contributions to the advancement of education, science, and society on a global scale. Through the ASCENT program, launched in FY2020, and its successor, ASCENT-6E, initiated in FY2024, the University has strengthened its efforts to nurture outstanding human resources from an early stage of education.

We firmly believe that inquiry-based learning and research activities, which begin at the high school level, are essential for developing independent thinking, creativity, and problem-solving skills. Such experiences provide a vital foundation for young people to engage with complex global challenges and to grow as future leaders.

In close collaboration with the Center for Contemporary Asian and ASEAN Educational Research at Chiba University, the University has been promoting international educational activities for high school students across Asia and the ASEAN region. I would like to express my sincere appreciation to all partner institutions and educators for their invaluable cooperation in launching this year the International Research Conference by Asian High School Students, which offers a meaningful platform for students to present their research and engage in cross-border academic exchange.

Looking ahead, Chiba University remains committed to further strengthening its collaboration with partners in Asia and the ASEAN region through ASCENT and ASCENT-6E. Together, we seek to expand international learning opportunities and to jointly nurture the next generation of globally minded researchers and leaders.

I sincerely appreciate your continued support and look forward to our ongoing cooperation.

Greeting

Daisuke FUJIKAWA

Dean, Faculty of Education,
Chiba University

To the esteemed faculty members and researchers from our partner universities in Asia and the ASEAN region, thank you very much for joining this annual assembly. On behalf of the Faculty of Education at Chiba University, I would like to express my sincere appreciation for your continued participation and collaboration.

The Faculty of Education plays a core role in the activities of the Asia and ASEAN Center for Educational Research. Our faculty members are deeply involved in teacher education, practice-oriented research, and international collaboration through the Center. In particular, we emphasize the integration of theory and practice through project-based learning (PBL), school–university partnerships, and collaborative research with local and overseas educational institutions.

Our mission is to contribute to a sustainable and inclusive society by fostering high-quality educators and generating educational knowledge grounded in real-world practice. To this end, cooperation with universities in Asia and the ASEAN region is indispensable. Diverse educational contexts and perspectives enrich our teacher training programs and strengthen our ability to respond to complex challenges in schools and communities.

While our past collaborations have produced valuable outcomes, we now seek to further strengthen our partnerships through joint planning, co-implementation, and shared responsibility. The Faculty of Education is fully committed to advancing this next stage of collaboration together with our partners.

I sincerely hope that this assembly will deepen mutual trust, inspire new ideas, and lead to concrete collaborative initiatives in education and research. I look forward to our continued cooperation and shared achievements in the years ahead.

Thank you very much.

Greeting

Jun NOMURA, M.D., Ph.D.

Professor, Faculty of Education
Vice Dean (International Relations, Research Promotion)
Director of Asia & ASEAN Center for Educational Research,
Chiba University

Dear Distinguished Guests,

It is my great pleasure to welcome you to the annual meeting of the Asia and ASEAN Center for Educational Research at Chiba University. As Director of the Center, I am sincerely honored to gather with colleagues and partners from across Asia, ASEAN, and beyond, whose continued engagement forms the foundation of our shared work.

The Asia and ASEAN regions stand at the center of global transformation, characterized by diversity, innovation, and rapid social change. These dynamics also present complex educational challenges that cannot be addressed by any single institution or country alone. Recognizing this, our Center is committed not only to advancing research and education but also to deepening partnerships and building collaborative frameworks in which we plan, implement, and learn together.

This annual meeting is more than a forum for academic exchange. It is a space for strengthening trust, aligning perspectives, and identifying concrete pathways for joint research, co-creation of knowledge, and collaborative educational initiatives. Through sustained cooperation among our institutions, we seek to generate insights that contribute to educational development, social inclusion, and sustainable growth throughout the region.

I would like to express my deepest appreciation to all of you for your continued commitment and for joining us, both in person and in spirit. Your participation reflects the strength of our network and our shared resolve to work collaboratively toward common goals.

I sincerely hope that today's discussions will lead to renewed partnerships, innovative joint activities, and a stronger foundation for long-term collaboration. Together, let us continue to advance education and research through cooperation, mutual respect, and shared responsibility for the future of Asia, ASEAN, and the wider global community.

Thank you very much.

International Research Session

Purpose of the Research Session

The ability of young researchers to formulate crucial topics related to the development and sustainability of the world is important and speaks to the appreciation of their responsibility as leaders of the next era. Communicating these critical topics to other young people in the intellectual community is a mutually empowering activity. Therefore, this International Research meeting aims at providing a platform for fostering the next-generation of leaders in the fields of science and education.

In this meeting, presenters will show their achievements in science and educational activities. Please find the output of various scientific activities, and exchange knowledge and friendship at the meeting site.

We hope every presenter finds positive suggestions and solutions for the progress of his/her research.

International Research Session

Room 2108 (Physics, Computer Engineering, Chemistry)		
Chairperson	SURAPONG RATTANAKUL	King Mongkut's University of Technology Thonburi
Panelist	YAYA SUKJAYA KUSUMAH	Universitas Pendidikan Indonesia
Panelist	Rabiatul Hazirah binti Idris	Chiba University
Presenter 1	KAWASHIMA Gaku, Ariya Thammakunma Chiba Municipal Chiba High School, Chulalongkorn University Demonstration Secondary School **The Effect of Particles on Image Clarity in Projection Mapping**	
Presenter 2	Hein Thura Aung King Mongkut's University of Technology Thonburi **UNSUPERVISED CRACK DETECTION SYSTEM USING GRAPH NEURAL NETWORK CLUSTERING**	
Presenter 3	HAYASHI Waka, Phoomjai Thienthammajak Chiba Municipal Chiba High School, Chulalongkorn University Demonstration Secondary School **The difference between O-ring and grooving surfaces**	
Presenter 4	Raihan Eko Sugiyanto Bandung Institute of Technology **Tidal Control On Water Column Stability In Balikpapan Bay, East Kalimantan, Indonesia**	
Presenter 5	OTSUKA Rin Chiba Prefectural Chosei High School **How to Make Fluffy Pancakes**	
Presenter 6	KADOWAKI Ayui, Ronnapat Srivoravilai Chiba Municipal Chiba High School, Chulalongkorn University Demonstration Secondary School **We want to make color changing spray！！**	
Presenter 7	SUN,HUI-YUN National Taiwan Normal University **I-V characteristics and resistivity**	

International Research Session

Room 2109 (Earth Science, Chemistry, Education, Humanities and Social Science)		
Chairperson	IVONNE MILICHRISTI RADJAWANE	Bandung Institute of Technology
Panelist	CHAINARONG JARUPONGPUTTANA	Chiang Mai University
Panelist	ZHANG JIAN YUN-YI	National Taiwan Normal University
Panelist	Kunti Khoirunnisaa	Chiba University
Presenter 1	SATO Nozomi Chiba Prefectural Chiba Higashi High School **The Relationship Between the State of Starch Solution and Iodine Clock Reaction**	
Presenter 2	Supitchaya Pangbubpha Kasetsart University **USING MATHEMTICAL TASKS TO ENHANCE MATHEMATICAL FLUENCY FOR GRADE 2 STUDENTS**	
Presenter 3	SUGISHITA Satsuki, YANO Momoka Chiba Prefectural Sakura High School **The Formation of Stripes in the Cross-Section of Sand Mountains Formed by Falling Sand**	
Presenter 4	Chung, Pei-Yu National Taiwan Normal University **Scientific Inquiry and Practice: Implementing the Monte Carlo Method and Buffon's Needle Problem with Gifted Students**	
Presenter 5	SHIBATA Hiroto Chiba Prefectural Makuhari Sogo High School **Acicular Crystals of Caffeine from Tea Leaves**	
Presenter 6	Ghina Nur Rohmah Universitas Pendidikan Indonesia **ENHANCING STUDENTS' MATHEMATICAL PROBLEM-SOLVING SKILLS THROUGH CONTENT-DIFFERENTIATED INSTRUCTION**	
Presenter 7	HAMADA Morihiro, HATANAKA Yuri, OHHORI Momoa Chiba Municipal Chiba High School **Turning blue flowers yellow**	
Presenter 8	JOZUKA Sakura, SOMEYA Yui Chiba Prefectural Funabashi-higashi High School **Does the feeling of regret enrich our lives?**	

International Research Session

Room 2111 (Physics, Geography, Chemistry, Education)		
Chairperson	ROLANDO V. OBIEDO	University of San Carlos
Panelist	MOHAMMAD ISNAINI SADALI	Universitas Gadjah Mada
Panelist	FATMASARI SIREGAR	Bogor Agricultural University
Panelist	Fakih Irsyadi	Chiba University
Presenter 1	TSUBOUCHI Amane, Natnisha Leelahavanichkul Chiba Municipal Chiba High School, Chulalongkorn University Demonstration Secondary School **Relationship Between the Petal Effect Structure and Water Droplet Retention Strength**	
Presenter 2	Satrio Budiman Universitas Gadjah Mada **Coastal Multihazard and Ecosystem Services in the Ayah–Jetis Coastal Area, Indonesia**	
Presenter 3	NAKAJIMA Yuto Chiba Municipal Inage High School **An Attempt to Extract Saponin from Soybean and Camellia for Antistatic Agent**	
Presenter 4	Gong Ping Mahidol University **Enhancing Thailand's English Teaching Competitiveness**	
Presenter 5	MASUDA Chiho Chiba Prefectural Funabashi High School **Substitution for Sugar in Meringue Making**	
Presenter 6	Rinasari Wijayanti Universitas Gadjah Mada **Spatiotemporal Analysis of Built-Up Areas Using NPP-VIIRS Nighttime Light Imagery (Case Study: Central Java Province, Indonesia)**	
Presenter 7	AIBARA Miho, FUJITA Tomohiro Chiba Municipal Chiba High School **Comparison of Kimono and Hanbok: Materials, Structure, and Climate Adaptation**	
Presenter 8	Williza Maña Cordova University of San Carlos **Crafting Climate Resilience: A Case for Integrating Indigenous Knowledge Through a Panay Bukidnon Student's Perspective**	

International Research Session

Room 2112 (Physics, Animal Science, Engineering (Technology), Information)		
Chairperson	DODI SUDIANA	Universitas Indonesia
Panelist	CHRISTINE LOURRINE S. TABLATIN	Pangasinan State University
Panelist	Savira Aristi	Chiba University
Presenter 1	NAGANO Sae, Prin Anantawong Chiba Municipal Chiba High School, Chulalongkorn University Demonstration Secondary School **Pattern Consistency of Harmonic Amplitude Variation accompanying Pitch Variation**	
Presenter 2	Dara Nur Sabrina IPB University **From Banana Peel Waste to Functional Insect Biomass: Enhancing Antioxidants in Black Soldier Fly Larvae**	
Presenter 3	MIYAO Yuuri Tokyo Metropolitan High School of Science and Technology **Reduction of CO2 Emissions by Utilizing Unexploited Biomass Resources**	
Presenter 4	Boo Zi Yen National Taiwan Normal University **Experimental Study on the Monochromation of Copper X-Rays**	
Presenter 5	WAKUNO Uta Tokyo Metropolitan High School of Science and Technology **Photosynthesis by Chloroplasts outside the Cell**	
Presenter 6	MIYAJIMA Takeru, Dharmatouch Pourpongpun Chiba Municipal Chiba High School, Chulalongkorn University Demonstration Secondary School **Transmission of Force and Its Direction in Bowling**	
Presenter 7	Giovan Christoffel Sihombing University of Indonesia **Automated Indonesian Radiology Reporting for Tuberculosis: Fine-Tuning MedGemma on Local Clinical Data via Low-Rank Adaptation (LoRA)**	

International Research Session

Room 2201 (Biology, Education)		
Chairperson	THITI YANPRECHASET	Slipakorn University
Panelist	WANDEE KASEMSUKPIPAT	Kasetsart University
Panelist	Yuhui Liao	Chiba University
Presenter 1	SHIBAO Kazuki, ISHIMORI Haruto, UCHIDA Keita, SUZUKI Yuto, ISOGAI Koichi, TAKAGI Sakura, NISHIJIMA Takumi, ISOBE Shiori Chiba Prefectural Kisarazu High School **Ice Cream and Muffin Made from Global Rice ~Recreating Japanese Taste~**	
Presenter 2	Ningyu Zhang Mahidol University **Taking the Development of Education in Eastern and Western China as an Example: Does Digital Education Truly Promote Educational Equity?**	
Presenter 3	ISHII Leon Chiba Prefectural Chosei High School **Relation between *Cayratia japonica* Self-non-Self Discrimination in Tendrils and Roots**	
Presenter 4	Guisando Lucky Faith Balame University of San Carlos **Full Inclusion in Practice: Echoes from Secondary Teachers' Experiences in Core Subjects Instruction in the Mainstream Classroom**	
Presenter 5	TSUCHIYA Ayako United Graduate School of Child Development, Osaka University, Kanazawa University, Hamamatsu University School of Medicine, Chiba University and University of Fukui **A Practice Report on an Online Exchange for Young Children Between Japan and Rwanda Using Digital Technology**	
Presenter 6	SHIMA Botan Seijo Gakuen Senior High School **Effect of acoustic stimulation on the chemical and biological qualities of soils**	
Presenter 7	Nguyen Bao Tran Vietnam National University **ADAPTING THE JAPANESE KYUSHOKU MODEL TO PRIMARY SCHOOL LUNCH EDUCATION IN HANOI: NURTURING RESPONSIBLE EATING HABITS THROUGH MOTTAINAI VALUES**	
Presenter 8	YAMAZAKI Kyoko, KUNIYASU Ema, TACHIBANA Chiune Chiba Municipal Chiba High School **Comparison of Storage Stability in Fermented Foods**	

International Research Session

Room 2202 (Biology, Geospatial & Environmental Studies, Geography, Education)		
Chairperson	SUJIRA MUKDA	Mahidol University
Chairperson	SUTHIPORN SAJJAPANROJ	Mahidol University
Panelist	VU CAM TU	Vietnam National University
Panelist	Rizvon Suleimanov	Chiba University
Presenter 1	YOSHIDA Sachiho, YAMASHITA Ryoya, YAMAMOTO Yuina, TOMITA Ayane Hyogo Prefectural Kakogawa Higashi High School **Do freshwater cyanobacteria contribute to iron supply to the sea?**	
Presenter 2	Arierta Pujitresnani University of Indonesia **Preliminary Land Use Analysis for Land Subsidence Assessment along the Northern Coast of Java Using Google Earth Engine**	
Presenter 3	FURUKAWA Miyu Hyogo Prefectural Kakogawa Higashi High School **Conservation activities for the endangered species FUJIBAKAMA in the Kakogawa River and its current status**	
Presenter 4	HANEISHI Reo, ARAI Ririka, NAGASHIMA Mayuko Chiba Municipal Chiba High School **Two Starters, Two Cultures: A Comparative Study of Koji and Nuruk Fermentation**	
Presenter 5	Shivdutt Kushwaha Mahidol University **PSYCHOLOGICAL WELL-BEING AMONG UNIVERSITY STUDENTS IN THE GENERATIVE AI ERA: EFFECTS OF AN AI-LITERACY AND DIGITAL SELF-REGULATION PROGRAM ON WELL-BEING, STRESS, SLEEP QUALITY, AND ACADEMIC ENGAGEMENT**	
Presenter 6	SUGAWARA Karen Chiba Prefectural Funabashi High School **Improvement in Making Dandelion Rubber**	
Presenter 7	BANIQUED, RODOLFO JR. M. Pangasinan State University **PANGASINAN STATE UNIVERSITY - URDANETA CITY AS SCIENCE, TECHNOLOGY, AND ENGINEERING EDUCATION HUB OF THE NORTH: A FORESIGHT STUDY**	

International Research Session

Room 2203 (Biology, Biomedical Engineering, Medical Science, Education)		
Chairperson	CHATREE FAIKHAMTA	Kasetsart University
Panelist	TOCH PHEAKDEY	Royal University of Phnom Penh
Panelist	Punnat Changsalak	Chiba University
Panelist	Armilia Ramandha	Chiba University
Presenter 1	NOJIRI Kotaro, Theerapat Permpolchokkna Chiba Municipal Chiba High School, Chulalongkorn University Demonstration Secondary School **Power generation performance of Aquatic P-MFCs**	
Presenter 2	Innezahra Aurellia Titani University of Indonesia **OPTIMIZING VERTEBRAL DEROTATION IN SCOLIOSIS CORRECTION SURGERY**	
Presenter 3	TAKASUGI Kanna Chiba Meitoku High School **A study on the relationship between weather and migraine**	
Presenter 4	KIMURA Hiroto, Pluemkamon Thongkham Chiba Municipal Chiba High School, Chulalongkorn University Demonstration Secondary School **Unraveling the formation effect of mosquitoes larvae**	
Presenter 5	KAMIO Kazusa, WATANABE Yumina, TAKAZAWA Mari, HATORI Mayu, KAMIOKA Manami, OKAMOTO Rika, KASAI Yuuhi, MURAKOSHI Kaho Chiba Prefectural Kisarazu High School **Amazake and Senbei Made from Global Rice ~ Recreating Japanese Taste~**	
Presenter 6	Yiqi Xiong Mahidol University **Educational Management in China's Higher Education: Challenges and Strategies in Teacher Education**	
Presenter 7	OKUMURA Momoko, YODA Mana Chiba Prefectural Chosei High School **Cosmetics Harm Our Lives!? ～The Impact of Microplastics on Plant Growth～**	
Presenter 8	Via Aini, Topik Hidayat*, Kusnadi, Lilit Rusyati Universitas Pendidikan Indonesia **Assessing the Impact of a Citizen Science Project Webinar on Teachers' and Lecturers' Knowledge**	

International Research Session

Room 2204 (Humanities and Social Science, Life Science)		
Chairperson	YUSLI WARDIATNO	Bogor Agricultural University
Panelist	PAYU KLEEBBUA	Mahidol University
Panelist	Roxana Mayhin Del Rocio Quispe Cuadros	Chiba University
Presenter 1	Sawako Hakamata, Iroha Tanaka, Kosuke Hatakeyama and Rio Ebato Chiba Prefectural Sakura High School **Project Report: Research and Practice of "Kodomo Shokudo"**	
Presenter 2	Aprilia Sarah Kristina University of Indonesia **HeLa Cell Culture and Bioimpedance Characteristics Analysis of Blood Erythrocytes: Optimization of Electric Field Efficiency for Cancer Cell Growth Inhibition**	
Presenter 3	DAIGO Naoya, TSUJI Arisa Chiba Prefectural Funabashi High School **Operating Small Wind Power Generation in Harmony with Nature**	
Presenter 4	KATO Hanon Showa Gakuin Shuei Senior High School **Development of UV Protective Solution from Rice Plant**	
Presenter 5	Firdha Chaylia Ayu Rachmandika IPB University **SINGLE NUCLEOTIDE POLYMORPHISM IDENTIFICATION OF THE eIF4G GENE IN INDONESIAN LOCAL AND HYBRID RICE VARIETIES**	
Presenter 6	YAMAUCHI Mayuko Shibaura Institute of Technology Kashiwa High School **Regional Revitalization by Enhancing Restaurant Value - How "Separation of Dining and Stay" Promotes Emerging Tourist Areas**	
Presenter 7	Lapat Tilokruangchai Chulalongkorn University **Knowledge Regarding Nutrition to Strengthen the Immune System and Food Consumption Behavior During COVID-19**	
Presenter 8	KANEMATSU Shoko Chiba Keiai Senior High School **Dreams can be seen as a mirror of the mind**	

International Research Session

Room 2205 (Humanities and Social Science, Oceanography, Education, Ocean Science)		
Chairperson	PUTU AYU ASTY SENJA PRATIWI	Udayana University
Panelist	KUO JUNG-JUNG	National Taiwan Normal University
Panelist	PANCHIT LONGPRADIT	Mahidol University
Panelist	Margaret Bro	Chiba University
Presenter 1	YAMAZAKI Mao Shibaura Institute of Technology Kashiwa High School **Cultural Policy and Curators' Working Conditions**	
Presenter 2	Kevin Aulia Aryasena Bandung Institute of Technology **Study on the Wave Characteristics of the Lombok Island using Reanalysis Data from ERA5**	
Presenter 3	NISHIHATA Misato Ichihara Chuo High School **Why the World is Obsessed with Japanese Food—Unraveling the Value of Japanese Cuisine**	
Presenter 4	Tran Thu Phuong, Pham Thi My Duyen Vietnam National University **INTEGRATING ECONOMY – SOCIETY – ENVIRONMENT DIMENSIONS IN GEOGRAPHY TEACHING TOWARDS SUSTAINABLE DEVELOPMENT IN GENERAL EDUCATION TO ALIGN WITH SCHOOL CURRICULUM**	
Presenter 5	SUZUKI Mihiro, TANIGUCHI Rina Chiba Prefectural Kogane High School **Bridging Companies and Consumers for Sustainability**	
Presenter 6	KOJIMA Yuishi, SAWADA Taiki, TANIGAKI Hayato, MANABE Eitaro, YOKOYAMA Yuma Hyogo Prefectural Kakogawa Higashi High School **Current situation and issues in designing a new ''District Disaster Management Plan'' ~Awazu District~**	
Presenter 7	Farrah Hanifah Bandung Institute of Technology **Numerical Modeling for Ocean Dynamics and Coastal Flooding: Insights and Applications**	
Presenter 8	SUZUKI Yuri Ibaraki Prefectural Koga Secondary School **Emotional Values and Narrative Structures of Everyday Landscapes in Resident Reviews**	

International Research Session

Room 2207 (Humanities and Social Science, Housing, Life Science, Interdisciplinary Life Science & AI)		
Chairperson	SOVARITTHON CHANSAENGSEE	Mahidol University
Panelist	WITCHAYADA NAWANIDBUMRUNG	Chulalongkorn University
Panelist	Zai Qurratu' Ainie Zainal Abbidin	Chiba University
Presenter 1	TATSUKO Mei, YOSHIDA Sakura Chiba Keiai Senior High School **How to Establish Memory Efficiently**	
Presenter 2	Fanisa Dwi Aulia Milani University of Udayana **DESIGNING INCREMENTAL SUBSIDIZED HOUSING FOR PRODUCTIVE LIVING IN EAST JAVA**	
Presenter 3	BEPPU Chihiro Shibaura Institute of Technology Kashiwa High School **School Design for Developing Student Agency**	
Presenter 4	SUZUKI Ayame Shibaura Institute of Technology Kashiwa High School **Reverse-imported Edition of "The Tale of Genji"**	
Presenter 5	Riska Andriani Bandung Institute of Technology **RECYCLING USED COOKING OIL INTO SOAP AS A STRATEGY TO REDUCE COASTAL AND MARINE POLLUTION IN SUPPORT OF SDG 12: RESPONSIBLE CONSUMPTION AND PRODUCTION**	
Presenter 6	Ichha Kharel, Perera Kavidhi Shumei Yachiyo High School **From Confusion to Confidence**	
Presenter 7	Phuree Thongpaitoon Chulalongkorn University **A Quantitative Framework for Taste Characterization Using Biosensor Arrays and Machine Learning Algorithms**	
Presenter 8	CHIN Waka, HIDAKA Runa, OHTAKE Honoka Chiba Prefectural Sakura High School **Making Life Easier for Foreign Children in Japan**	

International Research Session

Room 2208 (Education, Humanities and Social Science, Social Science)		
Chairperson	ARISARA LEKSANSERN	Mahidol University
Chairperson	POSCHANAN NIRAMITCHAINONT	Mahidol University
Panelist	TAGALOG, RITA MAY PATIÑO	University of San Carlos
Panelist	NUR SULIANTI SUCI PERTIWI	IPB University
Presenter 1	NAGASE Chiaki Chiba University **Difficulties Faced by Homeroom Teachers in Working with Children with Developmental Disabilities in Regular Elementary School Classrooms**	
Presenter 2	KUTSUMIZU Rion Shibuya Kyoiku Gakuen Makuhari Junior and Senior High School **Breaking the Hidden Mechanism of Gender Equality: Why Paternity Leave Changes Everything**	
Presenter 3	Ni Made Somawati Udayana University **Implementation of Tri Hita Karana as a Sustainable Development Model in Desa Adat Bedulu**	
Presenter 4	SAGIUCHI Mei Shibuya Kyoiku Gakuen Makuhari Junior and Senior High School **Dominance Theory and effects on Communication**	
Presenter 5	Rongjun Chu Mahidol University **Teacher Shortage and Teaching Quality Decline in K–12 Education: The Case of Israel with a Comparative Reference to China**	
Presenter 6	HOSOGAI Yuri, ONO Misaki Chiba Prefectural Sakura High School **Recycling Fashion Waste**	
Presenter 7	UEHARA Natsuki, HIRANO Yuika Chiba Prefectural Kogane High School **Educational Support for Children's Future: Study Guide Lending and Children's Canteen**	
Presenter 8	Tolete Jorome Castuera University of San Carlos **Next-Gen Science Instruction: Revolutionizing Teaching Through the Nearpod Application for Interactive Lesson Delivery**	

Proceedings

- High School Students -

The Effect of Particles on Image Clarity in Projection Mapping

Gaku Kawashima[1], Ariya Thammakunma[2]

1. Chiba Municipal Chiba High School, Japan
2. Chulalongkorn University Demonstration Secondary School, Thailand

Purpose and Background

These days, projection technologies are rapidly improving and we have a strong interest in this field. This year, we have collaborated with each other. From last summer, we started to collaborating on our study. And, at the same time, I visited Thailand and did some things for this research. After visiting Thailand, we have been communicating with each other and continuing our study. Purpose of this research is to learn how particle properties—such as size, density, and color—affect the clarity of projected images by using various materials. And, we ultimately want to explore other ways of creating 3D holographic projection, except for the established methods.

Materials and Methods

Set up a projector to project onto a wall, then create a medium of particles between the projector and the wall.

1. Prepare the particle curtains.
2. This time, we constructed the device can drop materials which we want to collect data from more densely and evenly (Randell, 2020).
3. Set up three cameras (Figure 1). This indicates the relationship between the camera and the subject.

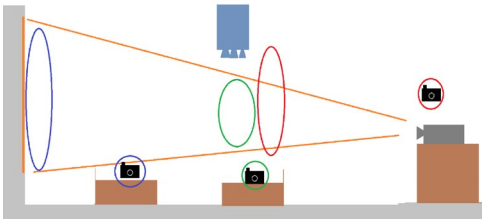

Figure 1 Camera set

Each of them captures the image from the projector before, after passing through and themselves the particles. We analyze the images subjectively which we had taken this time. Also, we judged and analyzed the results with the program can output graphs which compare luminance value before and after the experiments. About the materials which are used in experiments. We use baby powder and chalk powder.

The particle size of baby powder is smaller than chalk powder. To explore differences in projected images by using other colors, we prepare for White and Blue, Yellow colored chalk.

Results and Discussion

Projection experiments were conducted using baby powder, white chalk powder, and colored chalk powders (blue and yellow). Visually, baby powder produced the clearest particle curtain and projection image (Figure 2), followed by white chalk powder, which showed a slightly weaker result due to lower particle density. Projected images were also visible on blue and yellow particle curtains; however, these images appeared less clear than those produced by baby powder and white chalk. In addition, the colors of the particles interacted with the projected images. The images were captured from identical positions and analyzed using luminance values (Figure 3). Compared to the reference image taken before the experiments, baby powder and white chalk showed wider luminance distributions. In contrast, blue and yellow chalk produced luminance distributions closer to the reference image.

Overall, the results generally support our hypothesis that higher-density, smaller particles produce clearer projections. However, differences were observed between subjective visual evaluations and objective numerical analysis. Future work will expand evaluation metrics and improve particle density control for more reliable analysis.

Figure2 Visual result

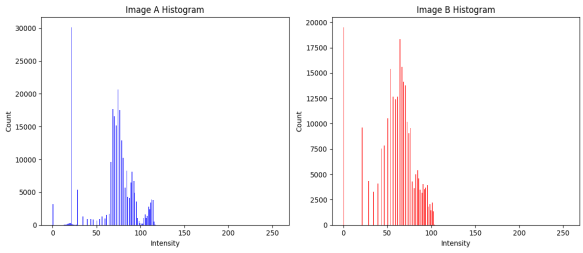

Figure3 Analytical result

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The difference between O-ring and grooving surfaces

Waka Hayashi[1] , Phoomjai Thienthammaiak[2]

1. Chiba Municipal Chiba High School, Japan
2. Chulalongkorn University Demonstraition Secondary School, Thailand

Purpose and Background

In this research, we focused on road surface designs that help prevent slipping. Currently, two common methods are used: grooving and O-ring patterns. Grooving is good for draining water and is often used on highways, airport runways, and sharp curves. O-ring pattern is expected to increase slip resistance and is used on steep slopes. We found that the O-ring shape is often chosen not because it's the most effective, but because it's easy to make. That made us wonder—could there be other shapes that work even better? That question became the purpose of our research.

Materials and methods

Experiment 1[1]

- Concrete board
- Smartphone
- A 1021 g weight
- Rubber mold

Experiment 2

- Motor

Experiment 3

- PC (Python)

Place a rubber mold with a weight on a concrete board. Gradually increase the angle of the board and observe the angle at which the rubber mold begins to slide.

Compare friction patterns using two approaches: a physics-based simulation.

A Python simulation modeled how different friction patterns affect motion and energy loss.

Results and discussion

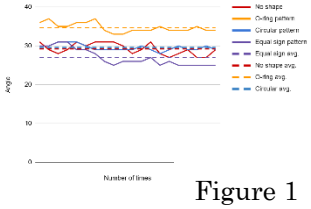
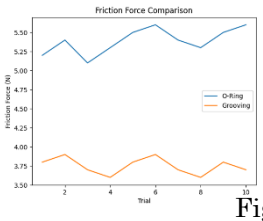


Figure 1



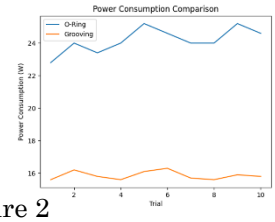


Figure 2

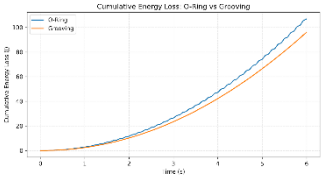


Figure 3

Experiment 1 did not lead to the discovery of a shape more effective than the O-ring. (Figure 1) However, through testing various shapes, we reached the conclusion that grooves angled diagonally to the direction of motion may contribute to an increase in the coefficient of static friction. During the experiments, the concrete plates used produced dust, which we wiped off each time. This cleaning process, along with residual moisture or dust, may have caused some discrepancies in the results.

Experiment 2 revealed that the O-ring generates more friction than the grooving surface, resulting in a higher motor load and increased power consumption, leading to greater energy loss.(Figure 2)

Experiment 3 confirmed that the O-ring causes more energy loss compared to the grooving surface.(Figure 3)

Therefore, based on the results of Experiments 2 and 3, it can be concluded that if greater energy loss is desired, the O-ring is the more suitable choice.

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How to Make Fluffy Pancakes

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Purpose and Objective

This study aims to investigate how carbon dioxide affects the expansion of pancakes and to determine which methods produce the fluffiest texture. In general, a low-density pancake indicates effective bubble formation and gas retention within the batter. Pancake rising occurs due to the production of gas and the development of a stable structure that traps this gas during baking.

Materials and Methods

In this experiment, 18 grams of egg and 36 grams of pancake mix were placed in a bowl. Then, 12 grams of a variable ingredient for each experiment were added and the mixture was mixed with a spatula. The quantities of each ingredient were calculated based on information from Morinaga & co., ltd. (n.d.). Five Basic Tips for Making Fluffy Pancakes. Sodium carbonate and acid react to produce carbon dioxide (Ogawa et al. 2025); therefore, baking soda and vinegar were included as one of the variable ingredients. Next, a hot plate was preheated to 170°C for 5 minutes. The batter was poured into a silicone mold and tapped 10 times. The pancake was baked for 9 minutes on the first side and 6 minutes after being flipped. The height and mass were measured after baking and after resting for 30 minutes. Five pancakes were prepared for each type of ingredient.

<Table 1> Results of Experiments

	Hight (cm)		**Weight (g)**		**Volume (cm^3)**		**Density (cm^3)**	
	Just after baking	**After 30 min**	**Just after baking**	**After 30 min**	**Just after baking**	**After 30 min**	**Just after baking**	**After 30 min**
Water (in yolk)	2.72	2.58	57.6	55.8	150.7	142.9	0.38	0.39
Water (no yolk)	2.34	2.16	54.8	54.0	129.6	119.7	0.42	0.45
Milk	2.84	2.94	58.4	49.2	157.3	162.9	0.37	0.30
Carbonated Water	2.66	2.62	58.8	56.0	147.4	145.1	0.40	0.39
Baking Soda + Vinegar	3.38	3.16	59.4	56.2	187.3	175.1	0.32	0.32

Results and Discussion

The graph shows that the pancake made with baking soda and vinegar had the greatest height and volume and had the highest mass. The lowest density was observed in the baking soda and vinegar pancake immediately after baking. Overall, these results suggest that carbon dioxide production plays a key role in making pancakes fluffy.

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We want to make a color changing spray!!!

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1. *Chiba Municipal Chiba High School, Japan*
2. *Chulalongkorn University Demonstration Secondary School, Thailand*

Purpose and background

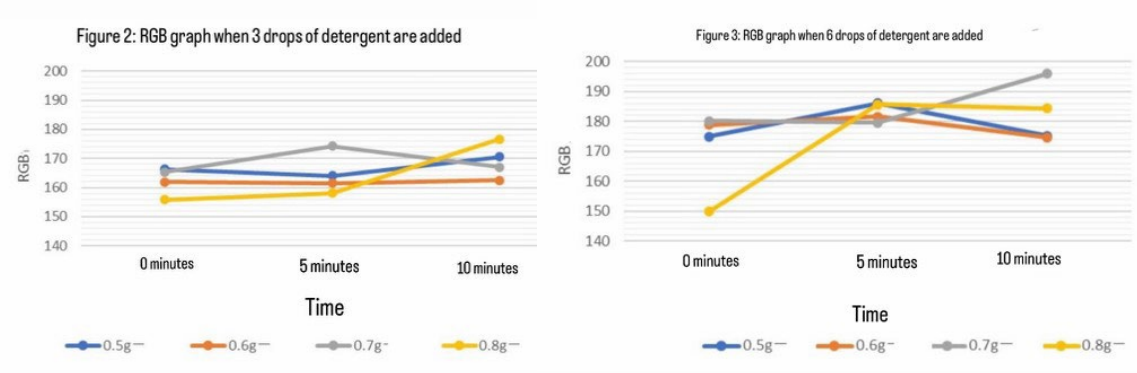
It is difficult to visually confirm where a spray has been applied. We came up with the idea of a system that is initially colored so that the sprayed area can be clearly seen but becomes colorless over time. Therefore, we aimed to develop a spray that reacts with carbon dioxide in the air and turns transparent within 15 minutes. Since it would be inconvenient if the color remained for too long, we set a time limit of 15 minutes. In addition, we investigated the relationship between the concentration of sodium carbonate and the time required for the color to disappear. We used a glue mechanism called a fading color pit (Tombow Pencil Co., Ltd.).

Material and methods

- Sodium carbonate (0.5–0.8 g) was dissolved in 10 mL of water-repellent solution.
- Two drops of phenolphthalein were added.
- In Experiment II, detergent containing a surfactant was added.
- Solutions were sprayed under identical conditions.
- Color change was recorded and RGB values were analyzed.

Change the pH value through an acid–base reaction with carbon dioxide to turn the pink solution colorless.

Results and Discussion



For figure2 and figure3, the addition of detergent increased the color intensity of the solution. In Experiment II, the sprayed solution became transparent within 15 minutes, regardless of sodium carbonate concentration. These results suggest that surfactants improve color visibility, and that the disappearance time may be influenced by the surface area of the sprayed solution. Design a container structure that minimizes the surface area of the liquid exposed to air so that the color does not disappear during storage.

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The Relationship Between the State of Starch Solution and Iodine Clock Reaction

Nozomi Sato

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Purpose and Background

Based on our experience of the iodine clock reaction failing to occur, we decided to investigate the conditions under which the iodine clock reaction succeeds.

Materials and Methods

I investigated how the heating method and heating time affect the iodine clock reaction. I used two heating methods: a microwave oven and a hot plate. I conducted the experiment ten times while changing the heating temperature. I adjusted the temperature changes so that they were similar for both heating methods. After heating, the starch solution was cooled at room temperature until it reached 25°C, and then the experiment was carried out.

Results and Discussion

Table: Table of heating temperature, heating time, and color after reaction (microwave in orange, hot plate in blue)

Temperature (°C)	Time until reaction	Color after reaction	
38.9	10.39	Discolored to brown	×
44.2	10.4	Discolored to brown	×
57.9	10.66	Discolored to brown	×
58	7.55	It changed to bluish purple, and then to brow	△
60.3	5.78	It changed to bluish purple, and then to brow	△
73.2	6.26	Discolored to bluish-purple	○
75.6	6.57	Discolored to bluish-purple	○
78.2	5.48	Discolored to bluish-purple	○
82.7	4.72	Discolored to bluish-purple	○
85	4.14	Discolored to bluish-purple	○

Temperature (°C)	Time until reaction	Color after reaction	
39	11.4	Discolored to brown	×
44.5	10.52	Discolored to brown	×
57.4	6.05	Discolored to bluish-purple	○
58.5	5.6	Discolored to bluish-purple	○
59.6	4.49	Discolored to bluish-purple	○
73.4	8.59	Discolored to bluish-purple	○
75.8	8.27	Discolored to bluish-purple	○
78.4	5.65	Discolored to bluish-purple	○
82.9	4.99	Discolored to bluish-purple	○
84.4	9	Discolored to bluish-purple	○

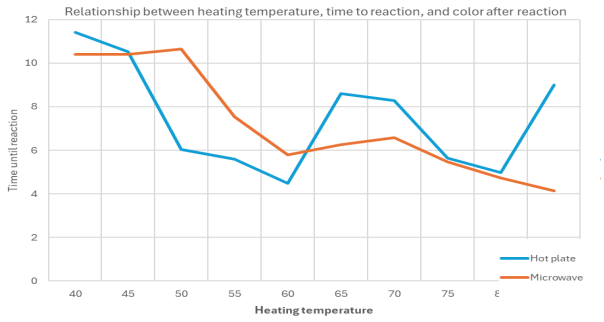

Fig: Relationship between heating temperature, time to reaction, and color after reaction

The temperature at which starch gelatinization progresses[1] and the temperature at which the reaction time suddenly shortened in the experiment overlapped, indicating that starch gelatinization is related to the iodine clock reaction. Compared to a hot plate, a microwave can provide more consistent results regarding the time it takes for the reaction to occur.

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The Formation of Stripes in the Cross-Section of Sand Mountains Formed by Falling Sand

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Chiba Prefectural Sakura High School, Japan

Purpose and Background

We can observe beautiful stripes with the simple operation of dropping sand. We started researching this topic because we were very curious about the strange stripes[1]. We researched with the aim of clarifying how stripes are formed and what factors are involved in changing the stripe pattern.

Materials and Methods

We made two different laboratory observation tanks A and B. The width of A is 0.75cm. B is 1.0 cm. We used three types of sand or beads, red colored sand (590μm-1190μm), small glass beads (63μm-74μm) and large glass beads (500μm-710μm). (Below, they are written as red, small white, large white.) The basic operation is listed on the right.

Put two kinds of sand into a jar and mix them

↓

Pour sand through a funnel into A or B

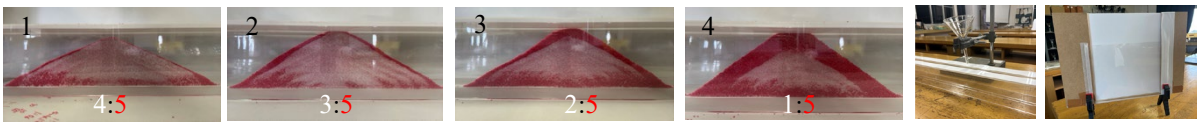
↓

Take a photo of cross-section from the front using an iPhone

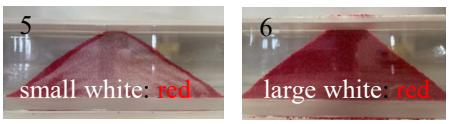
Experiment 1 is an experiment about the relationship between the mass ratios. We experimented with 4 patterns of mass ratio with red and small white. Experiment 2 is an experiment about the relationship between the particle size ratios. We did it with different types of particle size ratios. One type has a large particle size and uses red and small white, and the other has almost the same particle size and uses red and large white. (In experiments 1 and 2, we used laboratory equipment A.)

Results and Discussion

Experiment 1 – From photos 1 to 4, a ratio of 3:5 stripes were clearly visible. From this result, there is some relationship between the mass ratio and the formation of stripes.

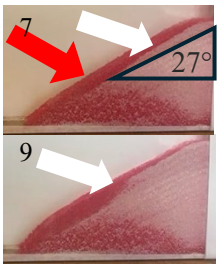


Experiment 2 – From photos 5 and 6, a larger sand particle size ratio tends to form strips. From this result, there is some relationship between the particle size ratio and the formation of stripes.



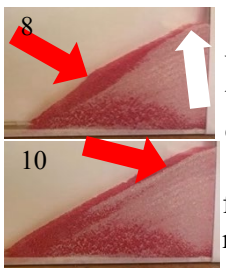
	Red	Small white	Large white
Angle of repose[2]	37°	27°	34°

From photo 5, we can understand that stripe patterns are formed regularly. Therefore, we conducted an experiment using laboratory equipment B to investigate sand mountain formation in greater detail. A mixture of small white and red in a 3:5 ratio was dropped, and the formation of sand piles was recorded on video using an iPhone's slow-motion camera. We thought 4 operations were repeated and the stripes are formed in the process of sand mountain. (The table above shows each angle of repose.)



The small white forms a mound with a boundary steeper than 27°. The red forms a 37° repose slope.

The small white flows down and accumulates on top of the red, forming strips. The small white doesn't reach the base.



Near the summit, the small white appears and its slope nears the repose angle. The red frows downslope as the boundary

During stage 3, the red flows down the surface, returning to stage 1.

In the future, we will research the formation pattern with more than 3 types of sand and examine the rules of the formation process focusing on the angle of repose.

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Acicular Crystals of Caffeine from Tea Leaves

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Purpose and Background

When green tea leaves are heated, white Acicular crystals of caffeine appear (Fig1). In this phenomenon, I investigated the conditions necessary to observe larger, cleaner crystals from the specimens.[1]

Fig1. Changes in green tea leaves due to heating

Experiment

Expriment1

Investigating what change occurred in the crystals depending on the sample used and the heating temperature.

Materials and Methods

Four types of samples were used in this study: green tea leaves, black tea leaves, ground coffee beans, and instant coffee powder [2]. All samples were commercially available food products.

Each sample was placed in an aluminum cup and heated on a hot plate. The hot plate surface temperature was set to 150 °C, 180 °C, or 210 °C. Samples were heated continuously for 90 minutes under each temperature condition. For comparison, heating was conducted under two conditions: with a lid covering the aluminum cup and without a lid. All experiments were performed under identical heating durations and temperature settings for all sample types and conditions.

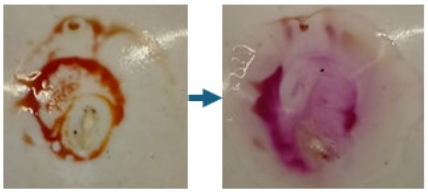

Fig2. murexide reaction

Results and Discussion

The sample with the most crystals was green tea leaves, while instant coffee turned the sample into a sticky paste. The sublimation point of caffeine is 178℃, so 150℃, is a low temperature. All crystals were confirmed to contain caffeine using the murexide reaction (Fig2).

Table1. Result of experiment1 About the amount of crystals.

☆=A particularly large amount of crystals was observed ○=Crystals were observed
△=Only small amount of crystals was appeared ×=NO crystals were observed

	Green Tea Leaves			Tea Leaves			Ground Coffee Beans			Instant Coffee		
	No Lid	With Lid		No Lid	With Lid		No Lid	With Lid		No Lid	With Lid	
	Surface	Surface	Lid	Surface	Surface	Lid	Surface	Surface	Lid	Surface	Surface	Lid
150°C	×	×	×	×	×	×	×	×	×	×	×	×
180°C	☆	☆	○	△	△	○	○	○	△	×	×	△
210°C	☆	○	☆	△	△	○	○	△	○	×	×	△

Expriment2

The locations where crystals tend to appear are reversed between 150°C and 180°C.
The temperature of the surrounding air was measured to examine the influence of the heated samples on ambient air temperature (Fig. 3).

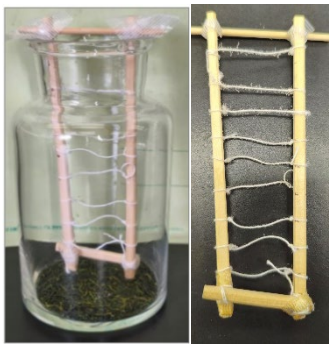

Fig3. laboratory equipment

Materials and Methods

Threads were arranged in a ladder configuration within the experimental setup. The assembly was placed on a hot plate, and heating was conducted at a surface temperature of 220 °C. Crystal formation on the threads was monitored during heating.

Results and Discussion

When heated at 220 °C, large crystals were observed at the upper part of the thread assembly, where the temperature was relatively lower. In contrast, fewer crystals formed near the hotter region close to the hot plate. These observations suggest that excessively high hot plate temperatures inhibit crystal formation directly on the sample surface.

Conclusion

These experiments showed that heating green tea leaves to 180℃ is the best way to obtain larger, cleaner crystals. In the future, I would like to explore factors other than temperature.

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Does the feeling of regret enrich our lives?

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Purpose and Background

This research was inspired by a quote from Vincent van Gogh [1]: "If one has no regret, life would be very empty." These words suggest that regret is a universal emotional experience. It is anticipated that individuals can enrich their lives by understanding how this negative emotion affects their daily lives. In this study, "regret" is defined as a negative emotion such as frustration or sorrow, directed toward one's past choices [2]. Conversely, "helpful" refers to an emotional process that has a positive impact on oneself.

Materials and Methods

In this study, interviews were conducted with 46 participants, including both students and teachers (Figure 1, 2). To investigate the extent to which the emotion of regret influences their lives, the following questions were asked: “Is regret helpful?”, “How strong was the feeling?”, and “Why was it helpful?”

Results and Discussion

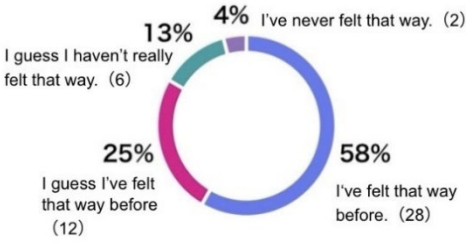

Figure 1

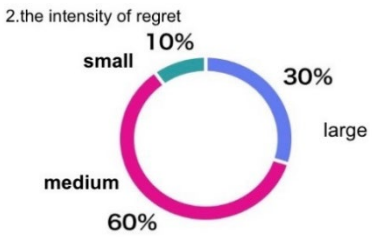

Figure 2

Table 1

strength	What you failed at	What you learned		
medium	I regretted not having the courage to take the first step toward what I wanted to do.	I learned how important it is to try something first rather than hesitate.		
strength	**What you failed at**	**What you learned**	**Teacher**	**Subject**
medium	I failed to complete the tasks I had to do, and as a result, I wasn’t able to finish preparing for the exam.	I made sure to prepare in advance.	Teacher A	Math

The findings from Study1 are summarized above (Table 1). In study2, one participant expressed moderate regret over not having the courage to “take the first step.” This participant highlighted the importance of trying rather than hesitating.

This study revealed that the desire to avoid mistakes was stronger than the desire to succeed. An interesting finding was that regret leads individuals to reflect on their future and motivates them to change their behavior [2]. Furthermore, many participants experienced a moderate level of regret (Figure 2). This indicates that regret possesses a unique power to encourage future-oriented thinking and provide the energy necessary for taking action [4]. In conclusion, regret plays a significant role in leading to personal growth. Our research shows that many participants experienced moderate regret, which they linked to learning and personal growth. For example, some students who previously remained silent in class begin to raise their hands, even if they were afraid of making mistakes. These results suggest that regret should not be viewed as a failure, but rather as valuable opportunity for growth.[3]

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Relationship Between the Petal Effect Structure and Water Droplet Retention Strength

Natnisha Leelahavanichkul[1], Amane Tsubouchi[2]

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2 Chiba Municipal Chiba High School, Japan

Purpose and Background

- The petal effect is a water-repellent phenomenon which strongly holds water droplets to the surface.
- The petal effect has not yet been applied very often in daily life, but we thought it could be used in everyday products such as cosmetics.
- In order to apply the petal effect to everyday products, we wanted to clarify the structure of the petal effect when the water droplet retention force is at its maximum from a physical perspective.

Materials and Methods

1. Model the structure of a petal effect structure
2. Create models using a 3D printer
3. The model is tilted at a 30-degree angle, and 10 balls are dropped from the top.
 (The diameter of the ball is 5 mm)
4. Measure the time it takes for all the balls to fall
5. Repeat 10 times and calculate the average value

In Experiment 1, the distance between the bumps was changed. In Experiment 2, the size was changed. In Experiment 3, the shape was changed. Three models of each type were created, and the time it took for all the balls to fall was compared. We thought the longer it took the stronger the petal effect would be.

Results and Discussion

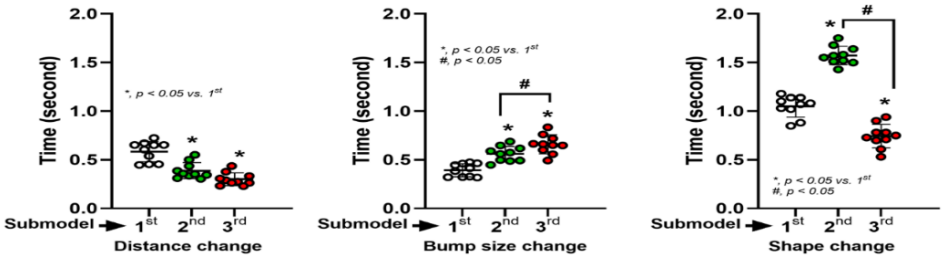

Figure 1. Results of Experiments 1, 2, and 3

- As shown in Figure 1, the results were analyzed using ANOVA and Tukey to determine whether the differences in the experiments were significant. Results marked with * and # indicate significant differences.
- To summarize, the distance between the bumps should be small and greatly uneven to catch the water droplets and increase the retention force.

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An Attempt to Extract Saponin from Soybean and Camellia for Antistatic Agent

Yuto Nakajima[1, 2]

1.Chiba Municipal Inage High school, Chiba, Japan
2. Chiba University STELLA Program ASCENT-6E, Chiba, Japan

Purpose and Background:

Antistatic agents are substances that reduce static electricity of clothes, machines and so on. Since they are usually made with petroleum-derived surfactants, these agents cannot be considered sustainable. On the other hand, saponins are widely recognized as plant-derived surfactants. To develop eco-friendly antistatic agents, this study extracted saponin from soybean(Glycine max) and camellia(Camellia Japonica) and tested their purity.

Materials and Methods:

The initial experiment compared the extraction method in soybean to remove other substances, particularly oil from the samples. Basic extraction procedure involved refluxing the sample in methanol(80 ℃, methanol:sample=4:1) for 60 min, followed by evaporation of the methanol. 1) Degreasing procedures with hexane were inserted as shown in Table1. To compare the contents of extracts, infrared spectroscopy was employed. Materials: soybean, soybean oil cake, saponin reagent, methanol, hexane,water bath, evaporator, funnel

Table1: Extraction Procedures

Procedure	Sample	Degreasing
[1]	Soybean	-
[2]	Soybean	After refluxing
[3]	Soybean	Before refluxing
[4]	Oil cake	Before refluxing

In the second experiment, the purity of extracted saponin was evaluated by phenol-sulfuric colorimetric method. Absorbance of the mixture of 1mL of saponin solution, 1mL of 5% phenol solution and 5 mL of concentrated sulfuric acid at a specific wavelength is proportional to saponin concentration. 2) 3) The mixture was heated at 80 ℃ for 30 min, and then cooled down to measure the absorbance at 483 nm. Materials used: soybean oil cake extract(by procedure[4]), camellia oil cake extract(by procedure[1]), saponin reagent, methanol, water bath, 5% phenol solution , concentrated sulfuric acid

Results and Discussion

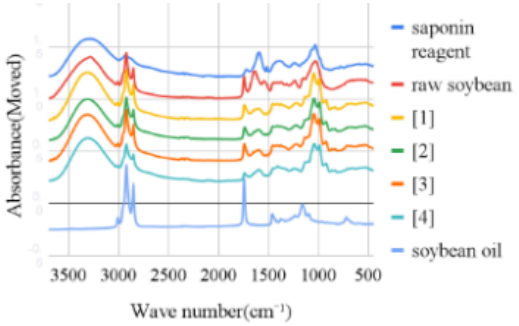

Figure1: Infrared spectrum of each extract

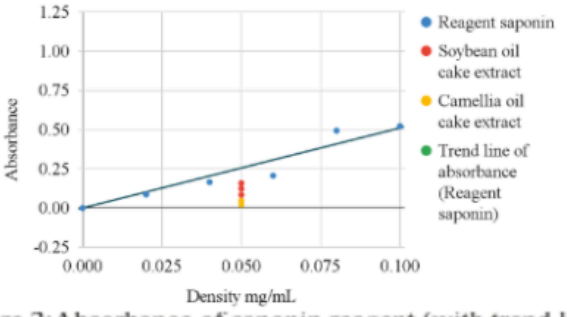

Figure 2:Absorbance of saponin reagent (with trend line) and extracted saponin at 483nm

As shown in Figure 1, absorption peaks around 2950 cm^{-1}, 2850 cm^{-1}, and 1750 cm^{-1} indicate the precence of oil. The spectral shapes of [2] and [3] showed distinct peaks and were similar to [1], suggesting the oil-removal procedure was ineffective. In contrast,the intensities of the pol-derived peaks were reduced when oil cake [4] was used. Therefore, it was revealed using oil cake was effective to extract with less impurities. Also, calculation from Figure 2 indicates that soybean oil cake extract contained 47.8±23.2% of saponin and camellia oil cake extract contained 13.4±9.6% of saponin compared to saponin reagent.

These results suggest that relatively pure saponin can be extracted through an easy and reasonable way by using oil cakes. Since saponins certainly have potential as antistatic agents, further research is necessary. Extracts gained through the experiments should be evaluated for their antistatic properties.

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Substitution for Sugar in Meringue Making

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Purpose and Background

Meringue stability depends on egg white proteins and the water-holding ability of sugar[1)2)]. In preliminary experiments, pectin caused gelation and artificial sweeteners produced excessive sweetness. Therefore, this study evaluates indigestible dextrin, a highly hydrophilic polysaccharide, as a sugar substitute for stabilizing meringue.

Materials and Methods

Dried egg white (3.00 g, Kikuya Co., Ltd.) dissolved in water (30.0 mL) was used. The mixture was whipped with a hand mixer under identical conditions until it held its shape when the bowl was inverted.
The following conditions were tested:
Sugar (30.0 g or 60.0 g) ,No additive,Indigestible dextrin (Fibersol 2®, 15.0 g, 18.0 g, or 20.0 g)

The stability of the meringue was evaluated by the following methods.

①Bubble observation[3)]

Fresh meringue was observed using a digital microscope. The number of bubbles in a 1.3 mm × 1.3 mm area was counted. Each condition was measured nine times (three samples × three locations).

②Water separation[4)]

Ten grams of meringue was placed on a tea strainer set over a cup and covered to prevent evaporation. The volume of separated liquid was measured every 10 min.

Results and Discussion

①Bubble observation

The number of bubbles increased as the amount of indigestible dextrin increased (15.0–20.0 g).
Meringue containing 20.0 g of indigestible dextrin showed a higher bubble count than that containing 30.0 g of sugar.

②Water separation

Water separation decreased with increasing amounts of dextrin. The time course of water separation for 20.0 g dextrin was similar to that for 30.0 g sugar, suggesting comparable stability between these conditions.

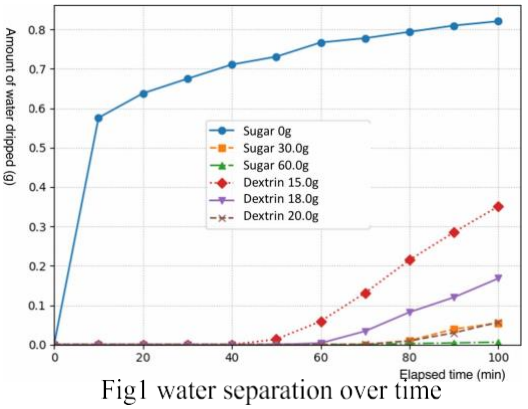

Fig1 water separation over time

The results of this study indicate that both sugar and indigestible dextrin enhance the stability of meringue, with stability tending to increase as the amount added increases. Their high hydrophilicity, due to abundant hydroxyl groups, likely enhances water retention and foam stability. These results suggest that an appropriate mass ratio of dextrin to egg white is critical for stabilization.

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PATTERN CONSISTENCY OF HARMONIC AMPLITUDE VARIATION ACCOMPANYING PITCH VARIATION

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Purpose and Background:

When humans change the pitch of their voice, both the frequency distribution and the amplitude of each harmonic vary. Standard mechanical transposition of a voice often sounds unnatural because it changes the fundamental frequency without altering the amplitude of each harmonic. The purpose of this research is to identify the rules governing harmonic amplitude changes caused by human pitch variations. Understanding these rules will assist in correcting unnatural vocal shifts during audio processing.

Materials and Methods:

Methods involved a preliminary experiment with three subjects analyzing the amplitudes of harmonics F0 through F10 across a C3-C4 chromatic scale. Experiment 1, a verification step, used 111 participants under strictly controlled conditions (80dB volume, 80 BPM, minimal reverberation) with analysis performed using Voxengo SPAN and Sonic Visualiser. Experiment 2 focused on practical application, testing a new pitch-shifting method: first, an averaging process flattened the EQ to neutralize vocal timbre, followed by transposition and then restoration of the original timbre. This process produced a result that successfully mimics harmonic structure and sounds significantly closer to a human voice than standard pitch-shifting algorithms.

Results and Discussion

The preliminary experiment revealed a consistent pattern where a shift occurs in the pitch displaying the maximum amplitude. Specifically, higher harmonics tend to reach their maximum amplitude at lower pitches. Experiment 1 confirmed these results and also identified a predictable "second shift" across pitch, indicating a more complex movement(Figure 1).

Standard mechanical transposition disrupts natural vocal timbre by stretching the spectral envelope along with the pitch. To address this, a flattening process can be applied prior to transposition to neutralize the timbre, providing a cleaner signal with fewer digital artifacts. Following transposition, the original timbre must be restored. While standard restoration relies on a static EQ curve, utilizing the collected harmonic amplitude data dynamically reconstructs the unique vocal characteristics of the subject, resulting in a more authentic human sound(Figure 2). Future work will focus on finding additional patterns in the analyzed data and employing advanced mathematical techniques to refine the averaging and peak reconstruction method. By separating pitch from timbre , this approach can be applied to vocal tuning and virtual synthesizers to eliminate digital artifacts and preserve an authentic, human-sounding vocal identity.

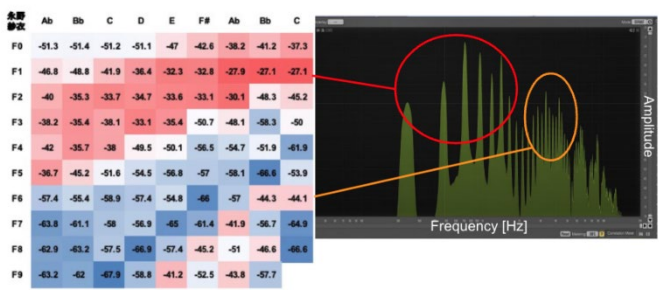

Figure 1. “second shift” across pitch

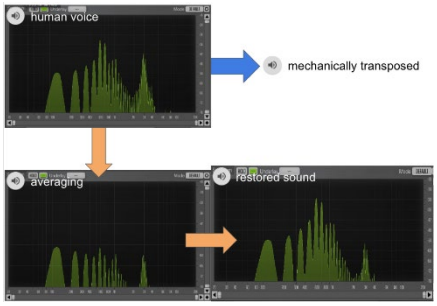

Figure 2. flattening process

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Transmission of Force and Its Direction in Bowling

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2. Chulalongkorn University Demonstration Secondary School, Thailand

Purpose and Background

■This study investigates how to throw a bowling ball to knock down the maximum number of pins.

■This study measures the degree of randomness in the collision process.

■We hypothesized when two balls collide, the collision angle would be equal to the theoretical value. Collision angle: At the time of impact, the angle between the line connecting the center of the pin and center of the ball and line parallel to the direction of the ball's movement. Actual measured value: Of the angles mentioned earlier, the one of the pin sides (Hiroe. n.d.).

Material and Methods

■In Experiment 1, we used the physics cart with a ball on the top to investigate the effect of no rotation. And we placed this device on the slope, released it, and hit the pin 30 times. Also, the collision angle was changed to 0°, 30°, 45°, and 60° using trigonometric ratios.

■In Experiment 2, we removed the cart and vertical rotation, following the same procedure as in Experiment 1.

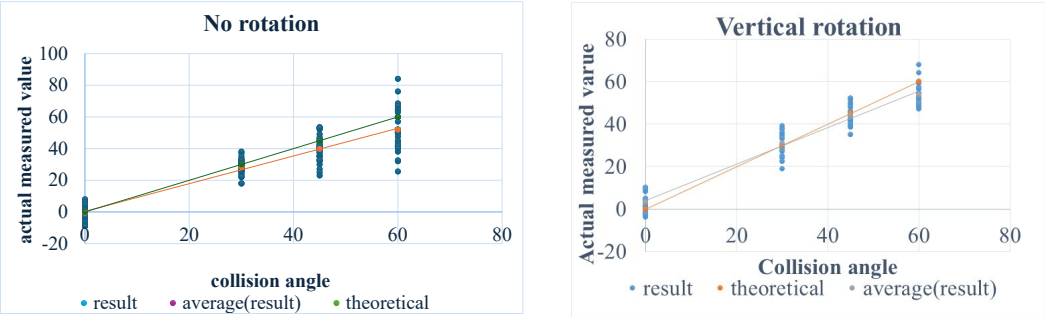

Figure 1. Measured and theoretical values under (a) no rotation and (b) vertical rotation.

Results and Discussion

■As shown in Figure 1, the results of both Experiment 1 and 2 were close to the theoretical value. Overall, the results were smaller than the theoretical value. This is probably due to the effect of friction between the ball and the pin.

REFERENCES

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Relation between *Cayratia japonica* Self-non-Self Discrimination in Tendrils and Roots

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Purpose and Background

My research aims to explore how *Cayratia japonica* adapt to a change in environment. *C. japonica* is a vine and common weed in Japan. It has already known that a lot of plants show recognition near plants in root. On the other hand, *C. japonica* has self-non-self discrimination in its tendril[(1)], which means *C. japonica* distinguish the host around which it coils its tendrils. From these researches, I have been interested in this function, and decided to start this research. I hypothesized that *C. japonica* self-non-self discrimination in tendrils and roots influence on each other.

Materials and Methods

(A) Preliminary experiment

To verify the previous research, I conducted Preliminary experiment from June to September 2025. I collected some *C. japonica* rhizomes at Mobara city and Isumi city (both Chiba, Japan) and put them into commercial pots with commercial soil. I observed how much its tendril coils around living objects including *C. japonica*, *Solanum lycopersicum*, and *Erigeron sumatrensis* (they are common weeds in the area), and non-living objects including kite strings, fishing lines, plastic rods, disposable chopsticks, and embroidery threads.

(B) Exploring the self-discrimination in tendrils and roots

I have conducted this research from November 2025. I hypothesized that if *C. japonica* roots are placed in the direction of a tendril coiling, self-non-self discrimination will change its response(fig.1). I transplanted *C. japonica* rhizomes into rectangular pots with commercial soil. Then I localized another *C. japonica* root in the direction. I recorded the movement of it with time-lapse photography. The temperature is approximately 23℃.

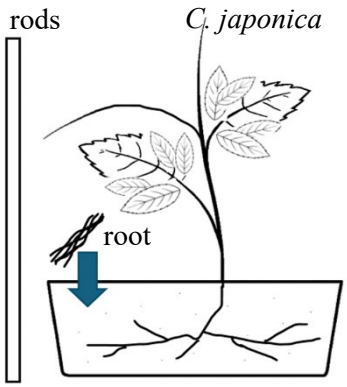

Figure 1. a hypothesis image

Results and Discussion

Experiment (A)

The result suggested that *C. japonica* shows less coils around *C. japonica* and fish lines(fig.2). Thus, the result is consisted with the previous research, and the verification is completed. I think the reason Fishing lines decreased is related to the difference in their tensions.

Experiment (B)

This experiment has been achieved only one for now (Feb. 2026). In the experiment, the movement altered and the result implied that the farther *C. japonica* is from the root, the more it grows. Now the trouble is that the number of experiments and reproducibility are insufficient because of a luck of my skill in cultivation management.

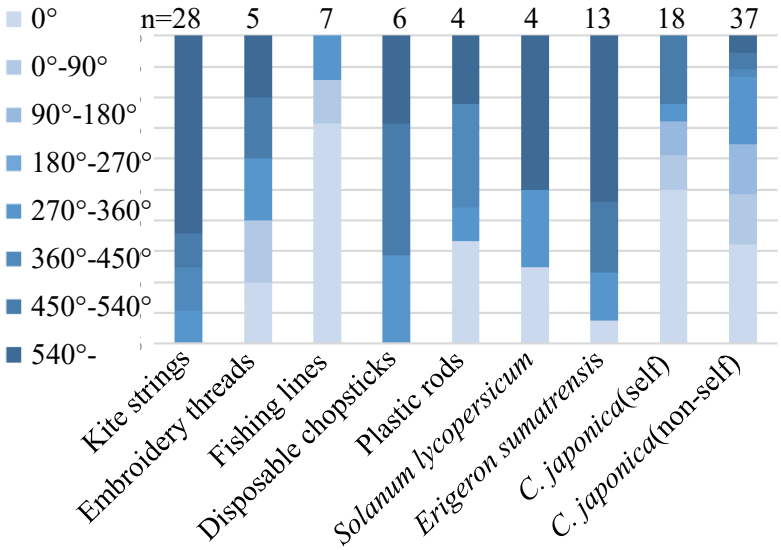

Figure 2. the target of coils and its strength (the number of coils)

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Effect of acoustic stimulation on the chemical and biological qualities of soils

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2. Chiba University STELLA Program ASCENT-6E, Chiba, Japan

Background:

Sound can affect human brain. My question was if sound can affect soil organisms that do not own brains. My objective was to test whether sound influences soil chemical and biological properties that in fact impact soil qualities and crop productivity in agriculture.

Materials and methods:

I prepared 3 types of soil: sandy, organic, and organic but sterilized soils. Then, these soils were exposed to sound of cicadas, about 70 dB for 6 weeks in 30 °C incubators. I also prepared the same soil sets in incubators without sound. During and after 6 weeks of incubation, soils were evaluated as follows: pH, electrical conductivity (EC), and organic matter decomposing activity. Organic matter decomposing activity was measured using Tea-Bag Index (TBI) [1)2)]. Data were statistically analyzed using paired t-test.

Results and Discussion:

Sound did not significantly change pH and EC of soils. Organic matter decomposing activity, measured as TBI, was significantly higher in sound treatment (Figure 1, $p = 0.022$). This result indicates the sound increased microbial activity and decomposition rate. Also, teabag weight reduction was larger in organic soils as compared with in sterilized organic soils, indicating the importance of soil microorganisms. Further investigation is needed to verify whether sound affects the soil microorganisms themselves. If sound stimulates soil microorganisms, it may have potential as a restorative tool to enhance agricultural productivity in soils severely degraded by environmental stresses such as desertification, salinization, and pollution.

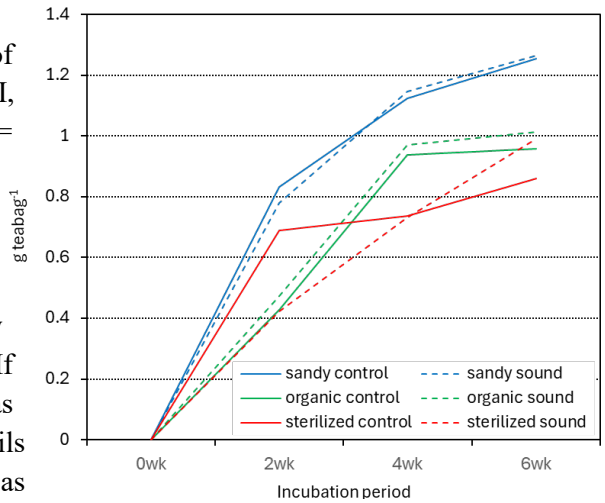

Figure 1. Organic matter decomposing activity measured as tea bag weight loss

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Improvement in Making Dandelion Rubber

Karen SUGAWARA
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Purpose and Background

Natural rubber is primarily sourced from rubber trees; however, dandelions have emerged as a promising alternative due to the rubber components in their roots. Despite this potential, current extraction methods—which rely on solvents like heptane—are energy-intensive and pose sustainability challenges. The objective of this study is to establish a more stable and sustainable supply chain for dandelion rubber.

1. **Resource Efficiency:** Replanting root residues that are typically discarded as waste after harvest.
2. **Energy Reduction:** Alternative solvents selection that operate effectively at lower temperatures.

Materials and Methods

Replanting Experiments using Residues: To determine the relationship between taproot length and lateral root growth, **root residues** were cut into seven different lengths and observed outdoors for three weeks (Method 1). A subsequent indoor experiment used a consistent residue length (50 mm) (Yamaguchi & Tani, 2016) to identify the specific zones where lateral roots develop most frequently (Method 2).

Solvent Selection via Solubility Parameter, etc.: To minimize energy consumption during extraction, the solubility parameters of various hydrocarbons were calculated. Candidates were selected by three criteria: **(A)** a Hilderbrand Solubility Parameter (δ) value close to polyisoprene (16.2), **(B)** a boiling point between 27°C and 100°C, and **(C)** safety for human health.

Results and Discussion

Replanting Experiments using Residues: Method 1 showed high variance and no significant correlation between total residue length and lateral root growth. However, Method 2 revealed that the **10–20 mm depth segment** is the most productive zone for side root development. This suggests that replanting **root residues of 10–20 mm in length** can efficiently stabilize the raw material supply and reduce waste.

Fig. 1 Results in Method 1

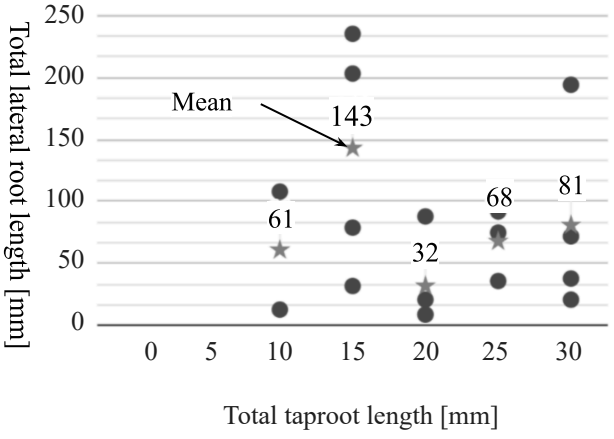
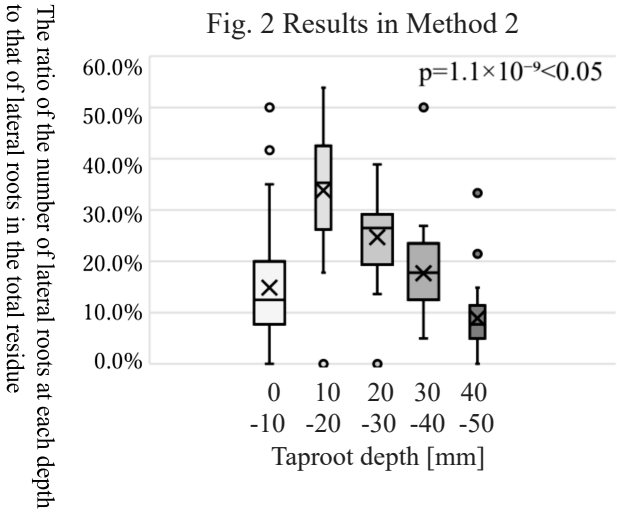


Fig. 2 Results in Method 2



Solvent Selection via Solubility Parameter, etc.: Calculations identified **Cyclopentene and Cyclopentane** as the most effective solvents. These cyclic hydrocarbons possess δ values highly compatible with rubber and lower boiling points than heptane, offering significant energy savings during production.

REFERENCE

Yamaguchi, H., & Tani, C. (2016). Japanese Patent No. 2016-149973. Tokyo: Japan Patent Office.

Power generation performance of Aquatic P-MFCs

Kotaro Nojiri[1] , Theerapat Permpolchokkna[2]

1. Chiba Municipal Chiba High School, Japan
2. Chulalongkorn University Demonstration Secondary School, Thailand

Purpose and Background

Plant-Microbial Fuel Cells (P-MFCs) have attracted attention as a carbon-neutral energy source. While using terrestrial plants is common, this study proposes a P-MFC using aquatic plants, term as "Aquatic Plant-Microbial Fuel Cells (AP-MFCs)". This research evaluates how light, oxygen (O_2), and plant conditions influence the power generation performance in AP-MFC.

Materials and Methods

The AP-MFC system was created using a carbon rod as the anode and a stainless-steel plate as the cathode (Figure 1). *Egeria densa*, a submerged aquatic plant, was selected. The solution was prepared by mixing soil with deionized water. To evaluate the power generation performance, voltage and current were measured, and the power density was calculated. Also, Chemical Oxygen Demand (COD) was monitored.

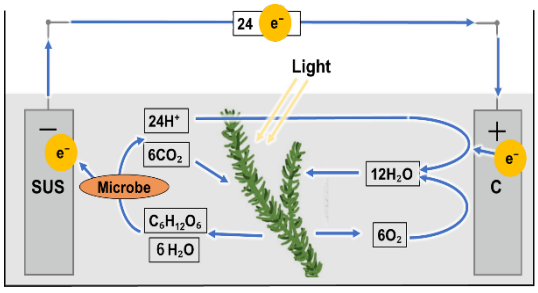


Figure 1 AP-MFC

Results and Discussion

The results of the experiment showed that almost no electricity was generated in a sterilized condition, confirming that electricity was generated by microorganisms. In conditions containing *Egeria densa*, large values of COD were observed, along with a strong positive correlation with power density. These results indicating that organic matter from plants activates microorganism (Iimori, 2010). However, this correlation was disrupted under dark conditions and conditions under which aquatic plants were cut down, where power output decreased despite high COD levels. Under dark conditions, the degrease of photosynthesis reduces the amount of O_2 in the solution, suppressing the oxygen reduction reaction (ORR), a chemical reaction at the cathode. This lack of O_2 is thought to activate microorganisms other than electrogenic bacteria (Banerjee et al., 2023). In the cutting treatment condition, a temporary increase in current was observed, suggesting microbial activation. Therefore, it is thought that microorganisms were activated and consumed the organic matter.

Lastly, the effect of external O_2 supply using an air pump was investigated. Under conditions without aquatic plants, the O_2 supply increased voltage due to enhanced ORR and aerobic microbial activity. However, in the presence of aquatic plants, the introduction of excess O_2 resulted in a decrease in both voltage and current. This result may be due to the inhibition of microbial activity of anaerobic electrogenic bacteria at the anode by excess O_2. Also, high amounts of O_2 in the solution can inhibit the transfer of electrons to the electrode.

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2. Aritro Banerjee. Rajnish Kaur Calay and Subhashis Das. (2023). Effect of pH, COD, and HRT on the Performance of Microbial Fuel Cell Using Synthetic Dairy Wastewater. *Special Issue: Biological Wastewater Treatment around the Globe.*

A study on the relationship between weather and migraine

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2. Chiba University STELLA Program ASCENT-6E, Chiba, Japan
3. Chiba University Graduate School of Medicine, Chiba, Japan

Purpose and Background

Migraine is a common neurological disorder, and many patients report that weather triggers their headaches [1]. However, previous studies have yielded inconsistent results [2]. This study utilized large-scale, real-time data from X (formerly Twitter) in Japan to investigate the association between meteorological conditions and headache-related posts using an infodemiology approach.

Materials and Methods

This study analyzed data collected over 146 days from June to November 2025. Daily meteorological data were obtained from the Tokyo Regional Meteorological Observatory of the Japan Meteorological Agency. Explanatory variables included precipitation, sunshine duration, atmospheric pressure, vapor pressure, mean temperature, and day-to-day changes in pressure, vapor pressure, and temperature. Migraine-related posts on X were collected using Yahoo! Real-Time Search with specific migraine-related keywords in Japanese (Kanji and Hiragana).

Days were classified as rainy (precipitation > 0 mm) or non-rainy (precipitation = 0 mm), and differences in post counts were compared using Student's t-test. Pearson correlation coefficients were calculated to assess univariate associations between meteorological variables and post counts. Multiple regression analysis was performed to identify independent predictors, with standardized regression coefficients (β) reported. All statistical analyses were conducted using R version 4.4.2, with statistical significance set at $p < 0.05$.

Results and Discussion

A total of 146 days were analyzed, including 102 non-rainy days (69.9%) and 44 rainy days (30.1%). Student's t-test revealed that migraine-related posts were significantly higher on rainy days compared to non-rainy days (16,288 ± 3,103 vs. 14,310 ± 1,342 posts; mean difference: 1,978 posts, 95% CI [1,253, 2,703]; $t(144) = 5.39$, $p < 0.001$; Fig. 1).

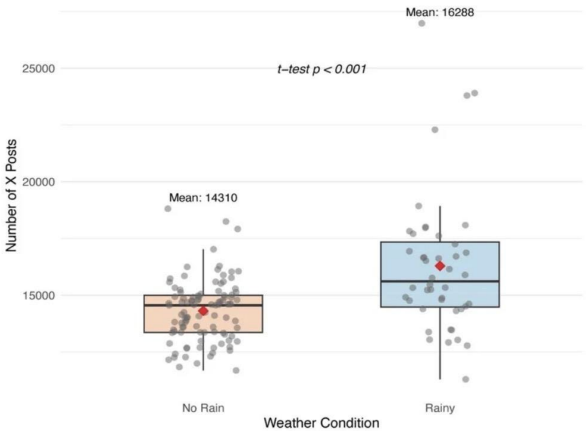

Fig. 1. Comparison of headache-related X posts between rainy and non-rainy days.

Univariate correlation analysis showed that precipitation had the strongest positive correlation with post counts ($r = 0.573$, $p < 0.001$), followed by vapor pressure ($r = 0.382$, $p < 0.001$). Sunshine duration ($r = -0.321$, $p < 0.001$) and atmospheric pressure ($r = -0.301$, $p < 0.001$) were negatively correlated.

Multiple regression analysis ($R^2 = 0.511$, $p < 0.001$) identified three independent predictors: precipitation ($\beta = 0.418$, $p < 0.001$), vapor pressure ($\beta = 0.278$, $p < 0.001$), and sunshine duration ($\beta = -0.227$, $p = 0.002$). Notably, atmospheric pressure was not a significant independent predictor after adjusting for other variables ($\beta = -0.104$, $p = 0.233$).

This infodemiology study demonstrated that precipitation, vapor pressure, and sunshine duration were independently associated with headache-related posts on X. These results suggest that humidity and rainy conditions play an important role in weather-related headache. Limitations include the ecological design and geographic restriction. This novel approach using social media data offers new insights into the population-level relationship between weather and headache.

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Unraveling the formation effect of mosquito larvae

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2. Chiba University STELLA program ASCENT-6E, Chiba, Japan
3. Chulalongkorn University Demonstration Secondary School, Thailand

Purpose and Background

The formation effect of mosquito larvae (Figure1) is an ecological phenomenon we discovered while raising mosquito larvae. Our goal is to discover the cause and process formation effect of mosquito larvae, which we believe will be more environmentally sustainable than any currently used mosquito larval control method

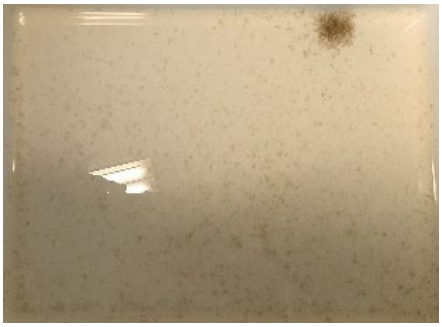

Figure1 formation of mosquito larvae

Materials and Method

Experiment 1 tested whether light influences larval aggregation by creating light and dark zones and comparing preference and average numbers over time. Experiment 2 examined whether corner geometry contributes to aggregation by dividing the container into corners, edges, and other areas and comparing how larvae distributed themselves. Experiment 3 evaluated whether increased population density slows larval movement and thereby promotes accumulation by measuring average movement speed at different densities.

Result and Discussion

Experiment 1 showed that Aedes aegypti exhibits negative phototaxis (Leming et al., 2020), and the same pattern was observed in Aedes albopictus. However, the weak inverse slope (–0.3143) indicates that this behavior is unlikely to be the primary driver of larval aggregation. In Experiment 2, larvae demonstrated a strong spatial preference for corners, spending 3.33 times more time there than at edges and 3.5 times more than in other areas, with no correlation between this preference and time. In Experiment 3, increasing larval density tenfold reduced movement speed by a factor of 4.48, suggesting that high-density conditions may stabilize larval populations. This slowdown may reflect collision-avoidance behavior or some form of social interaction among larvae.

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Cosmetics Harm Our Lives!?
～The Impact of Microplastics on Plant Growth～

Momoko Okumura, Mana Yoda

Chiba Prefectural Chosei High School, Japan

Purpose and Background

According to Kanehiro (2016), some cosmetics contain microplastics. The impact of microplastics on plants when they enter the environment has become a matter of interest. So, we decided to study the effects of microplastics on plant growth.

Materials and Methods

First, experiment with sunscreen was conducted. We wanted to use sunscreen without microplastics, so we made our own sunscreen A. Based on the article written by Martin (2025), sunscreen is made of coconut oil, shea butter, beeswax pellets and zinc oxide. After that, we dissolved our handmade sunscreen A and a commercial sunscreen B in water and filtered them to compare what remained on the filter paper. Finally, we compared plant growth in a sunny place.

Next, we did an experiment using facial cleansers. We dissolved scrub facial cleanser and non-scrub cleanser in water and filtered both. We filtered them once more and then placed seedlings in a sunny place to observe their growth.

Results and Discussion

For the results of the sunscreen experiment, the number and length of leaves and roots varied (Table 1.), so it was difficult to compare clearly. In the facial cleanser experiment, both cleansers dissolved in water. However, filtering the scrub cleanser took a long time, and impurities remained, so the process did not work well. From both experiments, we want to increase the number of trials. In the future study, we also want to test how different amounts of sunscreen and facial cleanser affect plant growth.

Table 1. *Plant growth after 28 days using sunscreen experiment (the number of leaves)*

	Radish	Sunflower	*Komatsuna*
MP (microplastics)	4	0	3
Sunscreens B	3	0	4
Water	3	6	2

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Operating Small Wind Power Generation in Harmony with Nature

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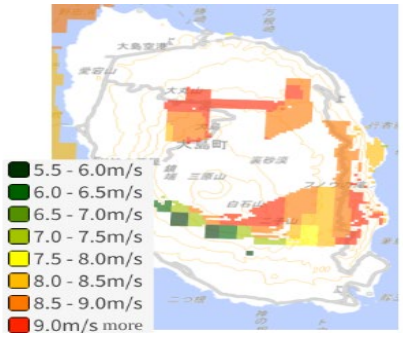
Purpose and Background

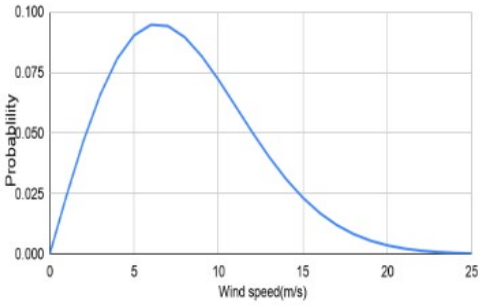
We went to Izu Oshima on the Unexplored Challenge Program trip. Izu Oshima uses a desalination plant (EDR) that requires a large amount of electricity to ensure drinking water. However, power generation is solely dependent on diesel generators, which we felt was dangerous in the event of an emergency. Therefore, our goal was to think of ways to diversify power generation methods that could be applied to other regions in harmony with the local environment.

Materials and Methods

Because Izu Oshima is windy, we considered the introduction of small wind power generation suitable, taking examples of Eigg Island (in Scotland) as a reference.[(1)] According to the REPOS website,[(2)] the southeastern area of Mt. Mihara had high potential for introduction. We estimated the capacity factor using NEDO data and a formula[(3)] for calculating wind power output.

Results and Discussion





The hourly probability of wind power occurring was calculated based on a Rayleigh distribution with an average wind speed of 8 m/s (see figure above). Estimating the capacity factor based on several assumptions did not include losses, but it was estimated to be higher than Japan's average capacity factor of 25-30%.[(4)] Therefore, from the perspective of capacity factor, the introduction of small-scale wind power generation in the southeast of Mt. Mihara is considered appropriate. However, there would likely be issues with cost and disaster prevention measures for typhoons, volcanic eruptions, etc.

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Development of UV Protective Solution from Rice Plant

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2. Chiba University STELLA Program ASCENT-6E, Chiba, Japan

Purpose and Background

Ultraviolet (UV) radiation damages not only skin but also hair, causing it to become dry and brittle. As a member of the lacrosse team, I spend long hours practicing outdoors. Especially during the summer, I noticed my hair became particularly damaged due to strong sunlight. However, while many people are aware of UV damage to the skin, UV protection for hair is often overlooked because sunburn on hair is less visible than sunburn on skin. This experience motivated me to search for scientific ways to protect hair from UV radiation.

Many commercially available UV-protective hair care products contain synthetic ingredients. These ingredients may have negative effects on the environment and on sensitive skin. Therefore, I became interested in whether natural materials could be used as a safer alternative. Previous research has shown that bamboo contains coumaric acid, which has the ability to absorb UV radiation[1)]. Bamboo extract, prepared by heat treatment using butylene glycol (BG) as a solvent, has been reported to have UV-absorbing effects.

I focused on rice, cultivated worldwide. Rice also contains coumaric acid, and Chiba Prefecture, where I live, ranks ninth in Japan for rice production. The purpose of this research is to scientifically determine whether familiar plant materials can protect hair from UV radiation. Specifically, I aimed to extract UV-absorbing substances from rice, measure their UV absorption, and evaluate whether they can reduce UV transmittance. I also considered the potential application of these extracts in hair care products.

Materials and Methods

Rice (cv. Nipponbare) was grown in an artificial climate chamber. For sample preparation, 0.1 g of rice tissue frozen in liquid nitrogen was ground into a fine powder using a chilled mortar and pestle. Next, the ground rice tissue was suspended in 1 ml of H_2O or 1,3-Butanediol (BG) solution and kept at room temperature for 15 min. The mixture was then centrifuged at 12,000 pm for 10 min. The supernatant was collected and diluted tenfold. The UV absorption of the diluted samples was measured using a UV-visible spectrophotometer.

Results and Discussion

First, Figure 1 shows the absorption spectrum results for rice extracts prepared using water and BG solution. Since the extract using BG solution exhibited higher absorption in the UV region, BG was used in subsequent experiments.

Next, the absorption spectra of extracts prepared from different parts of rice using BG solution were compared (Figure 2). The extract prepared from rice leaves showed the highest absorption in the UV region. This was considered to be because leaves are directly exposed to sunlight and contain more UV-absorbing compounds.

Finally, an experiment was conducted to evaluate whether the extract prepared from rice leaves reduces UV transmission. The extract was irradiated with 320 nm UV-B light, and the transmitted light was measured using a spectroradiometer. The result is shown in Figure 3. The rice leaf extract significantly reduced the amount of transmitted UV-B light compared to the BG solution alone. These results indicate that the rice leaf extract not only absorbs UV radiation but also reduces UV transmission.

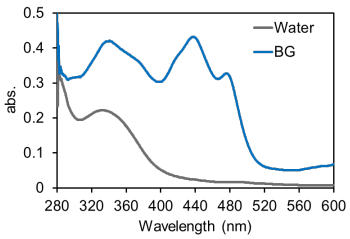

Figure 1. UV absorption spectra of 10-fold diluted rice extract

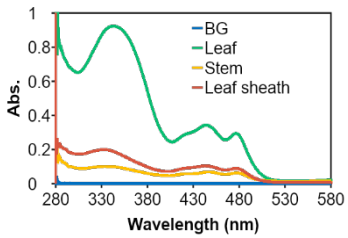

Figure 2. Absorption spectra of rice extract with leaves, stems and leaf sheaths.

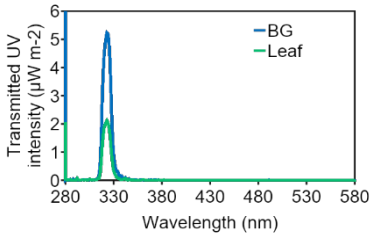

Figure 3. UV transmittance of rice extract

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Dreams can be seen as a mirror of the mind

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Introduction

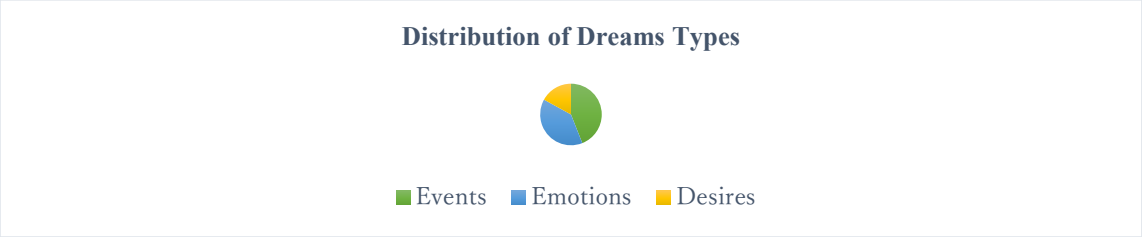
I often have many dreams, which makes me wonder why dreams exist. Because of this I read Sigmund Freud's The Interpretation of Dreams[1)], but his explanation did not fully convince me. Therefore, this study aims to explore why we dream and what functions dreams may have.

Research Method

Every night before going to bed, I write in a diary about the events of the day and my feelings. The next morning, I write down the dreams I had that night, also in diary form. I will continue this routine for two months, and after completing the final entry, I will analyze whether there is any correlation between the dream diary and the diary of real-life experiences.

Findings

As shown in the graph categorizing my dreams, a large proportion of them are related to real-life emotions and events. This result supports the idea that dreams are closely connected to emotions experienced in daily life and function as a phenomenon through which those emotions are re-experienced in different form.



Discussion and Conclusion

Based on this study, dreams can be seen as a way of organizing emotions. During sleep, feelings from waking life are related to memories and imagination and appear as images. As this process repeats, emotions gradually become more organized. Therefore, analyzing dreams and the emotions they contain may help us better understand our unconscious feelings.

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Emotional Values and Narrative Structures of Everyday Landscapes in Resident Reviews

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2. Chiba University STELLA program ASCENT-6E, Japan

Purpose and Background

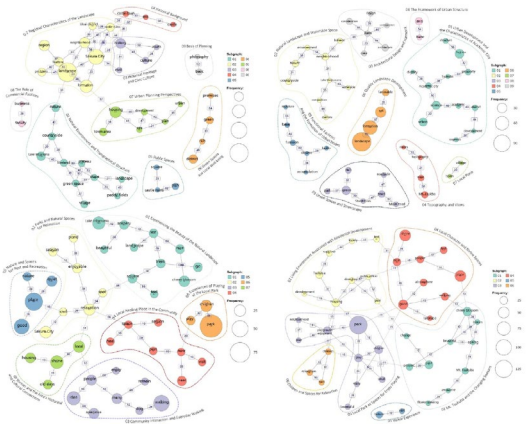
This study reconceptualizes landscape evaluation in urban planning by framing landscape not as a fixed physical object but as a phenomenon emerging through lived experience. Drawing on Tuan's concept of *topophilia* and Relph's critique of *placelessness*, landscape is repositioned as embodied and relational rather than merely visual or regulatory [1, 2]. The study examines how different urban transformation contexts shape residents' perceptions of landscape and forms of place attachment.

Materials and Methods

Two contrasting Japanese cities were compared: Sakura (Chiba), a historical town with gradual change, and Tsukuba (Ibaraki), a rapidly developed city. Japanese-language user-generated content (2018–2025) from Google Maps and Jalan was analyzed alongside official landscape planning documents. Morphological analysis and co-occurrence network analysis using the Jaccard coefficient were employed to visualize semantic structures in administrative and resident narratives.

Results and Discussion

As shown in Figures 1–4, two main findings emerged. First, a structural divide exists between administrative and resident discourses: planning documents frame landscape as a regulatory object, while residents describe it through embodied and affective practices. Second, transformation speed shapes attachment: Sakura reflects memory-oriented attachment, whereas Tsukuba emphasizes present usability. By positioning text mining as a bridge between institutional and experiential language, the study visualizes affective dimensions often excluded from planning discourse, suggesting that sustainable place-making must recognize landscapes as lived processes.



Figures1–4 Comparative co-occurrence network structures of administrative and UGC in Sakura and Tsukuba

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How to Establish Memory Efficiently

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Introduction:

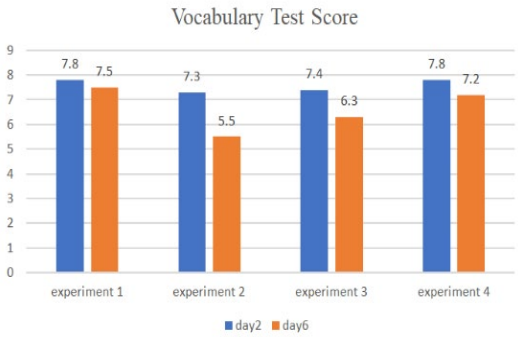
We decided to conduct this experiment because we believed that gaining a clearer understanding of more efficient study methods would help us prepare for next year's entrance examinations. We also thought that by examining how various activities after studying affect memory retention, we could improve our daily study habits. In addition, since effective learning styles differ from person to person, we wanted to find the study method that best suits each of us. Finally, we hoped that the results of this experiment would provide useful insights not only for ourselves, but also for other students facing similar challenges.

Method:

First, participants took a vocabulary test to check how many words they knew before studying. After reviewing their scores and memorizing the correct answers, they performed a different activity each week: sleeping immediately in Week 1, using their smartphones in Week 2, doing light stretching in Week 3, and completing simple calculations in Week 4. The following day, they took the same test again to measure improvement, and six days later, they took it once more to examine long-term retention. Based on these results, we collected and analyzed the data to evaluate changes in memory retention.

Findings:

This graph presents a comparison of the average scores on Day 1 and Day 6 to examine memory retention over time. The smallest score difference was in the "sleep immediately" condition, indicating the best retention, while the largest drop was in the smartphone condition, showing the poorest retention. Although the results for sleeping and smartphone use matched our expectations, the outcomes for stretching and simple calculations were different from what we had predicted.



Discussion and Conclusion:

The results suggest that sleeping immediately after memorization may be the most effective method for improving memory retention, possibly due to memory consolidation and reduced interference from new information. In addition, simple calculations after memorization may support retention because they are believed to activate different brain regions. According to previous research, memory is associated with a region of the temporal lobe called the hippocampus, while simple calculations involve a region known as the parietal lobe. [1)2)] Overall, post-study activities appear to significantly influence memory retention.

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Reverse-imported Edition of *"The Tale of Genji"*

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Purpose and Background

The Tale of Genji has been translated into over 30 languages, but translation studies have identified "translating waka poetry" and "differences in cultural understanding" as key challenges[1]. The unique culture of waka and the Heian period is difficult to reproduce in other languages[2], leading to a tendency for expressions to be simplified or made more direct during translation. This study examines, from a retranslation perspective, how Japanese expressions transform in English and how cultural and religious differences influence these choices and omissions.

Materials and Methods

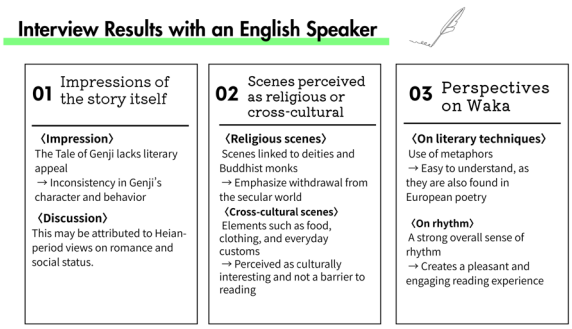
This study conducted a three-stage analysis. First, we retranslated the English version of The Tale of Genji[3] using self-translation, generative AI (ChatGPT), and a translation app (DeepL). Second, interviews with native English speakers investigated their perceptions and understanding of Japanese culture. Third, by comparing the modern Japanese translation with the re-translations, we analyzed shifts in meaning and omissions of cultural elements arising during the translation process, exploring new facets of Heian culture.

Results and Discussion

Table1.Translation Comparison

Original text	English	Japanese translation	ChatGPT	DeepL
葵	Heartvine	葵	心に絡みつく思い	ハートトイン
報いにや、なほ我につれなき人の御心を、尽きせずのみ思し嘆く。	As if to punish him, there ware complaints about his aloofness.	まるで彼を罰するかのように冷ややかな態度をとる女性がおり、それは源氏にとって苦痛であった。	まるでその報いであるかのように、彼自身もまた、ある一人の女性の冷淡さによって苦しめられていた。	まるで彼を罰するかのように、一人の女が自らの冷たさで彼に苦痛を与え続けた。
影をのみ 御手洗川のつれなきに 身の憂きほどぞいとど知らるる	A distant glimpse of the River Lustration. His coldness is the measure of my sorrow.	遥かなる聖なる川見れば 我が悲しみは 彼の冷たさ故なり	禊川 遠く見ゆなり つれなさに 我が悲しみの 深さ量らる	禊の川を遠く見る。 その冷たさが、私の悲しみの尺度。
物の怪、生霊などいふもの多く出で来て、さまざまの名のりする中に、人にさらに移らず、ただみづからの御身につと添ひたるさまにて、殊におどろおどろしう、上面しき聞こゆることもなけれど、また、片時離るる折もなきもの一つあり。	Several malign spirits were transferred to the medium and identified themselves, but there was one which quite refused to move.	いくつかの悪霊は葵の上から他の者に憑依し、名乗ったが、まったく動かない霊が一体あった。	多くの悪霊が憑依に移って名乗り出たが、どうしても動かないものが一つあった。	数体の邪悪な霊が媒介者に移り、自らを名乗ったが、

Table2.Interview Results with an English Speakers



Chapter Title "Aoi" is translated as 'Heartvine' prioritizing poetic imagery over the literal plant name "Hollyhock." Furthermore, while the Japanese waka poem does not use the word "distant," the English translation adds 'distant' to convey the sense of distance between the man and woman. Additionally, the term "Lustration" originates from ancient Rome, clearly evoking a Western and religious impression. The English version of The Tale of Genji is not a direct reproduction of the Japanese original. By translating it according to English-speaking culture, it has become a work that blends Japanese and Western cultures. While this reconstruction enhances readability, it also suggests that Japanese-specific indirect thinking and implied meanings may be omitted, potentially weakening the sensibility of Japanese culture.

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Dominance Theory and effects on Communication

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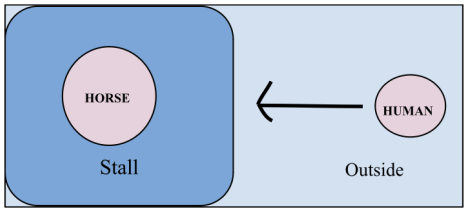
Purpose and Background:

Being a young person means varying opinions in your life strongly influences what is right and wrong. Growing up in an area with more dogs than children, I had the privilege of being around animals, training and playing with them wherever I wished. However, when it came to training, I got a myriad of conflicting words from various sources of how to train animals. With this research, I decided to see what constitutes the best training for all types of animals whilst maintaining a friendly relationship.

Materials and Methods:

Figure 1



The thesis was tested throughout 3 ways; literature review, survey, experiment. In the literature review, various studies regarding the body language of humans, as well as equines, canines, and felines were read to figure out the psychological impacts these animals get from outside stimuli. [1] Then a survey was conducted to get a better grasp of people's understanding of animal emotions and human-animal relations. [2] Lastly, an experiment was conducted with equines, canines, and felines as subjects. The experiment consisted of checking the reactions of those animals when a person approaches them by alternating the following; body language, tone/voice, eye-contact. The tester would approach the animals either doing a negative or positive reaction (ie. high vs low tone of voice) and observe their reactions. [3] In Figure 1, an example of the procedure is written with arrows to indicate how the human will approach the horse and where everyone will be situated.

Results and Discussion

Table 1

Voice Tone/Pitch

Species	Best Reaction	Statistics to Best Reaction	Explanation
Feline	HIGH	4/5 (Rest was Neither)	High voices often deemed soft and we was the key to a friendlier cat.
Equine	HIGH	6/10 (Rest was Neither)	Although Low caught the attention of some equines, High had a bigger pleasant reaction.
Canine	HIGH	6/10 (Rest was Neither)	The canines had bigger reactions than the other two species yet the High voic was ultimately the best to have a pleasant interaction.

The results of the literature review were utilized in the experiments that followed. However, one important thing to note are the 4 types of reinforcement: positive reinforcement, negative reinforcement, positive punishment, negative punishment. The survey was answered by 77 people on the younger side worldwide, though Japan and USA had the most participants. The public's opinions were conflicted with 50% saying “there is no need to establish dominance” and 80% believing “the treatment of animals needs to be changed based on the type”. As for the experiment, the results were put together in a series of tables such as Table 1 above. With everything analyzed, it was apparent animals reacted better when talked to in a higher pitch, and without strong eye contact. Interestingly, the feline, who has the least hierarchy, preferred stronger body language communication compared to the other 2 animals.

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Recycling Fashion Waste

Misaki Ono, Yuri Hosogai

Chiba Prefectural Sakura High School, Japan

Purpose and Background

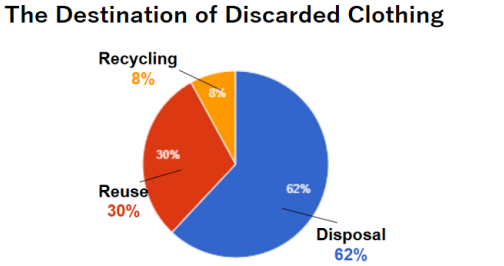
What kind of research could contribute to society, starting with small and familiar actions? Our answer was recycling. In Japan, while the recycling of plastics has become relatively common, clothing recycling is still not widely recognized. For this reason, we wanted to conduct research specializing in clothing recycling. In addition, we planned to study abroad in Germany, and having heard that Europe is advanced in clothing recycling, we decided to choose this theme.

Materials and Methods

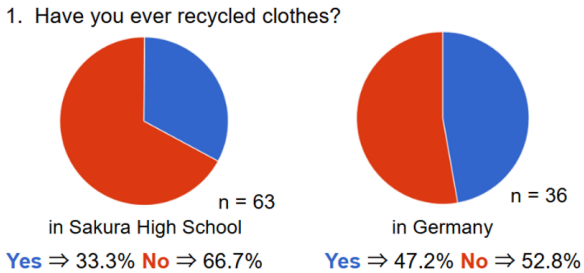
We utilized some research articles and sent an email to Aoyama Tailor to ask a few questions on their recycling efforts. We also conducted a survey of students at our high school and students at a German high school.

Result and Discussion

There are many environmental problems related to clothes around the world because making clothes requires a lot of resources and emits environmental pollutants. Moreover, as shown in Figure 1, most clothes are disposed of and either burned or taken to a landfill, so we cannot make use of used clothes as a resource[1]. According to an email from Aoyama Tailor, it is important not just to collect clothes but also to let people know how collected clothes are being recycled. They also believe that continuing small actions like using items for a long time will lead to a meaningful impact[2]. According to Figure 2, over half of the respondents answered NO to the question, “Have you ever recycled clothes?”. We also asked if they knew how the recycled clothes are used. Most people didn't seem to know the answer clearly. From the survey results, it can be said that most people have little knowledge of recycling clothes or what they are made into[3]. We also discovered advanced initiatives in Germany, such as the deposit system and Altkleider containers.



(Figure 1. Pie chart demonstrating the percentages of the destinations of discarded clothing)



(Figure 2. Pie chart demonstrating the percentages of respondents who have recycled clothes in Japan and Germany)

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Proceedings

- Undergraduate Students /
Postgraduate Students -

UNSUPERVISED CRACK DETECTION SYSTEM USING GRAPH NEURAL NETWORK CLUSTERING

Hein Thura Aung, Wuttipong Kumwilaisak

King Mongkut's University of Technology Thonburi, Thailand

Purpose and Background:

Infrastructure safety and degradation are critical to global concerns, as structural cracks can lead to severe failures if not detected promptly. Conventional manual inspection methods are labor-intensive, time-consuming, and prone to human error, often delaying necessary repairs. While automated solutions using supervised deep learning (e.g., CNNs) exist, they require massive, annotated datasets, which are expensive and difficult to obtain. To address these limitations, this research proposes a standalone, automated crack detection system that utilizes unsupervised learning. The primary objective is to develop a cost-effective, portable device capable of identifying cracks on various structural surfaces without the need for labeled training data. This system integrates a Raspberry Pi 5 with a hybrid Artificial Intelligence (AI) model combining Vision Transformers (ViT) and Graph Neural Networks (GNN) to ensure scalable and efficient infrastructure monitoring.

Materials and Methods:

The proposed solution is a hardware software integration designed for field deployment.

- Hardware Setup: The system utilizes a Raspberry Pi 5 equipped with a camera module for image acquisition. This setup was selected for its low cost (~$150), portability, and ability to perform on-device processing in hazardous or hard-to-reach areas.
- Algorithmic Pipeline: The unsupervised segmentation process consists of four stages:
  a. Preprocessing: Input images undergo Canny edge detection and morphological operations to suppress noise and identify candidate crack regions.
  b. Feature Extraction: A pre-trained Vision Transformer (ViT) extracts deep spatial features and contextual relationships from the preprocessed image patches.
  c. Graph Construction: Feature embeddings are transformed into graph representations where nodes represent image patches, and edges represent spatial or feature similarities.
  d. GNN Clustering: A Graph Neural Network performs clustering using a normalized-cut relaxation loss to partition the graph into foreground (crack) and background segments.
- Validation: The model was evaluated using the CRACK500 and GAPS384 benchmark datasets. Performance metrics included Mean Intersection over Union (MIoU), Mean Absolute Error (MAE), and F1-Score.

Results and Discussion

The standalone device successfully demonstrated accurate automated crack segmentation. On the CRACK500 dataset, the unsupervised ViT-GNN model achieved an MIoU of 65.88%, an MAE of 0.70, and an F1-Score of 71%. These results are competitive with, and in some metrics superior to, traditional supervised methods such as UNet and PSPNet, proving the efficacy of the unsupervised approach. On the GAPS384 dataset, the model achieved an MIoU of 61.89% and an MAE of 0.60, indicating strong generalization capabilities across different environments.

Financially, the system offers a significant reduction in inspection costs, lowering the estimated cost per bridge inspection from $4,600 to approximately $1,600. The system processes images in under 10 seconds, meeting the requirement for the real-time field application.

Table 1: Comparison Results on CRACK500 Dataset

Model	MIoU (%)	MAE	F1-Score (%)
UNet	67.76	3.01	53
PSPNet	62.88	2.81	50
DeepLabV3+	**71.56**	2.23	56

OpenCV	65.28	6.24	49
Ours (ViT+GNN)	65.88	**0.70**	**71**

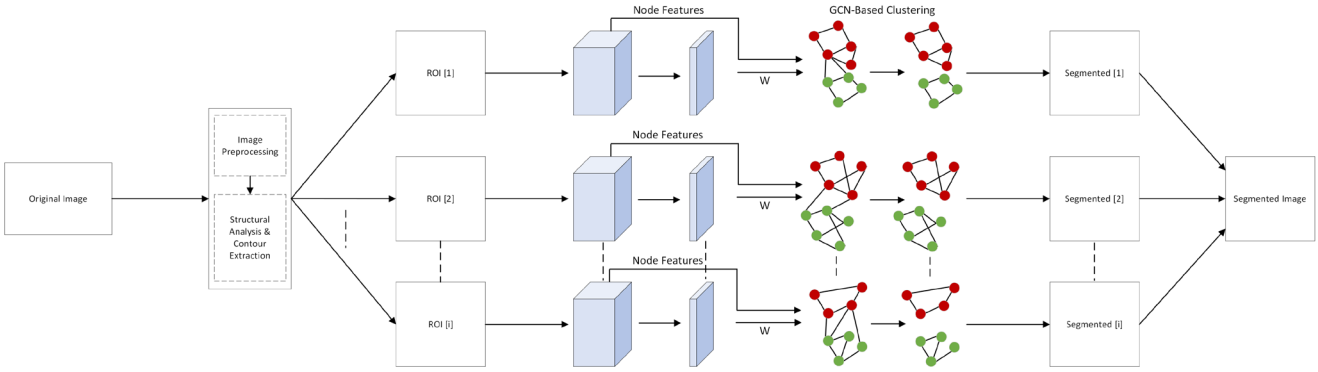

Figure 1: Unsupervised crack segmentation with graph neural network clustering

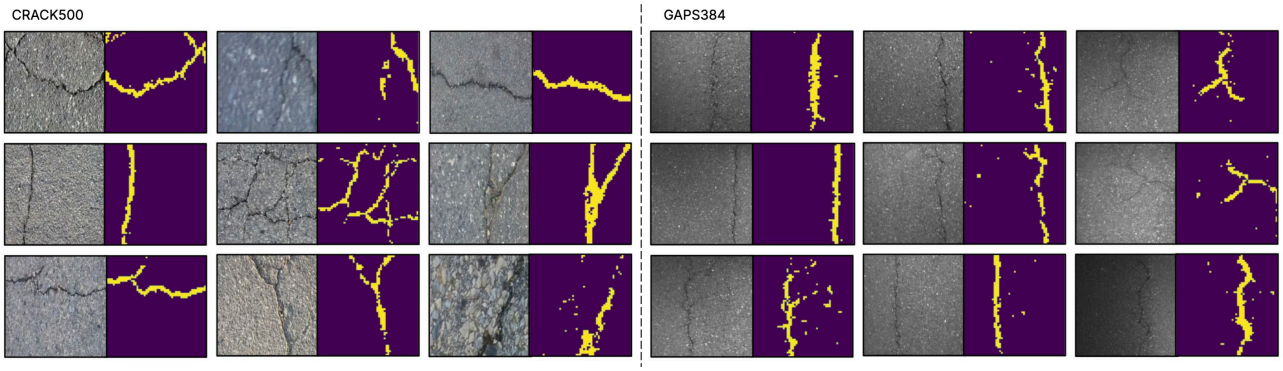

Figure 2: Results Examples on CRACK500 and GAPS384 Datasets

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TIDAL CONTROL ON WATER COLUMN STABILITY IN BALIKPAPAN BAY, EAST KALIMANTAN, INDONESIA

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Purpose and Background

Balikpapan Bay is a semi-enclosed mesotidal estuary in East Kalimantan, Indonesia, where tidal forcing exerts a dominant influence on hydrodynamics processes. Previous studies have demonstrated that water mass distribution in the bay is strongly controlled by tidal dynamic, resulting in distinct characteristics between the inner and outer regions of the estuary (Nurjaya dkk., 2018). In such environments, water column stability and vertical mixing play a critical role in regulating water mass distribution and transport processes. Despite this, the physical influence of tides on water column stability in Balikpapan Bay remains insufficient quantified, particularly under spring tide conditions during the wet season. This study investigates the physical control of tides on water column stability in the Balikpapan Estuary through combined temporal and spatial observations, with the Brunt-Väisälä frequency (N^2) employed as an indicator of stratification and vertical mixing processes.

Materials and Methods

The study area is located in the Balikpapan Bay on the eastern coast of Kalimantan, Indonesia (Figure 1). Bathymetric data were obtained from the General Bathymetric Chart of the Oceans (GEBCO) and the Indonesian National Bathymetry (BATNAS). Hydro-oceanographic data were collected during a field survey conducted in Balikpapan Bay from 15 to 17 November 2024.

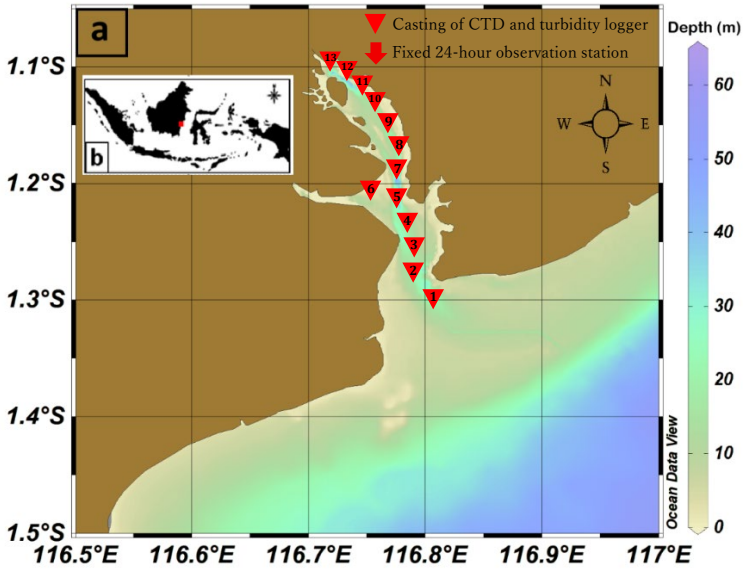

Figure 1. Casting CTD and turbidity logger for spasial and temporal

A fixed observation station was established approximately 20 km from the bay mouth to capture the interaction between freshwater inflow and seawater intrusion in the middle estuarine zone. Continous measurements were conducted over a 24-hour period to resolve intratidal variability in water column structure. Vertical water column stability was quantified using the squared Brunt-Väisälä frequency (N^2), which represents the resistance of the water column to vertical mixing. The Brunt-Väisälä frequency was calculated following the standard formulation:

$$N^2 = -\frac{g}{\rho_0}\frac{\partial \rho}{\partial z} \; ; \; N = \sqrt{\frac{N^2}{2\pi}3600} \; ; \; g = 9{,}81 \text{ m/s}^2 \; ; \; \rho_0 = 1025 \text{ kg/m}^3$$

Results and Discussion

Figure 2 and 3 show the temporal and longitudinal variability of the Brunt-Väisälä frequency (N^2) in Balikpapan Bay over a 24-hour tidal cycle. At the temporal station (Figure 2), N^2 varies from near zero to approximately 50 cycle/h, with higher values during ebb tide (12:00–18:00 and 20:30–00:00 UTC+8) indicating enhanced stratification driven by freshwater outflow, and lower values during flood tide (00:00–04:00 and 16:00–20:00 UTC+8) reflecting weakened stratification associated with seawater intrusion. Spatially (Figure 3), elevated N^2 during ebb tide extends from the estuary mouth to about 18 km upstream, while during flood tide, reduced N^2 propagates farther upstream to approximately 25 km, consistent with landward seawater intrusion. These patterns indicate a strong tidal modulation of water column stability; however, as N^2 represents static stability, interpretations of vertical mixing are limited to inferred changes in stratification rather than direct measures of mixing intensity. Elevated N^2 values persist in the upper estuary during both tidal phases, suggesting that stratification remains locally significant despite tidal propagation.

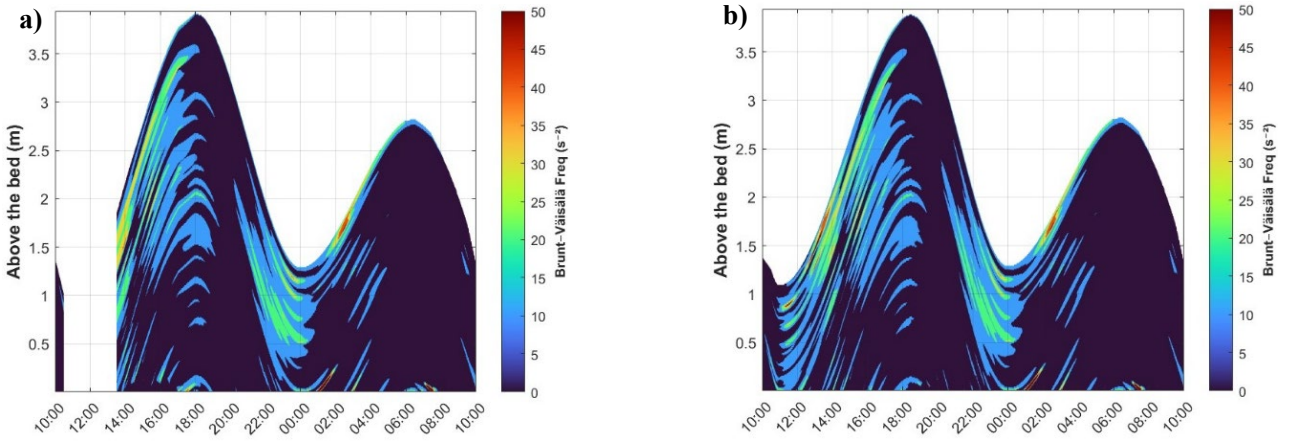

Figure 2. Contour plots of Brunt-Väisälä frequency against time and depth at the temporal station, based on data from (a) CTD Valeport and (b) CTD RINKO over a 24-hour period

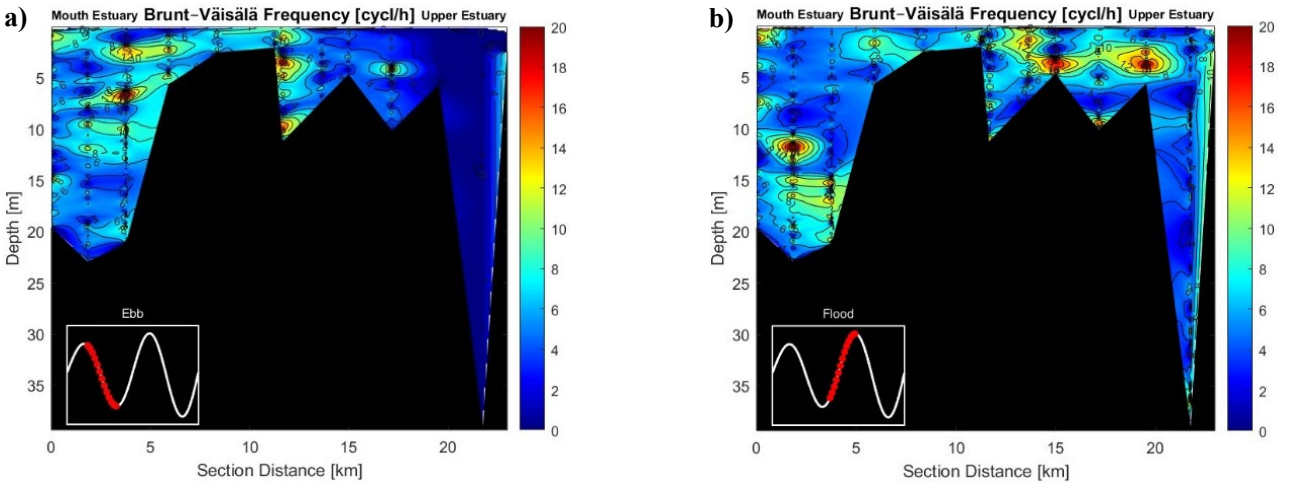

Figure 3. Vertical section plots of Brunt-Väisälä frequency from the mouth to the head of Balikpapan Bay during (a) ebb tide and (b) flood tide

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I-V characteristics and resistivity

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Purpose and Background:

This study aims to investigate the Ohmic contact characteristics and resistivity measurements at the metal-semiconductor (ZnO) interface. In an ideal Ohmic contact, the work function $\Phi$of the metal should be approximately equal to the electron affinity χ of the semiconductor $\Phi \approx \chi$. This condition minimizes the interface barrier, resulting in a linear current-voltage (I-V) relationship.

To quantify the contact resistance R_c and sheet resistance R_{sheet}, the Transmission Line Method (TLM) was employed. According to TLM theory, the total resistance R_t as a function of electrode spacing d is expressed as: $R_t = 2R_c + \frac{R_{sheet}}{w}d$ where w represents the electrode width.

By measuring the total resistance at various spacings and plotting the data, R_{sheet} can be derived from the slope, while R_c is determined from the y-intercept.

Materials and Methods:

The experimental samples consisted of metal electrodes deposited on Zinc Oxide (ZnO) substrates. A standard TLM pattern design was utilized, with electrodes labeled 14, 15, 2, 3, and 4. The vertical width w of the electrodes was 0.6 mm.Different electrode spacings d were set at 0.20 mm, 0.25 mm, 0.30 mm, and 0.35 mm.

Using a voltage source, I-V curves were measured for various electrode pairs (e.g., Pin 14-15, Pin 15-12) with a scan range from -1.0 A to 1.0 A. The total resistance $R_t$was then calculated. All data underwent linear fitting analysis to extract the resistance parameters.

Results and Discussion

The experimental results demonstrate that within the measured range, the I-V curves for all electrode spacings exhibit linearity, confirming the stability of the electrical measurements. The resistance values show a dependence on spacing, increasing from $(3168 \pm 29)\Omega$ for the smallest gap (green curve) to $(13329 \pm 61)\Omega$ for the largest gap (black curve).

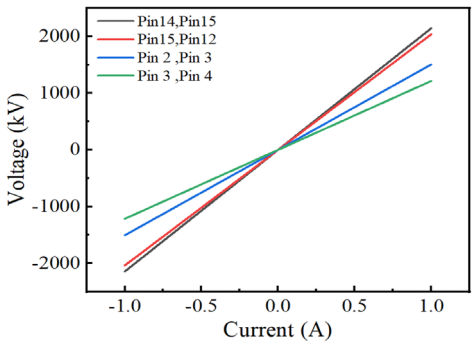

Figure 1: Voltage and current plots for each pair of electrodes

Plotting the total resistance R_t against the electrode spacing d yielded an excellent linear fit, with the following relationship: $R_t = [(51.6 \pm 5.0) \times 10^8]d + (3.4 \pm 1.6) \times 10^5$.

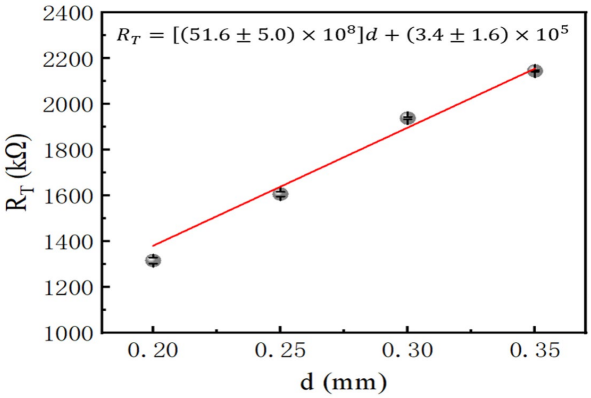

Figure 2: Plot of R_T versus d with the regression line equation.

Based on the linear fit, the contact resistance R_c and sheet resistance R_{sheet} were determined to be $(17.4 \pm 8.2) \times 10^4 \Omega$ and $(31.0 \pm 3.0) \times 10^5 \Omega$.

Despite the linear I-V curves, the measured resistance values are extremely high (high-resistance characteristics), and theR_c value indicates poor contact quality. This suggests that I-V linearity alone does not necessarily guarantee an ideal, low-impedance Ohmic contact. The TLM analysis results were consistent within the margin of error, confirming the reliability of the measurements while highlighting the necessity of improving the interface contact quality.

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USING MATHEMTICAL TASKS TO ENHANCE MATHEMATICAL FLUENCY FOR GRADE 2 STUDENTS

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Purpose and Background

Mathematics education in the 21st century places increasing emphasis not only on procedural accuracy but also on the development of students' higher-order thinking and creative abilities. Creativity has been widely recognized as an essential component of effective learning, particularly in mathematics, where students are expected to generate ideas, explore multiple strategies, and adapt their thinking to different problem situations. According to Guilford (1967), creativity comprises four main components: fluency, flexibility, originality, and elaboration. Among these components, fluency refers to an individual's ability to generate many responses or to produce multiple problem-solving strategies within a limited time, without being confined to a single fixed method. This ability reflects the smoothness and efficiency of thinking, enabling learners to adapt their approaches, select appropriate strategies, and respond to mathematical tasks effectively.

Despite the recognized importance of mathematical fluency, the current state of mathematics learning among Thai primary school students remains a concern. Results from the National Test (NT) in mathematics during the academic years 2022 to 2025 reveal that national average scores have remained at a moderate level. These results suggest that many students experience difficulties in problem-solving tasks that require the generation of multiple responses or solution strategies. At Grade 2 level, addition and subtraction of numbers up to 1,000 constitute fundamental content that supports future mathematics learning. When instructional practices emphasize only a single fixed procedure, students have limited opportunities to develop mathematical fluency. To address this issue, instructional approaches that engage students in mathematical tasks requiring multiple solutions and diverse strategies are essential. By engaging students in tasks that encourage the generation of multiple solutions to addition and subtraction problems, the study aims to promote efficient thinking, strategic flexibility, and confidence in mathematical problem solving.

Materials and Methods

Method

This study employed classroom action research to investigate the effects of using mathematical tasks on enhancing mathematical fluency among Grade 2 students. Classroom action research was selected as it allows the teacher-researcher to systematically plan, implement, observe, and reflect on instructional practices within an authentic classroom context.

1) Participant

The participants consisted of 42 Grade 2 students from a laboratory school in Bangkok, Thailand. The students were enrolled in the first semester of the 2025 academic year and participated in all learning activities designed for this study.

2) Instrument

The primary research instrument consisted of a set of mathematical tasks developed specifically for this classroom action research. All tasks were constructed with the explicit goal of enhancing students' mathematical fluency.The tasks were implemented during classroom activities and served both as learning activities and as tools for observing students' fluency development.

Upon completion of the lessons, the researcher administered 4 tasks of mathematical fluency assessments to measure students' fluency, comprising 2 tasks on addition fluency and 2 tasks on subtraction fluency. Criteria for assessing fluency is assessed based on the number of distinct responses, the variety of solution methods, and the generation of novel or initial ideas. (Sheffield and Cruikshank, 2004).

Results and Discussion

Result

1) Students showed great mathematical fluency.

Fluency emphasizes not only the correctness of answers but also the quantity and variety of ideas or solution methods generated within a given time frame. Accordingly, both dimensions, variety and quantity are presented as follows:

a) Regarding variety, across the four tasks, more than half of the students were able to generate two or more solution strategies within the given time limit. The proportion of students demonstrating multiple strategies ranged from 59.52% to 76.19%, indicating a relatively high level of fluency.

b) Regarding quantity, students produced a substantial number of solutions. Most students were able to generate many solutions within the limited time. The proportion of students who produced more than 10 solutions was 52.38% in Task 1, 71.43% in Task 2, 52.38% in Task 3, and 42.86% in Task 4.

Discussion

This study found that students improved their fluency by using diverse numerical strategies and generating more correct solutions, aligning with previous research (Lert-awas, 2011; Boonchaulaew, 2021). Creative tasks should let students explore, make mistakes, reflect, and expand their understanding. Structuring tasks differently can help provide suitable challenges (Vale & Barbosa, 2024). Once students chose the right strategy, they could quickly produce further answers, reduce cognitive load and increase correct solutions (Rohland, 2024). These results confirm earlier work showing that strong number sense leads to better reasoning and adaptability in mathematical problem-solving (Martinie & Coates, 2007).

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Scientific Inquiry and Practice: Implementing the Monte Carlo Method and Buffon's Needle Problem with Gifted Students

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En-Qian Lin and Yu-Lim Chen

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Purpose and Background

The Monte Carlo method is a fundamental scientific approach for solving problems involving inherent randomness. This course aims to bridge the gap between theoretical probability and practical application by guiding students from everyday chance events to formal statistical estimation.

Materials and Methods

1. Participants and Instructional Context

The participants of this study were 26 gifted junior high school students (transitioning from 7th to 8th grade) specializing in mathematics and science. The curriculum was implemented over four sessions, totaling 180 minutes of instructional time.

2. Instructional Procedures

2.1 Conceptualizing Randomness: Students explored the concept of randomness by conducting statistical analyses on the parity (even/odd) of the number of pens in their pencil cases and the outcomes of coin tosses.

2.2 Connecting Prior Knowledge: Building on prior learning in the 7th-grade biology curriculum, students reviewed the capture-recapture method and quadrat sampling to establish the conceptual and operational logic of the Monte Carlo method.

2.3 Application of Monte Carlo Area Estimation: Following the conceptual foundation of sampling, students applied the Monte Carlo method through the random placement of physical materials (such as red beans and rice) to estimate the areas of a circle and the main island of Taiwan (see Figure 1).

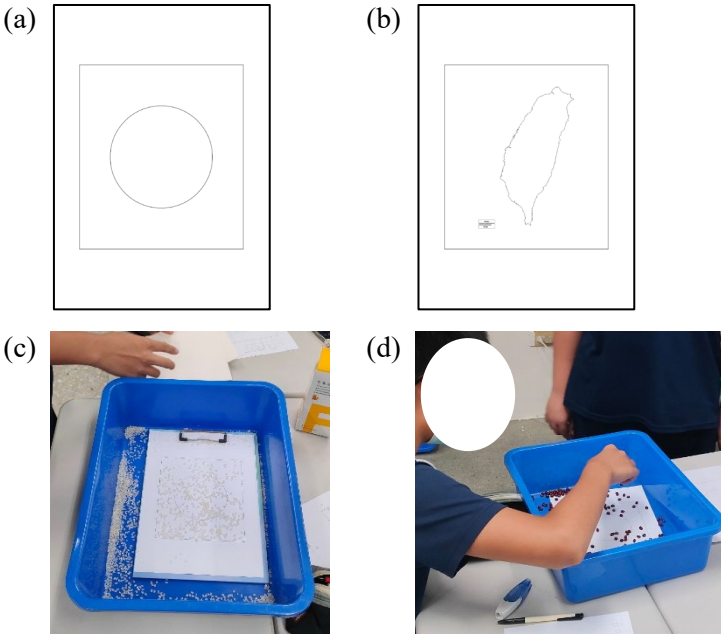


Figure 1. (a) and (b) Worksheets (A4 size) used for estimating the area of a circle and the main island of Taiwan, respectively. (c) and (d) Students conducting area estimation experiments using rice and red beans, respectively.

2.4 Theoretical Introduction to Buffon's Needle Problem: An instructional overview was provided on how the Monte Carlo method can be applied to solve the classic Buffon's Needle Problem.

2.5 Application of Buffon's Needle Experiment for Estimating π: Building on previous stochastic estimation activities, students implemented the Buffon's Needle experiment using disposable bamboo chopsticks (see Figure 2) to estimate the value of π.

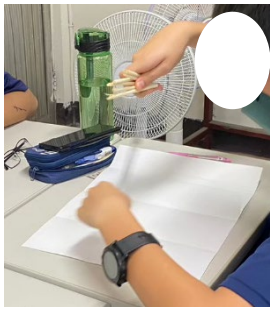
(a)  (b)  (c) 

Figure 2. An A3 sheet of paper was folded into four equal sections and marked with reference lines. (a) and (b) Students dropping multiple cut disposable bamboo chopsticks simultaneously from above the center of the sheet. (c) Students dropping cut disposable bamboo chopsticks one by one on the sheet.

Results and Discussion

The effectiveness of the curriculum was examined based on teacher observations and student feedback, with particular attention to conceptual understanding, scientific peer interaction, and experimental design.

1. Conceptual Understanding of Randomness

Following the instructional sessions, a majority of students characterized randomness as being "unstable and beyond human control." A smaller group of students provided more precise definitions, describing it as "the equal probability of selecting any option within a defined range." While many struggled to articulate the rigorous mathematical definition of randomness, they were still able to apply these concepts to perform practical area and π estimations. This suggests that intuitive grasp through hands-on activity may precede formal linguistic articulation in gifted learners.

2. Peer Interaction and Scientific Discourse

During the initial investigation into the parity of the number of pens in pencil cases, students engaged in scientific peer discussion to establish a consensus on the definition of a "pen" amidst various stationery types. Similarly, while recording coin tosses, the class collaboratively determined the number of trials and statistical methods. These interactions highlighted the importance of peer collaboration in the scientific process, allowing students to refine their experimental parameters through collective reasoning.

3. Experimental Design and Implementation

A critical learning moment occurred during the area estimation phase. Initially, students attempted to drop rice, beans or cut disposable bamboo chopsticks from a central fixed point, leading to a non-uniform distribution. After teacher guidance, students were able to redesign their experimental setups to ensure spatial randomness. This observation suggests that for future iterations of the course, a structured peer discussion on experimental design should take place before the experiment to avoid biased results.

4. Scientific Expression

While students demonstrated a functional internalization of randomness, their ability to express these concepts formally remained a challenge. This indicates a gap between practical competence and scientific communication. It is recommended that instructors provide explicit modeling of scientific terminology and guided practice to help students transition from experiential understanding to formal academic discourse.

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ENHANCING STUDENTS' MATHEMATICAL PROBLEM-SOLVING SKILLS THROUGH CONTENT-DIFFERENTIATED INSTRUCTION

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Purpose and Background

Mathematical problem-solving is a core competence in mathematics education, emphasizing students' ability to analyze situations, apply appropriate strategies, and reflect on solutions (National Council of Teachers of Mathematics [NCTM], 2000; Polya, 1973). This competence is essential not only for academic achievement but also for developing critical and adaptive thinking skills required in real-life problem situations (Sumarmo, 2010; Torres-Peña et al., 2025).

However, international assessments indicate that Indonesian junior high school students still demonstrate relatively low performance in mathematical problem-solving. The Programme for International Student Assessment (PISA) 2022 reported that Indonesia's average mathematics score was 366, significantly below the OECD average of 489 (OECD, 2023). Previous studies suggest that one contributing factor is the dominance of uniform instructional practices that fail to accommodate students' diverse learning readiness and prior knowledge (Hapsari & Dahlan, 2018; Tanudjaya & Doorman, 2020).

Classrooms are inherently heterogeneous, with students differing in learning pace, conceptual understanding, and problem-solving strategies. Content-differentiated instruction, as proposed by Tomlinson (2016), offers a pedagogical approach that adjusts learning materials based on students' readiness while maintaining common learning objectives. Several studies have shown that content differentiation can improve students' engagement and learning outcomes in mathematics (Rijal & Waluyo, 2025; Rohim et al., 2024). Nevertheless, empirical classroom-based evidence focusing specifically on mathematical problem-solving skills in the topic of Systems of Linear Equations in Two Variables (SLETV) remains limited. Therefore, this study aims to examine the effect of content-differentiated instruction on students' mathematical problem-solving skills in junior high school mathematics.

Materials and Methods

This study employed a quantitative approach with a quasi-experimental design using a pretest–posttest control group. The participants consisted of two eighth-grade classes from a junior high school in Bandung, Indonesia, with 32 students in each class. One class was assigned as the experimental group and received content-differentiated instruction, while the other class served as the control group and received conventional instruction.

The learning topic implemented in both groups was Systems of Linear Equations in Two Variables. In the experimental class, content differentiation was applied through tiered learning materials, in which tasks were designed at different levels of complexity according to students' learning readiness. All students worked toward the same learning objectives but engaged with content appropriate to their readiness level. The control class followed standard instruction using uniform learning materials.

Students' mathematical problem-solving skills were assessed using an essay-based test developed based on Polya's four problem-solving stages: understanding the problem, planning a solution, carrying out the plan, and reflecting on the solution. Data were analyzed using normalized gain (N-gain) to measure improvement, the Mann–Whitney U test to examine differences between groups, and Cohen's d to determine effect size.

Results and Discussion

The results indicate that content-differentiated instruction led to a higher improvement in students' mathematical problem-solving skills compared to conventional instruction. The average N-gain score of the experimental group was 0.680, while the control group achieved an average N-gain of 0.415. Both values fall within the moderate category; however, the experimental group demonstrated a higher level of improvement.

The Mann–Whitney U test revealed a statistically significant difference in the improvement of mathematical problem-solving skills between the two groups (Asymp. Sig. = 0.003 < 0.05). Furthermore, the effect size analysis yielded a Cohen's d value of 0.811, which is categorized as a large effect. These findings indicate that content-differentiated instruction has a substantial and meaningful impact on students' mathematical problem-solving skills.

Classroom observations further support these quantitative results. Students in the differentiated class showed greater engagement, increased confidence in attempting non-routine problems, and improved ability to explain their reasoning. Differentiated content enabled students to progress gradually according to their readiness, reducing learning gaps and fostering a more inclusive learning environment. These findings are consistent with previous studies highlighting the effectiveness of content differentiation in supporting diverse learners in mathematics classrooms (Hapsari & Dahlan, 2018; Rohim et al., 2024; Tomlinson, 2016).

Table 1. Comparison of Students' Mathematical Problem-Solving Improvement

Group	Average N-gain	Category
Experimental (Differentiated Instruction)	0.680	Moderate
Control (Conventional Instruction)	0.415	Moderate

The results summarized in Table 1 further emphasize that content-differentiated instruction provides a meaningful learning advantage compared to conventional instruction. Although both groups achieved moderate levels of improvement, students in the differentiated class demonstrated a more consistent progression across all stages of mathematical problem-solving, particularly in planning solution strategies and reflecting on their answers. This indicates that differentiated content supports not only procedural understanding but also higher-order thinking processes.

These findings reinforce the view that differentiation functions as a pedagogical bridge between students' diverse readiness levels and common learning objectives. By engaging students with tasks that match their current understanding, content-differentiated instruction allows learners to experience appropriate cognitive challenges without excessive frustration. This approach aligns with previous research suggesting that differentiation promotes equitable learning opportunities and helps reduce achievement gaps in heterogeneous mathematics classrooms.

This study demonstrates that content-differentiated instruction has a significant and positive effect on students' mathematical problem-solving skills in the topic of Systems of Linear Equations in Two Variables. Students who experienced differentiated content showed greater improvement than those who received conventional instruction, supported by both quantitative results and classroom observations.

Beyond improving learning outcomes, content differentiation fosters a more inclusive and student-centered learning environment by accommodating differences in learning readiness. These findings suggest that content-differentiated instruction is a practical and effective strategy for mathematics teachers seeking to enhance students' problem-solving abilities in diverse classrooms.

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COASTAL MULTIHAZARD AND ECOSYSTEM SERVICES IN THE AYAH–JETIS COASTAL AREA, INDONESIA

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Purpose and Background

The coastal is regarded as an important and changeable area due to its dynamic environment (Hinrichsen, 2013). Addressing those environmental changes in coastal zone are essential. The effects of these environmental changes could be amplified by the existence of climate change (Ury et. al., 2021). One of the regencies in the Central Java Province that faces the Indian Ocean directly is Kebumen Regency. This region has a landscape that fascinates tourists. Additionally, especially in areas like Ayah-Jetis, there is a substantial information vacuum regarding the qualitative contributions of ecosystem services to multihazard mitigation. The multihazard assessment in the Ayah-Jetis Coastal Tourism Area is expected to serve as a preliminary study beneficial for disaster mitigation

Materials and Methods

The Coastal Hazard Wheel (CHW) is a coastal vulnerability identification framework introduced by Appelquist (2016). The framework integrates coastal typology, hazard assessment, and coastal management options using biogeophysical parameters as inputs. These parameters include geological layout, wave exposure, tidal range, storm climate, flora/fauna, and sediment balance. By overlaying all parameters, the coastline is segmented into distinct coastal units with specific characteristics. Each coastal segment exhibits different levels of vulnerability to ecosystem disruption, gradual inundation, saltwater intrusion, erosion, and flooding.

Results and Discussion

The Ayah–Jetis Coastal Area comprises fluvial, marine, and combined solutional–structural landforms. Coastal ecosystems in the area are broadly categorized into vegetated and non-vegetated types. Sediment balance conditions are classified into surplus, deficit, beach, and no-beach categories, based on shoreline change analysis between 2014 and 2024. Wave exposure along the coast is classified as moderately exposed, with an average significant wave height of approximately ±1.45 m recorded at the Cilacap Station. The tidal regime is characterized as microtidal (<2 m), with mixed tides showing a semidiurnal tendency (Tama, 2023). In addition, the Ayah–Jetis coast is susceptible to tropical cyclone influences and is therefore classified as exposed to tropical cyclones.

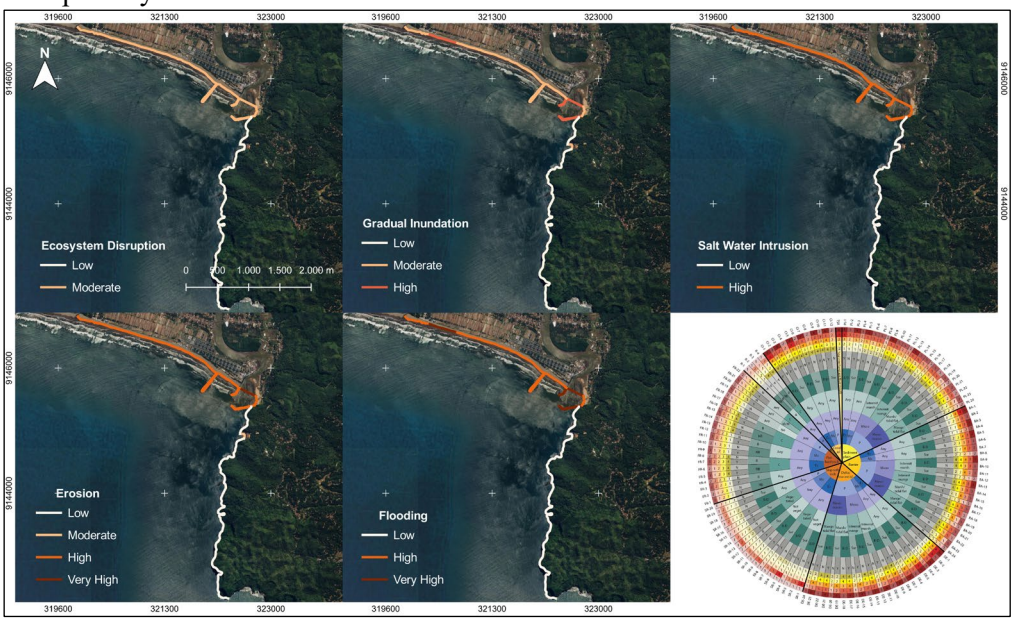

Figure 1. Multihazard assessment

Hazard levels for each coastal type were determined by analyzing the interactions among six biogeophysical characteristics (Appelquist et. al., 2016), as illustrated in Figure 1. For instance, the northern

coastal type exhibits moderate hazard levels for ecosystem disruption and gradual inundation, while saltwater intrusion, erosion, and flooding are classified as high. In contrast, the eastern coastal type shows consistently low hazard levels across all threats, largely attributed to its geological setting. The eastern coast, characterized by sloping hard rock, demonstrates greater resistance to coastal hazards compared to the western sedimentary plain. Overall, areas with sedimentary plains exhibit the highest multihazard susceptibility, whereas sloping hard rock coasts show the lowest.

Within this geomorphology-driven multihazard context, ecosystem services play a complementary role by shaping ecological functions and adaptive capacity rather than directly controlling hazard intensity. Several ecosystem services were recognized in the study area, as summarized in Table 1. Although only a limited number of services were identified, they collectively represent entire ecosystem service categories.

Table 1. Identified ecosystem services in Ayah-Jetis Coastal Tourism Area

Ecosystem Services	
Provisioning	Food provisioning: fish auction
Regulating	Water purification: mangrove area
	Carbon sequestration: mangrove area
Cultural	Recreation and ecotourism: beach and mangrove area
	Knowledge and learning: mangrove area
Supporting	Nutirent cycle

Provisioning services, such as aquaculture and coastal resource use, support local livelihoods but increase exposure to flooding and salinity intrusion, thereby functioning more as vulnerable elements than hazard-mitigating agents. Mangrove ecosystems near the mouth river segment provide strong supporting services through nutrient cycling and sediment trapping, as indicated by improvement water quality after passing mangrove area (Ibrahim et. al., 2024) and fine-grained sediment characteristics that enhance organic carbon retention (Hendrayana et al., 2023). These processes also underpin regulating services, particularly water purification and carbon sequestration, as higher mangrove density is associated with increased sediment organic carbon storage. However, despite these ecological functions, mangroves do not significantly reduce flooding, gradual inundation, or saltwater intrusion due to the dominance of river-mouth dynamics and sedimentary geomorphology. Cultural ecosystem services, represented by conservation knowledge, skills, and active community participation within the Environmental Awareness Community, enhance social learning and adaptive capacity, yet their influence remains indirect and does not translate into immediate hazard attenuation (Yuliani et. al., 2018; Murniasih et. al., 2023). Overall, ecosystem services in Ayah–Jetis function primarily as ecological and social support systems rather than effective mechanisms for direct multihazard reduction under geomorphology-driven coastal processes.

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Enhancing Thailand's English Teaching Competitiveness

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Purpose and Background

Thailand's performance in the 2025 EF English Proficiency Index, ranking 116th out of 123 countries with a score of 402, signifies an "extremely low" proficiency level that trails behind its regional competitors. While neighbors such as Malaysia (581), the Philippines (569), and Vietnam (500) have secured "high" to "medium" standings, Thailand's stagnation—surpassing only Cambodia—reveals a profound structural crisis. This disparity exacerbates an educational predicament: students in impoverished rural areas are systematically deprived of both quality foundational education and the linguistic "global passport" necessary for international mobility (Asian Development Bank, 2020).

To address these inequities, this paper advocates for a "parallel English-Thai" approach, aimed at elevating English to a status equal to the native tongue within the national curriculum. By standardizing teaching quality, this framework seeks to bridge the urban-rural divide and empower rural students with enhanced global competitiveness. Beyond education, this linguistic barrier creates a "translation gap" that confines Thailand's rich cultural heritage to non-verbal stereotypes Furthermore, drawing insights from the successful cultural exports of South Korea and Japan, the study explores how this linguistic reform can serve as a catalyst for amplifying Thailand's cultural soft power on the global stage.

Table 1: EF English Proficiency Index 2025: Selected economies in Asia.

Country/Region	EF EPI 2025 score	Proficiency band	Global rank (out of 123)
Malaysia	581	High proficiency	24
Philippines	569	High proficiency	28
Vietnam	500	Moderate proficiency	64
Thailand	402	Very low proficiency	116
Cambodia	390	Very low proficiency	123

Materials and Method

This study adopts policy-analysis and comparative-case approach to examine the connection between Thailand's English education and its international competitiveness, regional development, and cultural soft power. By synthesizing evidence from the implementation pathways of Vietnam's English education reforms, this research provides policy recommendations. Furthermore, it assesses the feasibility of Thailand's strategic development by benchmarking successful cultural export models from South Korea and Japan.

Results and Discussion

The global success of K-pop and Japanese anime rests on transforming indigenous cultural cores into systematic products disseminated through English. These nations move beyond single-city branding (like Tokyo or Bangkok) to narrate diverse regional stories in international languages. In contrast, Thailand's international image remains stagnant, fixed on unique characteristic like "elephants" and "temples" due to restricted linguistic dissemination.

Thailand is at a critical juncture for strategic choices. Low English proficiency is not merely a lagging indicator in education but also a structural bottleneck hindering cultural soft power and balanced regional economic development (Suksomboon, 2023). Enhancing the competitiveness of English teaching is not merely for the sake of examinations, but rather to cultivate versatile talents capable of performing 'cultural translation' through English, thereby partially mitigating educational disparities between urban and rural areas. Vietnam demonstrated the feasibility of systematic reform within five years (Vietnam News, 2025), yet the crux lies not in emulating Vietnam, but in designing an integrated education and cultural policy framework tailored to Thailand's local cultural strengths, tourism industry foundations, and geographical indication product reserves (Suksomboon, 2023; Royal Thai Government, 2025). This framework should utilize English as a bridge, local culture as its core, and regional balanced development as its objective. This would transform 'English instruction' from mere language teaching into a strategic tool for crafting a national cultural identity – much as South Korea disseminates K-pop through English-language content and Japan promotes anime IP via multilingual strategies. Thailand could leverage widespread English proficiency to grant every region, cultural heritage site, and artisanal product a passport to global market.

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Spatiotemporal Analysis of Built-Up Areas Using NPP-VIIRS Nighttime Light Imagery (Case Study: Central Java Province, Indonesia)

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Purpose and Background

The phenomenon of urban growth has become increasingly intensive on Java Island, particularly in Central Java Province (Prawatya, 2013). This province is one of the regions on Java Island that contributes significantly to Indonesia's national economy (Prawatya, 2013). It is further supported by the increase in its urban population, which rose from 14.8 million people in 2010 (BPS, 2010) to 19.1 million people in 2022 and is projected to continue growing in the coming years (BPS, 2020). Rapid economic growth and population increasing are the key determinants driving the expansion of built-up areas in Central Java Province, which can be spatially observed through remote sensing technology (Indrayati et al., 2024). One of the remote sensing products that enables the observation of urban dynamics through the emission of light from urban areas is Nighttime Light (NTL) imagery (Shi et al., 2014). This imagery from the Suomi National Polar-Orbiting Partnership Visible Infrared Imaging Radiometer Suite (Suomi NPP VIIRS) sensor analyzes variations in nighttime light intensity as a proxy for the level of urban built-up area (Bagan & Yamagata, 2015). Accordingly, this study aims to analyze the spatial and temporal dynamics of built-up areas in Central Java Province as an indicator reflecting urban growth phenomena using NPP-VIIRS Nighttime Light (NTL) imagery.

Materials and Methods

This study utilizes datasets obtained through cloud-based digital platforms, such as Google Earth Engine (GEE). In addition, to ensure effectiveness and efficiency, the entire data processing workflow was conducted using the same platform. Essentially, Google Earth Engine is a cloud-based platform integrated with the Python programming language. The method employed to address this study is spatiotemporal analysis. It is a technique that examines data across both space (geography) and time (chronology) to reveal how patterns, processes, and phenomena change and interact over locations and periods.

Result and Discussion

The results show a clear increase in Nighttime Light (NTL) intensity in Central Java Province from 2014 to 2024, indicating continuous growth in human activities and urban built-up areas. Spatially, areas with high NTL intensity become wider and brighter over time, particularly around major urban centers such as Pekalongan, Surakarta, and Semarang. These areas exhibit very high brightness and can therefore be clearly identified as major cities that function as important economic and administrative centers in the region.

Over time, the expansion of NTL intensity from urban cores forms linear branching patterns, reflecting typical modes of urban growth such as the development of new transportation corridors and other linear infrastructures. This type of growth generally extends outward from existing built-up areas into surrounding regions that are still largely undeveloped and located at some distance from the established urban core. In addition to these spatial patterns, statistical analysis shows a steady upward trend in NTL intensity, with a slight decline during 2020–2022, likely due to reduced human activities during the COVID-19 pandemic. Following this period, NTL intensity increases again, indicating a recovery in economic and social activities.

Overall, these findings show that Nighttime Light (NTL) data from Suomi National Polar-Orbiting Partnership Visible Infrared Imaging Radiometer Suite (Suomi NPP VIIRS) is an effective proxy for monitoring built-up area dynamics and urban growth in Central Java Province. NPP-VIIRS Nighttime Light (NTL) imagery provides a coarse spatial resolution that is sufficient to capture regional patterns of nighttime light that represent urban dynamics. This resolution allows identification of urban areas and their expansion, while also showing differences between urban and less developed regions. Therefore, the continued use of NTL data is necessary, not only for monitoring current urban growth but also for predicting future urban development, which can support strategies aligned with the Sustainable Development Goals (SDGs) 11, Sustainable Cities and Communities.

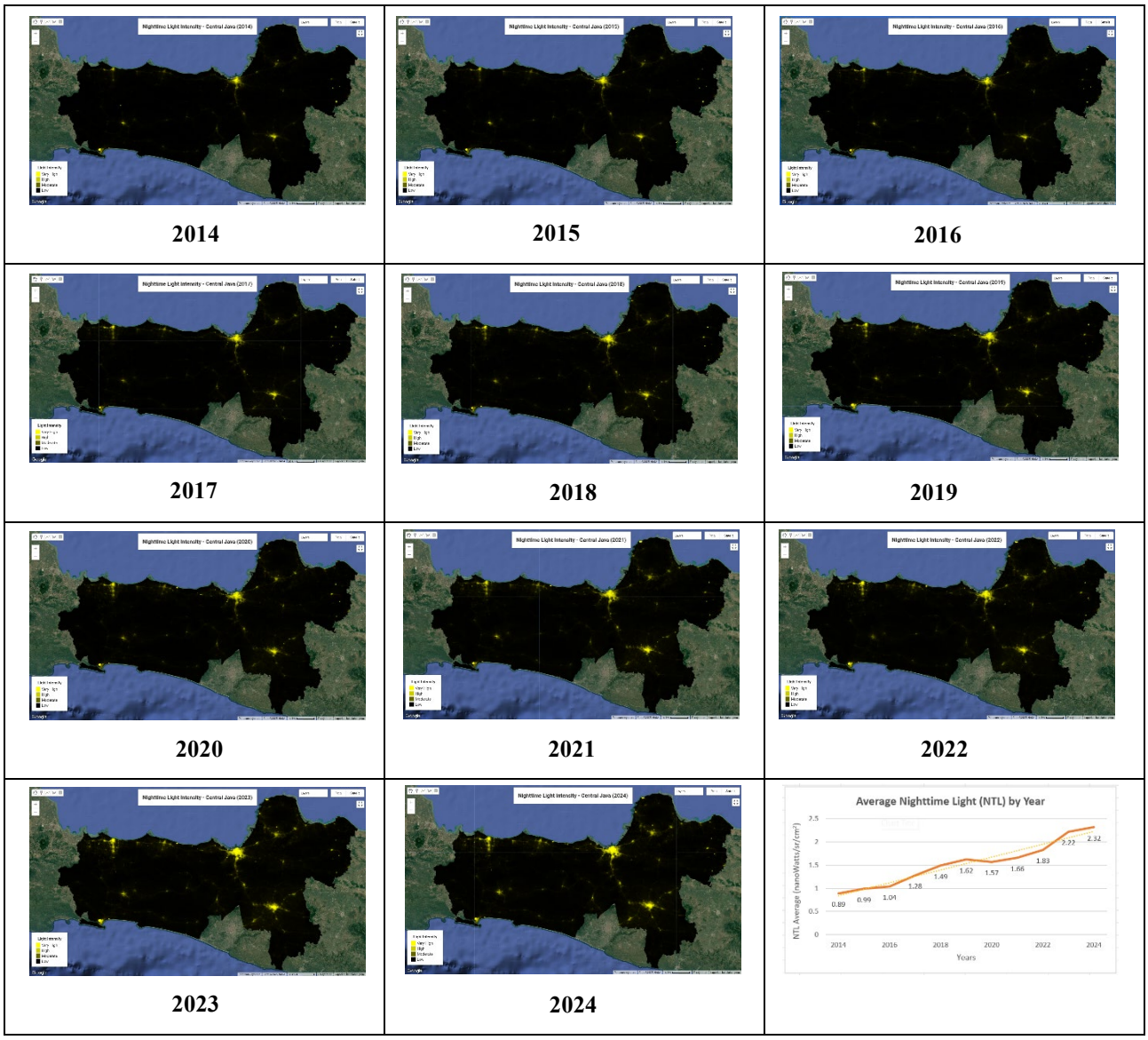

Figure 1. Spatiotemporal dynamics of Nighttime Light (NTL) intensity changes in Central Java Province, Indonesia (2014–2024).

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Crafting Climate Resilience: A Case for Integrating Indigenous Knowledge Through a Panay Bukidnon Student's Perspective

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Purpose and Background

With climate change continually altering ecosystems and livelihoods, the sidelining of Indigenous voices in formal education is an ongoing issue (Sherpa, 2021). For the Panay Bukidnon community inNegros Island, Philippines, climate resilience is rooted in daily practices and Traditional Ecological Knowledge (TEK), which has been passed down through many generations of living closely with the environmental resources. This qualitative case study focuses on the lived experiences of a first-year college Panay Bukidnon student who embodies Indigenous knowledge that mirrors broader community-based practices for climate resilience. Despite the richness of this knowledge, there is still a significant gap between the student's knowledge and real experience living in communities with a formal climate science curriculum as it mainly focuses on Western scientific models while overlooking Indigenous knowledge about environmental stewardship (Vogt et al., 2023). Informed by TEK (Chandra, 2014), Culturally Responsive Pedagogy (Chenowith, 2014) and Postcolonial Theory (Akena, 2012; Mbah et al., 2021), the research documents community-based resilience practices, investigates tensions between Indigenous and formal scientific knowledge systems and explores pathways for meaningful curriculum integration. While recognizing the epistemological obstacles and hazards involved in integrating Traditional Ecological Knowledge (TEK) into formal education (McCarter & Gavin, 2011), the study used an in-depth interview methodology underpinned by reflexivity, contextual analysis, and member validation to assure credibility. By situating an individual narrative within its socio-cultural and environmental context, the research shows how Indigenous knowledge may enhance climate science teaching, advance epistemic justice, and encourage culturally responsive and place-based learning by placing an individual narrative inside its socio-cultural and environmental context (Kayira, 2015). Moreover, the study emphasizes how curriculum changes, culturally aware teacher preparation, and solid community partnerships can incorporate Indigenous climate resilience practices into Philippine education, resulting in more inclusive, pertinent, and sustainable climate science education.

Materials and Methods

This study employed a descriptive case study design to examine the lived experiences of a Panay Bukidnon student within her cultural and environmental context, an approach well-suited for investigating Indigenous ecological practices that are deeply embedded in place, culture, and daily life and cannot be separated from real-world settings. The participant, a student from the Panay Bukidnon community in Negros Island, Philippines, was purposefully selected based on her active engagement in traditional ecological practices, exposure to both Indigenous knowledge and formal education, and willingness to participate, allowing for an in-depth exploration of Indigenous climate resilience within educational contexts. Data were gathered through an in-depth, open-ended interview that documented climate resilience practices such as intercropping, agroforestry, and the use of ecological indicators, as well as the participant's perceptions of the relationship between Indigenous knowledge and formal climate science education. Ethical standards were upheld through informed consent, voluntary participation, confidentiality, cultural sensitivity, and fair compensation, with findings disseminated through culturally appropriate channels to support community recognition of Indigenous climate resilience practices.

Results and Discussion

The results indicate that the Panay Bukidnon student possesses a broad and systematically applied body of Indigenous climate resilience knowledge that informs daily decision-making at the household and community levels. Documented practices include season-based crop selection to protect yields from drought and excessive rainfall, agroforestry and communal tree planting to prevent soil erosion and landslides, and sustainable food production through intercropping and small-scale

vegetable cultivation for both consumption and livelihood. The student also demonstrated traditional environmental monitoring skills, such as predicting weather changes through observations of animal behavior, cloud formations, and natural indicators, which guide planting, harvesting, and disaster preparedness decisions. In addition, the findings show the use of Indigenous housing and resource management practices—such as bamboo-based construction for natural cooling and the reuse of organic waste for animal feed—reflecting environmentally sustainable living. As seen in Figure 1, five major themes emerged from the analysis: climate resilience strategies, Indigenous knowledge and practices, Indigenous knowledge and formal education, challenges in sharing Indigenous knowledge, and contributions to climate science education. While the student actively applies these practices within the community, the results reveal limited recognition of Indigenous knowledge in formal school settings, where instruction is largely textbook-based and disconnected from lived experience. The student reported minimal opportunities to share Indigenous knowledge in class, experiences of cultural stereotyping, and a tendency for Indigenous knowledge to be reduced to cultural performance rather than acknowledged as scientific or ecological expertise. Despite these constraints, the findings demonstrate that Indigenous practices closely align with scientific principles of climate adaptation, ecosystem management, disaster risk reduction, and sustainability, indicating their relevance and applicability to formal climate science education.

Figure 1. Emerged Themes

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From Banana Peel Waste to Functional Insect Biomass: Enhancing Antioxidants in Black Soldier Fly Larvae

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Purpose and Background

The dependence of Indonesian feed industry on conventional protein sources, such as soybean meal and meat-and-bone meal, highlights the need for more sustainable alternatives. Black soldier fly (BSF) larvae (*Hermetia illucens*) are promising candidates because they can convert organic waste into high-value biomass, offering a dual benefit as both a waste-management solution and an alternative feed ingredient (Kim et al., 2015). BSF larval meal contains 32-58% protein on a dry matter basis (Gold et al., 2018). Beyond its high protein content, BSF larvae may provide functional benefits because they can contain bioactive compounds such as polyphenols, and their polyphenol content can be influenced by the rearing substrate (Barragan-Fonseca et al., 2017). This provides a basis for biofortification, where antioxidant-rich substrates are used to enhance the antioxidant capacity of BSF larvae.

Banana peel waste is abundant in Indonesia and contains antioxidant compounds, including phenolics, flavonoids, catecholamines, and carotenoids (Isibika et al., 2019). This by-product is generated in large quantities from banana-processing industries and household consumption, yet it is often not utilised optimally. However, oprtimal larval growth requires a balanced carbon-to-nitrogen (C:N) ratio, therefore, banana peel substrates were supplemented with fish meal to improve nutrient balance and supply essential amino acids (Jędrejek et al., 2016). This study aimed to evaluate the effectiveness of antioxidant-rich substrates in improving the antioxidant capacity of BSF larvae while maintain production performance. The findings are expected to contribute to the development of sustainable and environmentally friendly alternative feed ingredients.

Materials and Methods

a. Production of larvae meal

Unripe Kepok banana peels (*Musa paradisiaca*) were collected from a banana chips processing industry in Neglasari, Bogor Regency, Indonesia. The peels were shade-air-dried at an average ambient temperature of 26.81 °C and relative humidity of 84.86%, then ground to standardise particle size across substrate treatments. Fish meal and commercial chicken feed were purchased from a local supplier (CV. Nuansa Baru, Bogor Regency, Indonesia).

Five substrates for BSF were prepared: (P1) chicken feed (control), (P2) 100% banana peel (BP), (P3) 100% fish meal (FM), (P4) 74% BP + 26% FM, and (P5) 88% BP + 12% FM. Chicken feed was used as the control because BSF larvae are known to perform well on this substrate. A total of 15 containers were prepared (n = 3 replicates per substrate). Each container received 135 g substrate on a dry-weight basis to achieve a feeding rate of 0.125 g day^{-1} $larva^{-1}$ (Gold et al., 2018). Moisture content was adjusted to 50-78% (adapted to reach 100% of the fibre saturation point for each substrate). Approximately six-day-old BSF larvae were selected individually and allocated at 1,000 larvae per container (total = 15,000 larvae). Larvae were weighed and measured prior to feeding.

The feeding period lasted 9 days (from day 6 to day 15 of larval age) and was terminated when larvae in the control treatment approached pupation. Larvae were separated from the substrates and fasted for 24 h, then measured and weighed. Larvae were euthanised by freezing (−20°C) for 24 h, oven-dried at 55°C for 48 hours, and subsequently ground to produce larval meal.

b. Antioxidant tests

Larval meal was extracted using 80% methanol, sonicated in a water-bath sonicator for 20 min, and centrifuged at 3,700 rpm for 15 min. The supernatant was collected and used for subsequent antioxidant analyses. Total phenolic content was determined using the Folin–Ciocalteu method (Singleton & Rossi, 1965) adapted for a microplate reader (SPECTROstar Nano, BMG Labtech), and DPPH radical scavenging activity was measured based on Yen & Chen (1995) and adapted to a microplate format. Results are reported on a dry-matter basis as mg GAE/g (TPC) and mg TE/g (DPPH). Data were analyzed using one-way ANOVA, and differences among means were separated using Duncan's multiple range test (DMRT) at $p < 0.05$.

Results and Discussion

Figure 1 shows significant treatment effects on both total phenolic content (TPC) and antioxidant activity (DPPH) ($p < 0.05$). TPC was highest in P3 (9.64 mg GAE/g), followed by P2, P5, P4 and the control (P1). DPPH radical scavenging activity peaked in the banana peel treatment P2 (4.78 mg TE/g) and remained higher in the banana peel + fish meal formulation P5 (2.81 mg TE/g) than in P1 (1.16 mg TE/g), indicating that antioxidant-rich banana peel can enhance the functional potential of the larvae meal. Although P3 showed the highest TPC, this value may be partly influenced by non-phenolic reducing subtsrtae because the Folin–Ciocalteu assay is not fully specific to phenolics and can respond to other compounds, including some protein associated components.

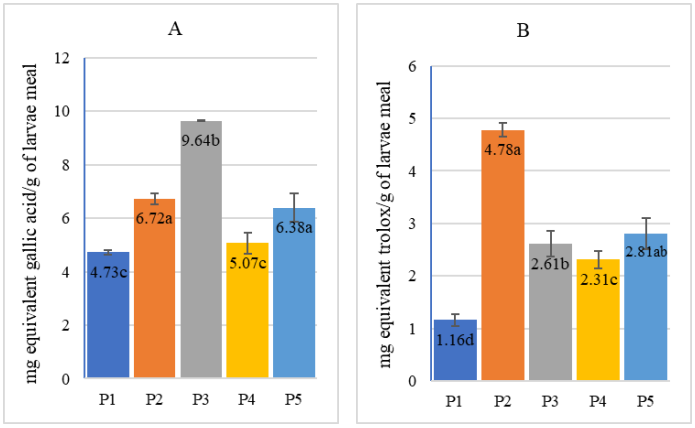

Figure 1 Antioxidant apacity of BSF larval meal extracts from larvae reared on different substrates: (A) TPC and (B) DPPH. Different superscript letters indicate significant differences ($p<0.05$), P1: chicken feed (control), P2: 100% banana peel (BP), P3: 100% fish meal (FM), P4: 74% BP + 26% FM, and P5: 88% BP + 12% FM

The results indicate that BSF larvae can absorb, metabolize, and accumulate phenolic compounds from banana peel–based substrates, as reflected by the elevated TPC in banana peel treatments. Among all treatments, P5 (88% banana peel + 12% fish meal) was the most favorable because it produced high larval biomass and achieved the greatest substrate reduction efficiency. Importantly, P5 also yielded larval meal with higher TPC and stronger DPPH radical-scavenging activity than the control (P1), showing that biofortification using antioxidant-rich banana peel, supported by fish meal as a protein source, can enhance both production output and functional quality and potentially producing insect-derived products with higher functional value.

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Experimental Study on the Monochromation of Copper X-Rays

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Purpose and Background

In the field of X-ray crystallography, the precision of lattice characteristic analysis depends heavily on the use of monochromatic electromagnetic waves. Copper (Cu) targets are widely used as X-ray anodes; however, they inherently emit a spectrum consisting of multiple characteristic wavelengths, primarily K_α (~8.04 keV) and K_β (~8.91 keV). The presence of K_β radiation introduces unwanted background noise and overlapping peaks in diffraction patterns, complicating the interpretation of experimental data.

The objective of this research is to identify an optimal filter material to achieve monochromation of the Copper X-ray beam. This study utilizes the "Absorption Edge" principle, which posits that a material's absorption coefficient increases sharply when the incident photon energy is slightly higher than the binding energy of the material's inner-shell electrons. By selecting a material with an absorption edge situated between the K_α and K_β energies, the unwanted K_β signal can be selectively suppressed.

Materials and Methods

The experimental setup consisted of a PHYWE X-ray unit with a copper anode, a Lithium Fluoride (LiF 100) crystal ($2d = 402.7\,pm$) serving as the monochromator/analyzer, and a Geiger-Müller counter for detection. The experiment was conducted in three phases. First, the LiF crystal was calibrated using Bragg's Law ($n\lambda = 2dsin\theta$) to verify peak intensity and alignment. Second, the characteristic emission energies of the copper source were identified by scanning diffraction angles.

Finally, the absorption characteristics of five metal foils—Aluminum (Al), Zinc (Zn), Copper (Cu), Tin (Sn), and Nickel (Ni) — were evaluated. For Al and Zn, the relationship between foil thickness and intensity was measured to verify the Beer-Lambert Law ($I = I_0 e^{-\mu x}$).

Results and Discussion

Initial calibration of the LiF(100) crystal yielded high-intensity diffraction peaks, reaching a maximum of 9,316 Imp/s at a Bragg angle of 22.6°. Based on the angular positions of the peaks (20.3°, 22.6°, 43.8°, and 50.0°), the characteristic photon energies were calculated to be 8.03 keV (K_α) and 8.86 keV (K_β), which align with theoretical values for Copper K-series emission.

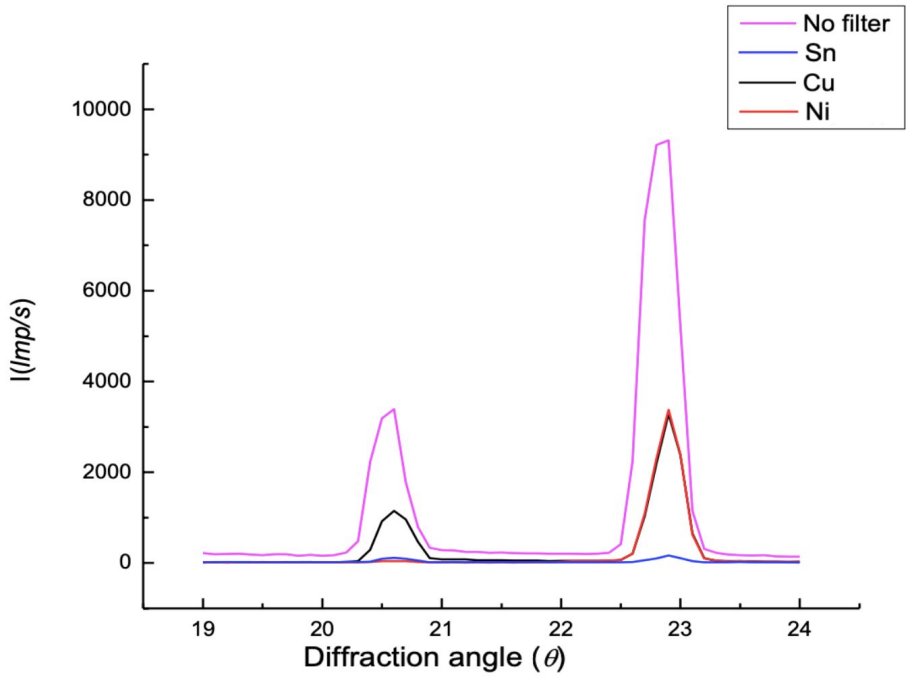

Figure 1. Comparison of X-ray diffraction intensity for unfiltered Cu radiation and various metal foil filters (Ni, Cu, Sn) between 19° and 24°.

As shown in Figure 1, the comparative analysis of filter foils revealed that while Sn absorbed nearly all radiation and Cu showed no selectivity, Nickel (Ni) successfully suppressed the K_β peaks while preserving the K_α signal. This is explained by the Nickel K-absorption edge at 8.33 keV. Because this edge sits between the K_α (8.03 keV) and K_β (8.86 keV) lines, Ni acts as a high-pass energy filter, effectively "deleting" the higher-energy K_β noise. Consequently, Nickel was identified as the most effective monochromator for Cu-anode X-ray systems.

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Automated Indonesian Radiology Reporting for Tuberculosis: Fine-Tuning MedGemma on Local Clinical Data via Low-Rank Adaptation (LoRA)

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Purpose and Background

Tuberculosis (TB) remains a major epidemiological burden in Indonesia. While Artificial Intelligence (AI) has shown promise in radiology, its implementation is hindered by a significant language barrier. Most existing Vision-Language Models (VLMs) are trained primarily on English datasets (e.g., MIMIC-CXR), rendering them ineffective for generating narrative reports in Bahasa Indonesia. Furthermore, Indonesian radiologists require comprehensive narrative reports rather than simple binary classification labels (e.g., "TB Positive"). This research addresses these challenges by developing an automated radiology report generator for Chest X-Rays (CXR) focused on TB detection specifically for the Indonesian language. We employ a Parameter-Efficient Fine-Tuning (PEFT) strategy to adapt a state-of-the-art Multimodal Large Language Model (MedGemma) on local clinical data.

Materials and Methods:

Data Preparation: We utilized a primary dataset of 524 validated Chest X-Ray and report pairs from Cipto Mangunkusumo Hospital (RSCM). The dataset was pre-processed and split into Training (366 samples), Validation (79 samples), and Testing (79 samples) sets to ensure robust evaluation.

Model Architecture and Training: We selected MedGemma-4B, a multimodal model combining a SigLIP vision encoder and a Gemma language decoder. Experiments were conducted on a local workstation equipped with a single NVIDIA RTX 5090 (32GB VRAM).

Unlike previous approaches that utilize quantization (4-bit), we implemented Standard LoRA (Low-Rank Adaptation) with BFloat16 precision. This configuration allows the model to retain full-precision weights for higher accuracy while only training the adapter layers. We targeted all linear modules (all-linear) in the architecture to maximize visual-linguistic alignment. The training was executed for 3 epochs with a learning rate of 2e-4 and gradient accumulation steps of 8.

Results and Discussion

The experimental results demonstrate that the Fine-Tuned MedGemma 4B model significantly outperforms the Baseline model across all metrics. The Baseline model exhibited "hallucinations," often generating conversational fillers and incorrect metadata. In contrast, the Fine-Tuned model successfully adopted the structured, concise reporting style of Indonesian radiologists.

Quantitative evaluation (Table 1) shows a massive improvement in linguistic alignment, with the BLEU score increasing from 0.0022 to 0.3214. More importantly, the Clinical Accuracy, evaluated by an LLM-Judge (Qwen2.5-14B), improved to 3.03/5.00, indicating the model's capability to correctly identify pathological findings such as "Infiltrat" and "Limfadenopati".

Metric	Baseline (Vanilla)	Fine-Tuned (Ours)	Improvement
BLEU Score (Precision)	0.0022	**0.3214**	+14,227%
ROUGE-L (Completeness)	0.1074	**0.5095**	+376%
BERTScore F1 (Semantic)	0.6518	**0.8190**	+25.6%
Clinical Accuracy (1-5)	2.94	**3.03**	+0.09
Total LLM-Judge Score	3.11	**3.35**	+0.24

Table 1. Performance Comparison: Baseline vs. Fine-Tuned Model (Standard LoRA BF16)

The breakdown of the results indicates that the Standard LoRA (BFloat16) approach yields better generation quality compared to 4-bit Quantized LoRA (BLEU 0.3167) and Full Fine-Tuning (BLEU 0.3129), proving that retaining model precision is crucial for medical nuances.

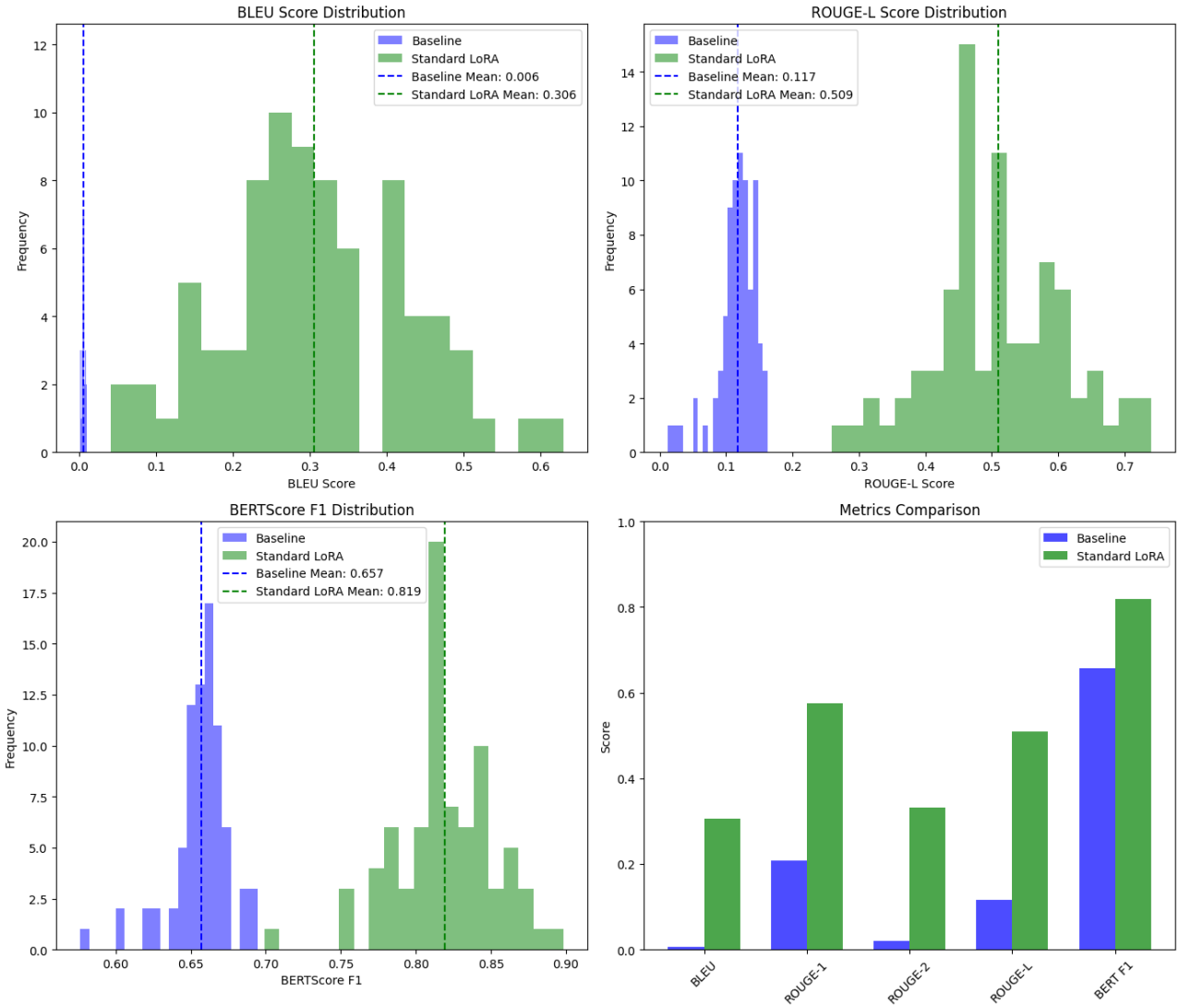

Figure 1. Visual comparison of evaluation metrics showing significant improvement after fine-tuning.

Conclusion

This study validates that MedGemma-4B, when fine-tuned using Standard LoRA with BFloat16 precision, can effectively generate accurate Indonesian radiology reports for Tuberculosis detection. The model eliminates stylistic errors and improves clinical accuracy compared to the baseline. Future work will extend this framework to Federated Learning to address data privacy concerns across multiple hospitals.

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Taking the Development of Education in Eastern and Western China as an Example: Does Digital Education Truly Promote Educational Equity?

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Background

China's rapid modernization has been accompanied by persistent regional imbalances, with Western China lagging significantly behind the eastern coastal provinces in terms of economic development and social infrastructure. These structural disparities reflect deeper gaps in industrial structure, transportation networks, and public services, all of which constrain the accumulation and effective use of human capital in the western regions. The modernization of Western China therefore depends critically on prioritizing education, science, and culture, making the expansion and equalization of educational opportunities a strategic necessity rather than a mere social policy choice.

Since the late 1990s, digital education has been promoted in China as a key strategy to modernize the education system and to narrow regional and social gaps. National initiatives such as the "Modern Distance Education Project," the Ten-Year Development Plan for Education Informatization (2011–2020) and the "Internet Plus Education" strategy have aimed to expand ICT infrastructure, enhance digital literacy, and foster innovative teaching practices across both urban and rural schools. More recently, the National Smart Education Platform for Primary and Secondary Schools (NSEP) has been designed as a centralized platform to provide high-quality digital resources for more than 200 million students, with particular emphasis on supporting rural and underdeveloped regions.

Against this backdrop, digital education is widely expected to promote educational equity by overcoming geographical barriers, sharing high-quality teaching resources, and offering flexible, personalized learning opportunities. However, emerging evidence suggests that digital initiatives may also generate new forms of inequality related to access, skills, and actual usage, especially for students and schools in Western China and other disadvantaged areas. This paper therefore uses a literature-based approach to examine whether digital education in China has truly advanced educational equity between the eastern and western regions, or whether it risks reproducing and deepening existing disparities.

Materials and methods

This study adopts a literature research method to synthesize existing scholarship and policy documents on digital education and educational equity in China. The analysis focuses on publications from 2010 onwards, including Chinese government reports and policy texts on educational informatization and compulsory education equalization, empirical studies on online learning and ICT in education, and international reports on China's education system and the digital divide.

Results and discussion

The literature shows that large-scale investments in educational informatization have substantially improved the basic conditions for digital learning in Chinese schools, including many in western and rural regions. Most primary and secondary schools are now connected to the internet and equipped with digital terminals, and national platforms such as the National Smart Education Platform for Primary and Secondary Schools provide a wide range of online courses and open educational resources that can help alleviate teacher shortages and expand access to high-quality instruction.

However, improved physical access does not automatically translate into real equity. Studies highlight persistent "second-level" and "third-level" digital divides related to digital skills, usage patterns, and learning outcomes, with eastern, urban, and higher socio-economic groups often better able to benefit from digital technologies than schools and students in Western China. In many under-resourced western and rural schools, weaker infrastructure maintenance, limited technical support, and insufficient teacher training constrain the meaningful integration of ICT into everyday teaching, leading to a "Matthew effect" in which those already advantaged gain more from digital education.

Furthermore, structural problems in the supply and circulation of high-quality digital resources limit the equalizing potential of digital education. Market-driven concentration of top teachers and premium content in

developed regions, together with fragmented platforms and unclear intellectual property arrangements, makes it difficult for disadvantaged schools to access and adapt high-value resources. The experience of emergency remote teaching during the COVID-19 pandemic also revealed significant differences in home learning environments, device access, and parental support, especially for rural and low-income families, reinforcing concerns that digital education can become another layer of stratification if not accompanied by strong equity-oriented policies.

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Full Inclusion in Practice: Echoes from Secondary Teachers' Experiences in Core Subjects Instruction in the Mainstream Classroom

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Purpose and Background

The reinforcement of SDG 4.5 and the mandate influenced by the Salamanca Statement (UNESCO, 1994) urges education systems to implement inclusive education to eliminate disparities, specifically for learners with special needs and disabilities (United Nations, 2015). In connection, the Philippines expressed its commitment to inclusion through national policies such as DepEd Order No. 72, s. 2009, and the Inclusive Education Act. However, its implementation remains disproportionate and largely symbolic in many public schools (Muega, 2016). Teachers in non-SPED centers often shoulder full responsibility for accommodating learners with disabilities despite lacking training, resources, and institutional support (Teo et al., 2025).

This study investigated how public secondary school teachers from one of the schools in the Division of Leyte, Philippines, a non-SPED, large public school with a notable number of learners with special needs, implement full inclusion in teaching English, Math, and Science subjects in mainstream classrooms. Moreover, anchored on Critical Disability Theory (CDT), the study examined the lived experiences of teachers who employed full inclusion for learners with physical deformities, cognitive and developmental disorders such as ADHD, and anxiety. Furthermore, it aimed to understand (1) teachers' perceptions of full inclusive education and (2) the challenges they encounter in enacting this within resource-constrained environments.

Materials and Methods

A qualitative, transcendental phenomenological design (Moustakas, 1994) was used to capture the essence of teachers' inclusive teaching experiences. One of the schools in the Division of Leyte, Philippines, was purposively selected due to its typical profile as a large public school without SPED personnel or facilities, and implemented full inclusion in mainstream classrooms.

Five purposively selected secondary teachers with at least five years of experience but no inclusive education training, who taught learners with special needs in mainstream classrooms. Semi-structured, one-on-one interviews lasting 45–60 minutes were conducted over a week. Interviews were audio-recorded, transcribed verbatim, validated through member checking, and triangulated through data and theory validation. Data analysis followed phenomenological procedures: epochs, horizontalization, clustering of meaning units into themes, and synthesis into a composite essence. Trustworthiness was ensured through peer debriefing, audit trails, and thick description.

Results and Discussion

The study revealed three interrelated themes that emerged and formed part of a recursive process rather than existing in isolation.

Theme 1. Teachers' Perceptions of Inclusive Education. Teachers expressed strong moral commitment to inclusivity as revealed in UN Convention on the Rights of Persons with Disabilities and the World Declaration on Education for All. Teacher participants often describe full inclusion as "*accepting everybody*" or "*fusing different learners inside the classroom*." However, these concepts only highlighted the physical integration and equal opportunities but lack grounding in official policies such as DepEd Order No. 21, s. 2019 or pedagogical frameworks. This shows that teachers understood full inclusion as a personal and moral action rather than an institutional mandate. Conversely, these positive attitudes shown were uncertain and restricted by their perceptions of manageability, behavior, or classroom norms. Thus, without training, teachers' implementation of full inclusion was associated with tolerance rather than structured pedagogical transformation.

Theme 2. Systemic Barriers to Implementation. Teachers consistently mentioned that structural constraints such as overcrowded classrooms with 40-60 learners, lack of in-service training, and difficulties in managing behavioral diversity were the key challenges. Also, no SPED training or access to SPED specialists**,** insufficient materials for physical, cognitive, or emotional disability support**,** limited parental cooperation, and inconsistent institutional support hinder its realization**.** One teacher noted, "*Sometimes I lower my standards*

because I don't know how to teach them properly," illustrating how a lack of training can inadvertently lead to diluted learning expectations. This finding depicts a repeating loop where teachers' positive perceptions structured their inclusion initiatives; however, systemic barriers force them to improvise, eventually restructuring their perceptions and expectations on full inclusive implementation in their classrooms. Hence, full inclusion becomes a teacher's struggle, not a collective responsibility.

Theme 3. Adaptive Strategies and Pedagogical Adjustments

> One teacher said *"I approach him in a special manner wherein most of his classmates could say that I have favoritism, because this student is special. When this SPED student was absent, I tried to explain to the class that they need to do those things, because that's what he needs. Yes. From now, from that time on, they understand why I had this special care with this SPED student. In regards to my teaching strategies, I will always have a special activity for this special learner."- Participant 2*

> Another participant stated *"On the teaching strategies, of course, I use the normal teaching strategy, and it just differ on the activities that I gave to that particular learner, the way I am teaching with my lesson, the activities, it was just normal classroom set up, but when it comes to that particular student, I give him a different kind of activity. Or sometimes if there is a group activity, I will let that particular student work with the group that he or she is comfortable with. And then I also have a separate activity for that particular student if he doesn't like to participate. – Participant 5*

Adaptive Strategies and Pedagogical Adjustments. These teachers' adaptive strategies of full inclusion reflected genuine initiatives and were anchored on D.O. No. 21 s. 2019, Annex 5; however, it was more on intuition rather than evidence-based. Teachers accommodate these strategies, but facilitate learning reduction. This is evident when teachers' expectations for learners with disabilities were lowered due to a lack of guidance on differentiated instruction. Though these improvisations depicted teachers' resilience, they also showed a lack of systemic, structured intervention models, assistive resources, and interdisciplinary collaboration.

This implies that teacher attitudes, such as "lowering standards", risked merging accommodation with reduced expectations, leading to tensions and pedagogical compromises. Effective full inclusion requires Professional development focused on differentiated instruction and inclusive assessment, Assistive technologies, accessible infrastructure, and SPED support personnel. It also necessitates clear, actionable guidelines that translate national policies into school-level practice, as well as multi-stakeholder engagement involving families, community groups, and specialists.

The study reinforces that inclusive education cannot rely solely on teacher attitudes. Instead, it must be an institutionally supported, policy-guided, collaboratively sustained process, and collective accountability.

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A Practice Report on an Online Exchange for Young Children Between Japan and Rwanda Using Digital Technology

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Introduction

Why I Began Research on Early Childhood International Exchange

- International understanding education has traditionally focused on middle school, high school, and university students, while research on the early childhood period remains limited.
- Early childhood is considered a period in which children develop an interest in others and the surrounding world through sensory and experiential activities rather than through linguistic understanding (Shiomi, 2014).
- Recent advances in ICT have made international exchange possible beyond geographical constraints.
- In addition, an environment already existed that enabled ongoing exchange and short-term study abroad programs with Rwanda.

This study also contributes to the growing discussion on how digital technology can support international exchange and intercultural learning in early childhood education.

Aim of the study

The project aimed to connect young children in Japan and Rwanda through online interaction using digital technology, thereby fostering the foundation for international understanding from early childhood.

Specifically, the study sought to clarify what kinds of learning experiences nonverbal communication — transcending differences in language and living environments — can provide for young children and the university students who support such exchange.

Methods

Practical Overview

Partner Schools　Rwanda: Private School Preschool Division
Japan　: Private Nursery School

Implementation Date and Time：September 3, 2025 (Wednesday)　30 minutes
Rwanda Time: 9:30 - 10:00 AM
Japan Time　: 4:30 - 5:00 PM（7-hour time difference）

Cooperating Organizations：Faculty members and students from Josai International University

Equipment and Environment Used：Laptops, projectors, screens, and speakers were used at both locations.
The online meeting system used was Zoom.
In Rwanda, the kindergarten's Wi-Fi was initially used, but due to unstable connectivity, the session was ultimately conducted using a portable Wi-Fi device brought by the Japanese participants.

Exchange Content：
- Greetings and self-introductions
- Play activities and toy introductions
- Anpanman exercise
- Question Time

Results

1.Children's Behavior in Interactive Scenarios

Despite the language barrier, the children showed strong interest in their counterparts on screen and actively

participated in the exchange through smiles, gestures, and imitative behavior.

Particularly when children from both countries performed the Anpanman exercise simultaneously, a sense of unity transcending language differences was observed.

2. Implementation Challenges

Several practical issues were identified during the exchange.

- The communication environment on the Rwandan side was unstable, causing multiple interruptions in video and audio transmission.
- The built-in computer microphone could not adequately capture the group's voices, highlighting limitations in the audio setup.
- Interpretation between Japanese, English, and French was required, consuming significant time. Consequently, sufficient time could not be allocated for the Rwandan children to ask questions.

3. University Students' Learning (Qualitative Analysis Results)

Qualitative analysis of student reflections identified six categories of learning:

① Experiencing mutual understanding through nonverbal expression
② Awareness and confusion regarding language and cultural differences
③ Recognition of differences in young children's behavioral characteristics based on cultural background
④ Recognition of the impact of ICT environments on exchange experiences
⑤ Expectations for the future significance of international exchange in early childhood
⑥ Deepening learning as part of specialized education

These elements are interrelated, suggesting a structure centered on the experiential realization of cross-cultural understanding through nonverbal communication, which promotes the deepening of student learning.

Discussion

The results of this study suggest that online international exchange in early childhood has the potential to foster awareness of others and interest in different cultures even before language comprehension develops.

In particular, nonverbal activities such as dance and physical expression function as effective means to promote mutual understanding beyond language barriers.

Furthermore, university students' recognition of differences in children's behavioral characteristics provided an opportunity to gain experiential insights into differences in culture, living environments, and childcare philosophies.

Therefore, this exchange also served as an important learning opportunity for university students, who took on the role of facilitators of international exchange.

However, it also became clear that constraints in the communication environment, audio equipment, and interpretation systems could impact the interactivity and overall quality of the exchange.

Future Challenges and Outlook

The following initiatives are necessary for the future development of this project:

① Stabilization of the ICT environment
② Development of innovative language support methods
③ Design of exchange programs suited to the developmental characteristics of young children
④ Effectiveness evaluation through continuous and sustained exchange

In particular, longitudinal research is necessary to verify how international exchange experiences in early childhood influence the formation of multicultural understanding and peace-oriented attitudes later in life.

International exchange in early childhood utilizing digital technology holds promise for expanding learning opportunities beyond geographical constraints.

Such practices can become an effective approach to advancing international understanding education in the future.

Therefore, this initiative is considered to hold significant educational value for both young children and university students who will become future specialists.

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ADAPTING THE JAPANESE KYUSHOKU MODEL TO PRIMARY SCHOOL LUNCH EDUCATION IN HANOI: NURTURING RESPONSIBLE EATING HABITS THROUGH MOTTAINAI VALUES

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1. Introduction and Research Rationale

Food waste represents a critical sustainability challenge. Japan's comprehensive approach has proven effective: after setting a 2020 target to halve food waste by 2030 from a 2000 baseline of 9.8 million tons, the country reduced total food waste to approximately 4.72 million tons by 2022.

Vietnam presents a contrasting picture, ranking second in Asia-Pacific for food waste with over 8 million tons wasted annually, causing economic losses of approximately USD 3.9 billion—nearly 2% of GDP. In primary schools, food waste occurs regularly due to student preferences, inadequate meal quality, insufficient education, and cultural dynamics where children reject collective dining options.

Vietnam and Japan's elevation of bilateral relations to a Comprehensive Strategic Partnership in November 2023 provides an opportunity to foster educational exchange and learn from Japan's successful school lunch practices. Building on this context, the present study proposes adapting the Kyushoku (school lunch) system, grounded in the Mottainai philosophy, to address food waste and cultivate responsible eating habits among primary school students in Hanoi.

2. Research Objectives

This study aims to develop an adapted meal education model for Hanoi primary schools that reduces food waste through enhanced student engagement, cultivates responsibility and appreciation for food resources, integrates cultural values with practical interventions, and creates sustainable, scalable practices.

3. Theoretical Framework

SDG 12.3 aims to halve per capita global food waste at the retail and consumer levels by 2030 and reduce food losses along production and supply chains (Xue et al., 2017).

Bandura's Social Learning Theory suggests learning occurs through observation and modeling. When students observe peers and teachers demonstrating respectful food practices, they internalize these behaviors through social reinforcement (Bandura, 1977)

Ajzen's Theory of Planned Behavior indicates behavioral intentions are determined by attitudes, subjective norms, and perceived behavioral control. The proposed model addresses all three components systematically (Ajzen, 1991).

4. The Mottainai Philosophy and Kyushoku System

Mottainai is a Japanese term expressing regret over waste and reverence for resources, originating from Buddhist concepts of interconnectedness. It encompasses gratitude for materials, recognition of labor in their creation, and reluctance to waste anything useful.

The Kyushoku System, established post-WWII, represents school lunch programs where students actively participate in meal preparation, serving, and cleanup. Key features include student-led serving duties rotating daily, communal classroom eating, integrated nutrition education, and pre/post-meal gratitude rituals. Research documents effectiveness in reducing food waste, improving nutritional knowledge, and developing social responsibility.

5. Proposed Adapted Model for Hanoi Primary Schools

Pre-Meal Organization: Classes divide into small groups (5-6 students) with rotating group leaders who survey members regarding portion preferences, then report to teachers for appropriate portioning. This develops organizational skills, peer leadership, and awareness of food quantity needs.

Meal Appreciation Education: Teachers conduct brief educational moments (3-5 minutes) tracing meal components to their origins: seafood from fishermen, vegetables from farmers, rice from paddies, preparation by kitchen staff. This builds cognitive connections between food items and human effort.

Ritualized Gratitude Practice: A bell signals mealtime, prompting students to collectively express gratitude to farmers, fishermen, transporters, cooks, and nature. This creates mindful transition to eating and social reinforcement of appreciation values.

Post-Meal Reflection: Brief activities include group sharing about meal origins, self-assessment of portion appropriateness, and recognition of groups minimizing waste. This creates feedback loops reinforcing learning and metacognitive awareness.

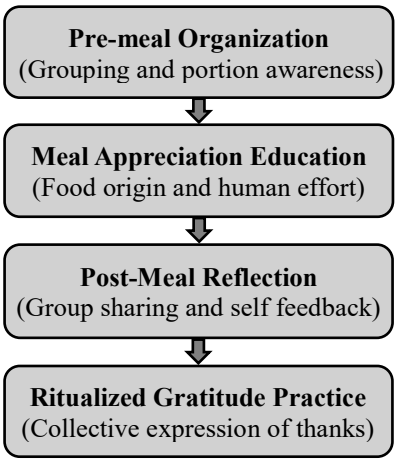

Figure 1. Flow of the Adapted Kyushoku-based lunch Education Model

6. Research Limitations and Implementation Challenges

Scope Limitations: This research proposes educational intervention rather than addressing root causes like meal quality or kitchen infrastructure. Comprehensive waste reduction requires parallel investment in meal quality improvement.

Institutional Variability: Hanoi schools exhibit significant variation in schedules, lunch duration, and facilities. This heterogeneity complicates standardization and may require school-specific adaptations.

Teacher Capacity: Effective implementation requires teachers to possess food systems knowledge, pedagogical skills, and classroom management abilities. Successful scaling requires developing teacher training modules, ready-to-use materials, and peer learning networks.

7. Conclusion

Adapting the Kyushoku model to Hanoi's primary schools offers a culturally informed, theoretically grounded approach to reducing food waste while developing students' social responsibility. By integrating Mottainai values with Vietnamese contexts and leveraging behavioral theories, the model creates systematic touchpoints where learning and behavior change can occur.

Future research should include pilot implementation with rigorous evaluation, comparative analysis across schools, longitudinal tracking of behavior transfer to homes, and investigation of adaptations for other educational levels. As Vietnam and Japan deepen their strategic partnership, sustainability-focused educational exchange can advance bilateral SDG commitments.

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Preliminary Land Use Analysis for Land Subsidence Assessment along the Northern Coast of Java Using Google Earth Engine

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Purpose and Background:

Land subsidence is a critical geohazard in rapidly urbanizing coastal regions, particularly in areas characterized by intensive groundwater extraction and low-lying alluvial plains. InSAR-based studies have demonstrated that persistent land subsidence is closely associated with irreversible aquifer compaction and can substantially amplify coastal flood risk beyond the effect of eustatic sea-level rise alone. (Hasan et al., 2023) The northern coast of Java, especially the Semarang–Demak coastal corridor, represents one of the most subsidence-prone regions in Southeast Asia, where rapid urban expansion, infrastructure development, intensive groundwater use, and recurrent tidal flooding (rob) coincide with the planned implementation of the Java Seawall Project. (Chaussard et al., 2013)

Following recent global subsidence mapping frameworks that emphasize preliminary screening of land-use dynamics and environmental stressors prior to detailed InSAR deformation analysis, this study conducts a Google Earth Engine–based land use and land cover (LULC) classification using multispectral Sentinel-2 imagery and Random Forest. (Belgiu & Drăguţ, 2016) The objective is to generate a reliable LULC baseline for the Semarang–Demak coastal area, assess its classification accuracy, and demonstrate its role as an initial analytical step supporting subsequent InSAR-based land subsidence monitoring and risk evaluation for the Java Seawall Project.

Materials and Methods:

The study focuses on the Semarang–Demak coastal region along the northern coast of Java, Indonesia. This area consists of low-lying coastal plains with unconsolidated sediments, dense urban development, industrial zones, transportation networks, and frequent tidal inundation. The region is widely recognized as a subsidence hotspot and forms a critical segment of the Java Seawall planning corridor.

The primary dataset used in this study is Sentinel-2 Harmonized surface reflectance imagery (COPERNICUS/S2_HARMONIZED), which provides multispectral optical data at 10–20 m spatial resolution. Imagery was filtered for the period October–December 2023 to represent recent land-cover conditions within the study area.

To reduce atmospheric disturbances and cloud contamination, the following pre-processing steps were applied within Google Earth Engine:

- Cloud filtering with a threshold of <20% based on scene metadata;
- Explicit masking of clouds and cirrus using the QA60 quality band;
- Median compositing to generate a single representative cloud-free image.

The spectral bands utilized include B2, B3, and B4 (RGB), B8 (NIR), and B11–B12 (SWIR), which are known to be effective for discriminating vegetation, water, built-up areas, and bare surfaces. In addition to raw spectral bands, several spectral indices were derived to enhance class separability:

- Normalized Difference Vegetation Index (NDVI),
- Normalized Difference Built-up Index (NDBI),
- Modified Normalized Difference Water Index (MNDWI),
- Normalized Difference Soil and Land Index (NDSLI).

These indices were added as additional feature bands, enabling feature engineering tailored to the spectral characteristics of coastal urban environments.

Ground truth data consisted of manually digitized polygon samples representing five LULC classes: vegetation, water bodies, built-up areas, highways/roads, and open land. The sample dataset was randomly split into 80% training and 20% testing subsets using a random column approach. A Random Forest classifier with 50 decision trees was implemented using ee.Classifier.smileRandomForest(). The model was trained using both spectral bands and derived indices to maximize class separability.

Classification performance was evaluated using a confusion matrix, overall accuracy, and the Kappa coefficient derived from the independent testing dataset. These metrics were used to assess both general classification reliability and class-specific performance.

Results and Discussion

The Random Forest classification successfully generated a detailed LULC map for the Semarang–Demak coastal region, consisting of five classes: vegetation, water bodies, built-up areas, highways, and open land. The classification achieved an overall accuracy of 88.44% with a Kappa coefficient of 0.83, indicating a high level of reliability in representing current land-cover conditions.

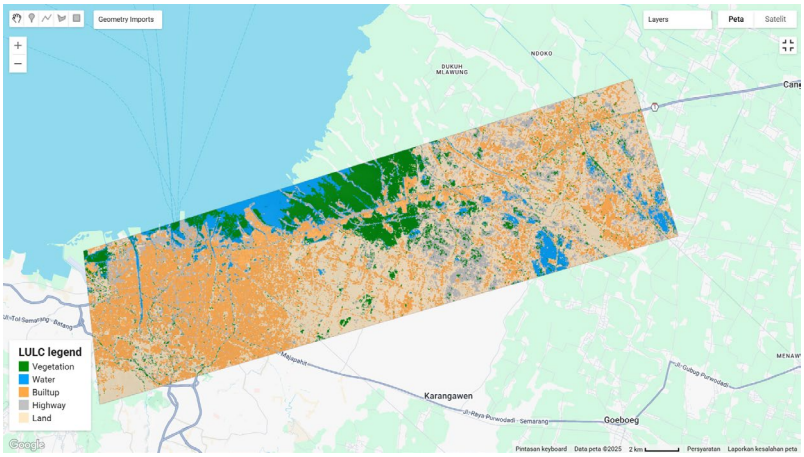

Figure 1. Visual results of LULC mapping with AOI along the Semarang-Demak toll road

The results show that classes with strong and consistent spectral characteristics, particularly vegetation, water bodies, and highways, were classified with high accuracy. The highway class, representing rigid linear infrastructure, exhibited particularly robust performance, highlighting the capability of Sentinel-2 multispectral data to delineate infrastructure elements relevant to deformation-sensitive environments. Misclassification mainly occurred between built-up areas and open land, reflecting their spectral similarity in coastal urban settings.

From the perspective of land subsidence research, the reliable mapping of built-up areas and transportation networks is a key outcome of this study. These land-cover classes represent anthropogenic pressure and infrastructure exposure that are highly relevant for subsidence analysis. The resulting LULC map therefore serves not only as a land-cover product, but also as a spatial baseline to support the interpretation of ground deformation patterns.

As a preliminary exercise, this study establishes an essential foundation for the planned doctoral research on InSAR-based land subsidence monitoring along the northern coast of Java. The LULC baseline derived using Google Earth Engine provides spatial context for the selection of priority analysis areas and enables future integration with InSAR time-series deformation data. This staged approach supports a more targeted and robust assessment of subsidence-related risks, particularly in relation to the long-term evaluation of the Java Seawall Project.

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PSYCHOLOGICAL WELL-BEING AMONG UNIVERSITY STUDENTS IN THE GENERATIVE AI ERA: EFFECTS OF AN AI-LITERACY AND DIGITAL SELF-REGULATION PROGRAM ON WELL-BEING, STRESS, SLEEP QUALITY, AND ACADEMIC ENGAGEMENT

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Purpose and Background

These days, generative AI tools are becoming part of normal university study life. They can help with learning tasks, but they also bring new challenges—especially when students use AI without strong checking skills and clear study boundaries. UNESCO has highlighted that education systems need guidance and human-centered use of generative AI, including learner skills such as critical evaluation and responsible use (UNESCO, 2023).

At the same time, scholars have consistently linked heavy and constant digital use with student strain. Research on college students has found that higher cell phone use is associated with higher anxiety and lower academic performance (Lepp et al., 2014). Sleep is also part of this problem. A systematic review suggests that inadequate sleep has a negative effect on university students' academic performance (Suardiaz-Muro et al., 2020). In addition, evidence from a systematic review and meta-analysis shows that stress and poor sleep quality are closely connected among undergraduate students (Gardani et al., 2022). Taken together, the literature supports the concern that when students are constantly connected, distracted, and sleeping poorly, stress tends to rise, and academic focus and engagement can weaken.

This study centers on the idea that by enhancing AI literacy—encouraging responsible and critical use of AI—and teaching digital self-regulation—helping students manage their attention, habits, and boundaries—they may better safeguard their well-being and learning. The research seeks to determine whether a program that emphasizes AI literacy and digital self-regulation can boost psychological well-being, reduce stress, improve sleep quality, and foster greater academic engagement among university students. These outcomes will be assessed using established tools: the WHO-5 for well-being (Topp et al., 2015), the Perceived Stress Scale (Cohen et al., 1983), the Pittsburgh Sleep Quality Index (Buysse et al., 1989), and a student engagement measure aligned with engagement research in university students (Schaufeli et al., 2002).

Materials and Methods

This paper is based on documentary research, particularly a review of the literature. The focus is to understand what previous research and trusted reports have already discussed about generative AI in university learning, AI literacy, and digital self-regulation, and how these are connected with student well-being, stress, sleep quality, and academic engagement. The aim is to clearly frame the problem and show how a practical program could respond to it.

Relevant sources were collected from academic databases and trusted reports using keywords related to generative AI, AI literacy, digital self-regulation, university students, well-being, stress, sleep quality, and academic engagement. Priority was given to peer-reviewed studies and major guidance documents (UNESCO, 2023). Sources were only included when they explicitly addressed student experiences, digital habits (like distraction and heavy usage), or skills and interventions related to mental health and learning outcomes.

After choosing the sources, the findings were grouped into main themes: students' use of generative AI in learning, the importance of AI literacy for responsible and critical use, the role of digital self-regulation in attention and healthier habits, and the links between these aspects and well-being, stress, sleep, and engagement. The results were then summarized using a narrative synthesis, focusing on patterns that appear consistently across studies.

Based on this documentary research, a future empirical study can be designed to test an AI-Literacy and Digital Self-Regulation Program more directly (for example, using a quasi-experimental pretest–posttest design). If implemented at a later stage, outcomes can be evaluated with established tools such as the WHO-5 for well-being (Topp et al., 2015), the Perceived Stress Scale for stress levels (Cohen et al., 1983), the Pittsburgh Sleep Quality Index for sleep quality (Buysse et al., 1989), and the UWES-Student (UWES-S) for measuring academic engagement (Schaufeli et al., 2002).

Table 1. Key constructs and commonly used measures (based on documentary research)

Construct	Common measure	When used	Notes (simple meaning)
Psychological well-being	WHO-5	Often pre/post in studies	Higher score = better well-being (Topp et al., 2015)
Stress	PSS	Often pre/post in studies	Higher score = higher perceived stress (Cohen et al., 1983)
Sleep quality	PSQI	Often pre/post in studies	Higher PSQI = worse sleep (Buysse et al., 1989)
Academic engagement	UWES-S	Often used in student studies	Higher score = higher engagement (Schaufeli et al., 2002)

Results and Discussion

Based on the documentary research, the literature shows a clear pattern: when students have heavy digital exposure without strong self-regulation, stress and sleep problems become more common, and academic focus can weaken (Lepp et al., 2014; Suardiaz-Muro et al., 2020; Gardani et al., 2022). At the same time, scholars and major education guidance highlight that students need AI literacy to use generative AI responsibly, including critical checking and ethical study practices (UNESCO, 2023). Together, these findings support the idea that combining AI literacy with digital self-regulation is a practical direction for supporting student well-being and learning.

The main message is simple: generative AI is not only a "tool issue," it is also an "attention and habit issue." When students build AI literacy, they become more careful and critical instead of blindly trusting outputs. When they build digital self-regulation, they manage distraction, late-night screen use, and daily study routines more steadily. Because of this, a short university program that teaches both areas is worth testing in future empirical research.

Limitations and Future Directions

This proceeding is based on documentary research, so it summarizes existing evidence rather than testing the program directly. Future studies should implement the program and evaluate it with pre–post measures and follow-up to see whether changes remain over time.

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PANGASINAN STATE UNIVERSITY - URDANETA CITY AS SCIENCE, TECHNOLOGY, AND ENGINEERING EDUCATION HUB OF THE NORTH: A FORESIGHT STUDY

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Purpose and Background:

This study aimed to conduct a foresight analysis to guide the transformation of PSU–Urdaneta City Campus into a Science, Technology, and Engineering Education Hub of Northern Luzon. Specifically, it seeks to identify key drivers influencing this transformation, develop plausible future scenarios, and formulate robust strategies that will inform a strategic framework for institutional development. Through the application of strategic foresight, the study intends to support proactive decision-making and position PSU-UCC as a regional leader in science, technology, engineering, and innovation aligned with national development goals.

Higher education institutions face growing pressure to adapt to rapid technological change, particularly in artificial intelligence and emerging innovations, as traditional academic structures no longer align with future demands. Universities are increasingly expected to contribute not only to teaching and research but also to sustainable development, regional growth, and innovation aligned with the Sustainable Development Goals (SDGs). Within this context, the concept of an education hub—where institutions, industry, and stakeholders collaborate in science and engineering—has become a strategic pathway for regional development.

Pangasinan State University–Urdaneta City Campus (PSU-UCC) is well-positioned for this role, given its historical foundation in science and engineering, sustained academic excellence, strong performance in licensure examinations, and strategic investments such as the PSU Fabrication Laboratory. Despite these strengths, the campus lacks a comprehensive, long-term, and adaptive strategy to guide its transformation into a fully realized Science and Engineering Education Hub for Northern Luzon. Addressing this gap is essential to ensure sustained leadership amid rapid educational, technological, and economic change.

Materials and Methods:

The study employed an explanatory sequential mixed-method design. This methodology is characterized by two distinct, chronological phases. The first phase involves the collection an analysis of quantitative data, which is then followed by second phase involving the collection and analysis of qualitative data. The qualitative phase is designed to explain and interpret the initial quantitative results in greater depth.

The first phase of the research is a descriptive-correlational and factor-analytic study. The primary objective is to identify, measure, and prioritize the "Drivers of Change" that currently influence the university's potential. Utilizing the PESTLE Framework (Political, Economic, Social, Technological, Legal, and Environmental) as a scanning lens, this phase seeks to quantify the magnitude of influence that various external and internal factors exert on PSU-UCC. The quantitative strand serves a critical reductionist function: it filters the infinite number of potential future variables down to a manageable set of statistically significant "Critical Drivers." This prevents the subsequent foresight workshops from being overwhelmed by irrelevant data. By subjecting the survey data to rigorous statistical treatments, including Exploratory Factor Analysis (EFA), the study identifies the underlying latent structures – the "hidden" forces – that will shape the university's trajectory.

The second phase utilized Strategic Foresight Methodologies, specifically Scenario Planning and Wind-Tunneling. This phase is explanatory in nature; it seeks to explain how the drivers identified in Phase 1 might interact over the 15-year horizon (2025-2040). The integration of the two phases occurs at the intermediate point: the statistical outputs of Phase 1 (specifically the high-impact, high-uncertainty drivers) are directly converted into the "Scenario Axes" for Phase 2. This ensures that the scenarios developed are not generic "future of education" narratives, but are bespoke explorations of PSU-UCC's specific context. The qualitative phase concludes with "Wind-Tunneling," a stress-testing exercise where proposed strategies are evaluated against the developed scenarios to determine their robustness and resilience.

Results and Discussion

The first phase of the study sought to identify the primary drivers influencing the university's potential to become a Science and Engineering (S&E) Education Hub. Quantitative data gathered from university administrators, faculty, and industry partners were analyzed using descriptive statistics to determine the perceived impact of PESTLE factors.

Table 1. Weighted Mean of Pimary Drivers Influencing PSU-UCC's Transformation (N=150)

Rank	Driver Category (PESTLE)	Weighted Mean	Interpretation
1	Technological (e.g., AI Integration, Laboratory Modernization)	4.82	Very High Influence
2	Economic (e.g., R&D Funding, Regional Industrial Growth)	4.75	Very High Influence
3	Political (e.g., Gov't Support for SUCs, Niche Centers)	4.5	Very High Influence
4	Social (e.g., Demand for STEM professionals, Migration)	4.12	High Influence
5	Legal (e.g., Intellectual Property, Accreditation)	3.95	High Influence
6	Environmental (e.g., Green Infrastructure, Climate Resilience)	3.88	High Influence
Grand Mean		4.34	Very High Influence

The results in Table 1 indicate that Technological factors are the most dominant driver (M=4.82). This aligns with the university's current focus on integrating emerging technologies like Artificial Intelligence (AI) into the curriculum, a necessity driven by the rapid evolution of the educational landscape. Respondents emphasized the "Adequacy and modernization of laboratories" (Item 5) as a critical prerequisites, supporting the notion that specialized hubs require advanced physical infrastructure like the FABLAB to function effectively as industry service hubs.

Economic drivers ranked second (M=4.75), highlighting the "Sufficiency and sustainability of institutional funding sources" (Item 6) as a pivotal concern. This corroborates literature suggesting that S&E hubs require sustained investment to maintain competitiveness and avoid complacency. The data reflects the challenge of transforming from a tuition-reliant institution to one that generates revenue through the "Third Mission" of knowledge transfer and commercialization.

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OPTIMIZING VERTEBRAL DEROTATION IN SCOLIOSIS CORRECTION SURGERY

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Purpose and Background

Adolescent Idiopathic Scoliosis (AIS) is a three-dimensional spinal deformity characterized by lateral curvature, sagittal imbalance, and axial vertebral rotation. While modern surgical techniques are effective in reducing coronal deformity, residual axial rotation remains a frequent limitation, contributing to rib prominence, imbalanced load transfer, and long-term functional compromise. Current vertebral derotation techniques largely depend on manual force, implant-specific tools, and global rotation maneuvers, resulting in variable correction quality and elevated mechanical risk. This proceeding explores the optimization of vertebral derotators from an engineering perspective, framing axial correction as a controllable biomechanical process rather than a force-driven maneuver.

Materials and Methods

A general engineering framework for optimizing vertebral derotators was developed based on biomechanical modeling, computational simulation, and mechanical validation. The spine was conceptualized as a segmented load-bearing system, enabling identification of force paths and rotational moments during axial correction. Finite Element Analysis (FEA) was employed to simulate stress distribution and deformation under controlled torsional loading, ensuring forces remained below material and bone safety thresholds. Prototype concepts were further evaluated through static torsion and load testing to verify structural integrity and assess safety margins. This methodology emphasizes force redistribution, segmental control, and universal compatibility across instrumentation systems.

Results and Discussion

Biomechanical modeling demonstrated that uncontrolled global derotation concentrates stress at pedicle screw interfaces, increasing the risk of pull-out and bone failure. In contrast, segmental derotation strategies combined with distributed force application reduced peak stresses and improved rotational controllability. FEA results indicated lower von Mises stress concentrations when rotational loads were applied incrementally and distributed beyond screw heads. These findings support the premise that design decisions directly influence clinical safety and correction quality. Optimized derotator design enables measurable torque application, reduces surgeon-dependent variability, and provides a foundation for future sensor-integrated spinal instruments.

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EDUCATIONAL MANAGEMENT IN CHINA'S HIGHER EDUCATION: CHALLENGES AND STRATEGIES IN TEACHER EDUCATION

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Purpose and Background

Since the Reform and Opening-up began in 1978, China's higher education system has changed significantly. It has expanded very quickly through different stages to become the largest education system in the world (Xiong et al., 2022; Xiao et al., 2024). This large system is now a very important engine for the growth of human capital and scientific innovation in the country (Xiao et al., 2024). A major part of this development is the change in the governance structure. The government has moved from a "state control" model to a "state supervision" model, which gives universities more autonomy and freedom to choose their own strategic goals (Han & Xu, 2019).

However, as China enters the "systematic reform" stage from 2019 to 2035, teacher education and professional development have become key factors for maintaining high-quality education (Xiong et al., 2022). Even though there are more students and more research papers being published now, there are still some structural management problems that slow down the growth of teachers (Xiao et al., 2024). This paper will analyze the current challenges in managing teacher education and suggest strategies to help improve the professional development environment for teachers in China.

Materials and Methods

This research utilizes the document research method. By examining various materials, such as national policy plans, institutional reports, and academic literature, this study tries to understand the real challenges and the complex organizational context of educational management in China’s higher education today.

Results and Discussion

By looking at the current literature and reports, there are several big challenges for teacher development. First, China's professional development system for teachers is still in its early stages. As summarized in Table 1, China's Teacher Professional Development (TPD) System faces significant structural gaps compared to the UK's collaborative model (Li, 2023). For example, China does not have enough clear and unified standards for evaluation, and most teacher training happens within China instead of through international cooperation (Li, 2023).

Second, the "Double First-Class" (DFC) Initiative has brought very high performance pressure to universities. This has created a "publish or perish" culture for many teachers (Liu, 2025; Liu et al., 2019). This pressure often leads to "academic utilitarianism," which means teachers spend most of their time trying to publish many research papers to meet numeric targets, but they may neglect the quality of their teaching or help for their students (Liu, 2025).

Third, the way resources are given to universities shows a "Matthew Effect." This means the top universities in rich coastal cities get most of the money and the best talent (Liu, 2025; Liu et al., 2019). This makes the gap between different regions and universities even larger. Private universities also face problems like high teacher turnover rates, a lack of professional training opportunities, and not enough welfare support for their staff (Zhang, 2023).

Table 1 Comparison of Teacher Professional Development Systems between China and the UK

Comparison Dimension	China's TPD System	UK's TPD System
Governance Structure	Top-down administrative system	Collaborative (Gov, Orgs, & Unis)
Training Content	Domestic mutual exchange	Globalized academic engagement
Evaluation Standards	Lack of unified frameworks	Systematic professional standards
Funding Mechanism	Centralized government subsidies	Diverse grants, funds, & scholarships

Source: Adapted from Li (2023)

Based on the findings of the study, the following strategies are recommended for China.

1. Improve Evaluation Systems: Universities should change their evaluation methods to value good teaching and social impact, rather than just looking at simplistic numeric rankings (Li, 2023; Liu, 2025).

2. Use New Funding Methods: The government and universities should create more types of grants and funding to help teachers grow, instead of only giving basic subsidies (Li, 2023; Xiong et al., 2022).

3. Give More Support to Private and Local Universities: It is important to increase the welfare and social status of teachers in private schools to keep the staff stable (Zhang, 2023).

4. Increase International Cooperation: Organizing more international seminars and exchange programs can help Chinese teachers learn the best practices from around the world (Li, 2023).

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Assessing the Impact of a Citizen Science Project Webinar on Teachers' and Lecturers' Knowledge

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Purpose and Background

Citizen Science Projects (CSP**)** is defined as the active participation of non-expert members of the public, including students, in scientific research to generate authentic scientific data (Bonney et al., 2014). CSPs are built on open collaboration, allowing participants to engage in key scientific activities such as data collection, analysis, and interpretation, and in some cases contributing to research design (Balcom, 2015). In essence, CSPs are partnerships between professional scientists and the public to collect, share, and analyze data across diverse ecosystems and contexts.

In school settings, CSP implementation emphasizes field-based collaboration among students, teachers, and scientists, positioning students as citizen scientists who conduct original research using scientific methods. This approach supports knowledge transfer, generates scientifically validated outputs, and encourages dissemination through digital platforms and social media while adhering to ethical standards, including intellectual property and copyright. Typically, CSPs begin with joint planning with scientists, followed by group-based mini-research involving parents and local communities, and conclude with report preparation, scientific validation, and dissemination to strengthening students' scientific literacy and promoting research-based learning (Aripin & Hidayat, 2024).

However, citizen science remains unfamiliar to many Indonesians. In Majalengka, 67.1% of respondents were unaware of the Citizen Science concept, and 65.7% lacked sufficient research knowledge (Aripin & Hidayat, 2020). Therefore, this study implements an online CSP webinar and evaluates its impact by comparing participants' pretest and posttest scores. Accordingly, the study addresses the following research question: Does participation in the CSP webinar significantly increase teachers' and lecturers' knowledge, as measured by pretest and posttest scores?

Methods

This study employed a quasi-experimental pretest–posttest design with a mixed-design analytical approach to assess the impact of a Citizen Science Project (CSP) webinar on participants' knowledge. The participants were 52 respondents, consisting of 26 teachers and 26 lecturers, and the study was conducted on 7 August 2025. Data were collected using a five-point Likert-scale (1–5) questionnaire administered before and after the webinar. Total scores were computed and treated as continuous variables. The webinar was delivered online and covered fundamental CSP concepts and examples of implementation in educational contexts. Data analysis was conducted using IBM SPSS Statistics version 27. After confirming statistical assumptions (normality, homogeneity of variances, equality of covariance matrices, and sphericity), a mixed-design ANOVA was performed with time (pretest–posttest) as the within-subject factor and respondent group (teachers–lecturers) as the between-subject factor. Effect sizes were reported using partial eta squared (η^2p), with a significance level of 0.05.

Result and Discussion

The result of descriptive statistics of pretest and posttest knowledge scores for teachers and lecturers are presented in Table 1.

Table 1. Descriptive Statistics of Pretest and Posttest Scores by Group

Measurement	Group	N	Mean	SD
Pretest	Teachers	26	62.58	7.22
	Lecturers	26	68.23	11.22
	Total	52	65.40	9.77
Posttest	Teachers	26	72.58	9.07
	Lecturers	26	70.92	8.96
	Total	52	71.75	8.96

Descriptive statistics (Table 1) indicated an overall increase in participants' knowledge scores following the CSP webinar. The mean score increased from 65.40 at pretest to 71.75 at posttest, suggesting a general

improvement across respondents. This finding was statistically confirmed by the mixed ANOVA results (Table 2), which revealed a significant main effect of time, $F(1, 50) = 20.61$, $p < .001$, partial $\eta^2 = .292$. This result indicates a substantial increase in knowledge after participating in the CSP webinar, with a large effect size. The effects of time, respondent group, and their interaction were then examined using a mixed-design ANOVA, with the results summarized in Table 2.

Table 2. Multivariate Mixed ANOVA Results

Effect	Test (Pillai's Trace)	F	df (hyp, err)	p-value	Partial η^2	Interpretation
Equality of covariance matrices	Box's M	1.78	(3, 450000)	0.148	–	Assumption met
Time (Pretest–Posttest)	Pillai's Trace = 0.292	20.61	(1, 50)	< .001	0.292	Significant (large effect)
Time × Group	Pillai's Trace = 0.120	6.83	(1, 50)	0.012	0.120	Significant (moderate effect)

At the pretest stage, lecturers showed higher mean scores than teachers, whereas at the posttest stage, teachers slightly outperformed lecturers (Table 1). However, when knowledge scores were averaged across time points, the mixed ANOVA revealed no significant main effect of respondent group, $F(1, 50) = 0.87$, $p = .355$, partial $\eta^2 = .017$ (Table 2). This finding indicates that teachers and lecturers did not differ significantly in their overall knowledge levels before and after the webinar. The mixed ANOVA identified a significant interaction effect between time and respondent group, $F(1, 50) = 6.83$, $p = .012$, partial $\eta^2 = .120$ (Table 2), indicating that the magnitude of knowledge improvement differed between teachers and lecturers. As shown in Table 1, teachers experienced a larger increase in scores from pretest to posttest (+10.00 points) compared to lecturers (+2.69 points). Although lecturers started with higher knowledge, teachers achieved greater gains after the CSP webinar. The webinar significantly improved knowledge, with no group differences in average overall scores across time, but larger learning gains among teachers. This study shows that the CSP webinar significantly increased teachers' and lecturers' knowledge, as reflected in a strong main effect of time. This finding aligns with prior evidence that webinar-based professional development can strengthen educators' conceptual understanding when grounded in authentic scientific practice. Although lecturers scored higher at pretest, the non-significant main effect of group indicates no overall difference between teachers and lecturers when averaged across time. However, the significant time × group interaction suggests that teachers gained more from the webinar. This may reflect closer alignment of CSP with school-based instruction and a possible ceiling effect among lecturers due to higher baseline familiarity (Braz Sousa et al., 2024).

Despite these positive outcomes, participants reported several barriers to implementing CSP in educational settings, including limited instructional time, scheduling constraints for project-based activities, differences in student readiness, and limited facilities, technology access, and human resources. Limited access to scientists or external experts was also identified as a key challenge. Thus, while CSP webinars effectively improve educators' knowledge, successful implementation requires adequate time allocation, institutional support, and sustained partnerships. The high interest in advanced CSP training (90.4%) further highlights the program's sustainability potential and the need for continued, more structured professional development.

Conclusion

The CSP webinar effectively improved teachers' and lecturers' knowledge, with teachers showing greater learning gains despite lecturers' higher initial scores. These results highlight the potential of CSP-based online training to enhance educators' understanding while emphasizing the need for ongoing support and contextual adaptation to facilitate effective implementation in educational settings.

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HeLa Cell Culture and Bioimpedance Characteristics Analysis of Blood Erythrocytes: Optimization of Electric Field Efficiency for Cancer Cell Growth Inhibition

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Purpose and Background

Bioimpedance is a simple method for characterizing the electrical properties of biological tissues that has been widely studied for the early detection of various cancer cell properties and blood disorders because cancerous tissues or cells show significantly different impedance values and frequency spectra compared to normal tissues. HeLa cells as the most widely used cancer cell line provide a stable in vitro model to study the response of cancer cells to electric fields, including membrane potential modulation and inhibition of proliferation, while human blood erythrocytes have been widely characterized using bioimpedance techniques and microfluidic systems to assess the electrical properties of normal blood cells. However, studies directly comparing the bioimpedance characteristics of cultured HeLa cells with blood erythrocytes are still very limited, even though this comparison is important to understand the fundamental differences in electrical responses between cancer cells and normal blood cells, especially when exposed to low intensity and medium frequency electric fields that are reported to be able to change membrane potential and inhibit cancer cell growth. Therefore, this study aims to describe the morphological characteristics of HeLa cell culture, analyze and compare the bioimpedance characteristics of HeLa cells and human blood erythrocytes based on literature data and single cell electrical models, describe the effect of variations in electric field intensity and frequency on the inhibition of HeLa cancer cell growth through the relationship between changes in membrane potential, bioimpedance spectrum and proliferation rate, and formulate the concept of optimizing electric field efficiency for cancer cell growth inhibition by considering biological effectiveness and energy consumption according to the basic principles of electrical engineering.

Materials and Methods

This research is a literature based analytical study integrating published data on HeLa cell culture, human blood erythrocyte bioimpedance, and the effects of electric fields on cancer cell growth. Data sources include indexed articles (IEEE Xplore & ScienceDirect) reporting electrical parameters of HeLa cells and erythrocytes, such as conductivity, impedance at various frequencies and equivalent circuit models of single cells or cell suspensions. The referenced HeLa culture protocol uses DMEM medium with FBS and incubation at 37°C, 5% CO_2, including studies that place cells on electrode surfaces for application of electric fields and observation of morphological changes.

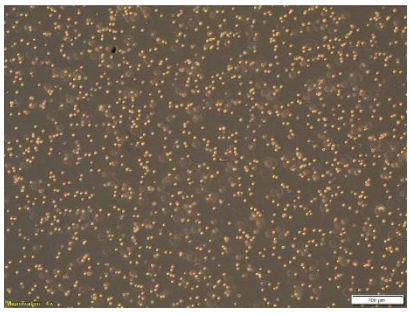

Figure 1. Day one overall view of a HeLa cell culture at high confluence observed under a microscope at 4x magnification (scale bar 200 μm).

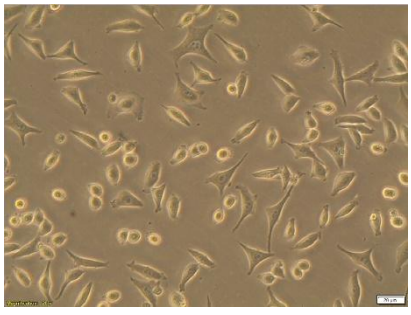

Figure 2. Day two HeLa cell colonies at intermediate confluence showing cluster formation and empty spaces in the culture dish at 20x magnification (scale bar 20 μm).

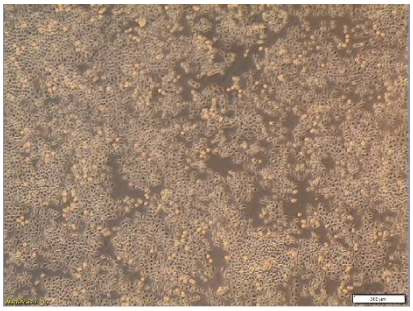

Figure 3. Day three the HeLa cell culture collection with a density level and forming polygonal cells resulting from previous cell division with a magnification of 4x (scale bar 200 µm).

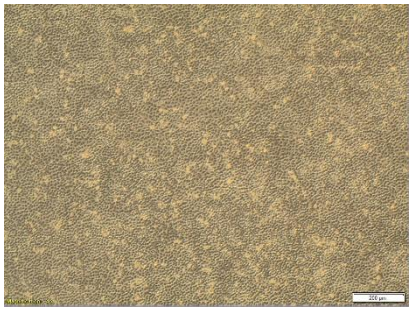

Figure 4. Day four the HeLa cell culture collection with a denser density level and the empty space is filled with cells so that there is no empty space left with a magnification of 4x (scale bar 200 µm).

Erythrocytes (red blood cells) are the main component of blood, transporting oxygen and carbon dioxide, and contributing most of the blood's electrical response to bioimpedance measurements. Structurally, erythrocytes are biconcave, without a nucleus with a thin, capacitive lipid protein membrane and conductive, hemoglobin rich cytoplasm. Therefore, they can be electrically modeled as a series or parallel resistor capacitor circuit.

Figure 5. (Centrifugation) The process of separating red blood cells from plasma using a centrifuge.

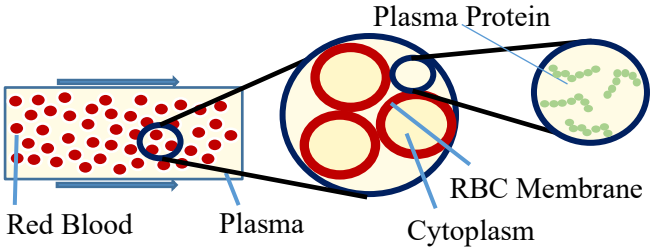

Figure 6. Blood Structure

The bioimpedance characteristics of erythrocytes were obtained from electrical impedance spectroscopy (EIS) studies of blood or erythrocyte suspensions using macro/microfluidic electrodes, recording resistance, reactance, and effective conductivity values over the low to middle frequency range. For the effects of electric fields, research data applying low intensity electric fields (approximately 1–6 V/cm) at middle frequency were used and reporting the relationship between changes in membrane potential and the percentage of HeLa cell growth inhibition.

Result and Discussion

Literature based analysis shows that HeLa cell cultures constitute a highly proliferative cancer model with electrical properties significantly different from those of normal human erythrocytes, supporting the use of bioimpedance to differentiate cancer cells from non cancerous cells. Electrical impedance spectroscopy shows that erythrocytes dominate the electrical response of whole blood through their capacitive membrane and hemoglobin rich conductive cytoplasm, which behaves as a resistor capacitor circuit with characteristic dispersion in the low to middle frequency range. In contrast, HeLa cells and other cancer cells exhibit altered membrane permittivity and cytoplasmic conductivity, resulting in impedance spectra and frequency responses that deviate from those of normal cells and can be selectively targeted. These analyses collectively demonstrate that, with appropriate selection of electric field frequencies and intensities, electrical methods can selectively differentiate and target HeLa cancer cells through bioimpedance while limiting effects on erythrocytes and normal blood tissues.

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SINGLE NUCLEOTIDE POLYMORPHISM IDENTIFICATION OF THE *eIF4G* GENE IN INDONESIAN LOCAL AND HYBRID RICE VARIETIES

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Purpose and Background

Genes are the fundamental unit of genetic information consisting of a series of nucleotide bases. Alterations in the composition of bases can lead genetic variations, most notably in the form of single nucleotide polymorphism (SNP). SNPs play an critical role because they can cause changes in gene function, including the possibility of frame shifts that affect protein expression (Sahoo, Mahanty, Mishra, & Joshi, 2023). Rice plant (*Oryza sativa* L.) as an ideal model for genetic studies because it has a fairly complete and easily accessible genebank collection. However, studies on SNPs are still relatively limited especially in local Indonesian rice varieties and hybrid rice. In fact, understanding the genetic variation in these varieties is essential to support plant breeding and resistance to abiotic stresses, such as genome editing. Recent research by (Rachmandika, Satrio, Hamim, & Miftahudin, 2025) states that there are SNPs in several genes related to rice architecture in local Indonesian rice. One of the challenges of biotic stress that many local and hybrid rice faces is susceptibility to tungro disease. Resistance to this disease is known to be controlled by the *eIF4G* gene which acts as a negative regulator. Therefore, the identification of SNPs associated with the *eIF4G* gene in local rice varieties and Indonesian hybrids is a crucial step to understand the mechanisms of resistance and open up opportunities for the development of superior varieties. This research aims to identify potential SNPs within the *eIF4G* gene of Indonesian hybrid and local rice.

Materials and Methods

The two cultivars used in this study are IPB 13S (Indonesian hybrid variety) and Hawara Bunar (local Indonesian variety) cultivars which are then planted up to one month old to obtain fresh young rice leaves. Furthermore, DNA isolation was carried out using the modified 2% CTAB method (Doyle & Doyle, 1987). The results of the DNA isolation were then qualitatively tested using a 1% electrophoresis gel with a setting of 100 V for 28 minutes. Furthermore, the *eIF4G* gene (ID: LOC_07g555200) was analyzed using the https://plants.ensembl.org/index.html website. The sequence checked for protein domain area using the https://www.uniprot.org website. As for the primary design, it is carried out using a https://www.primer3plus.com website. The amplification process is carried out using the Thermal Cycler, which is each cycle consisted of commonly PCR program. The results of PCR are checked using gel electrophoresis (the same as DNA isolation). The results of PCR products are then sequenced using the sanger sequencing method and reads using the UGENE v52.0 software which was aligned with the *eIF4G* genomic sequence that had been obtained previously.

Results and Discussion

Figure 1A illustrates the successful of genomic DNA isolation based on the single band at the top site. The bands positioned near from the wells indicate the presence of high-molecular-weight genomic DNA, which consistent with the expected size approximately 10 kb. Although there is a slight smear, the DNA integrity remains sufficient for the subsequent downstream application, specifically for PCR.

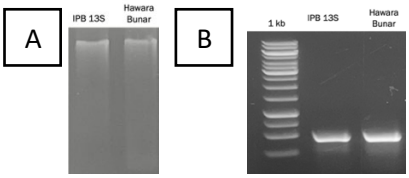

Figure 1 (A) Genomic DNA isolation of rice plants of IPB 13S and Hawara Bunarr varieties shown by a single band at the top; (B) Electrophoretic profiles of *eIF4G* gene in rice varieties IPB 13S and Hawara Bunar

Table 1 presence the optimal primary design results from the other 10 candidates are obtained, where the expected size of PCR products is 480 bp with an annealing temperature of 58^{o}C. This primer also consists of

forward and reverse which are each 20 bp long. To find out the position or region of gene amplification, Figure 2 shows a map of forward and reverse positions that flank the region of the protein domain. This position is the sixth position of the ten coding sequences that are part of the exon. Protein domain is essential because it is the nucleus of a gene among other components (Hess & Joseph, 2025). Following primer validation, gene amplification was performed to confirm target specificity. Figure 1B shows a single band of approximately 480 bp, indicating successful amplification. According to Crossley et al., (2020), the presence of a single band permits the sample to proceed directly to sequencing.

Table 1 The primary sequence of the *eIF4G* gene consisting of forward and reverse primers

Type of Primer	Primer Length (bp)	Band Size (bp)	Tm (ºC)	Sequence
Forward	20	480	58	5'-TCGACCTGAAGCTGAACCTC-3'
Reverse	20			5'-AGAACCACTAAAGAAGGAAGCC-3'

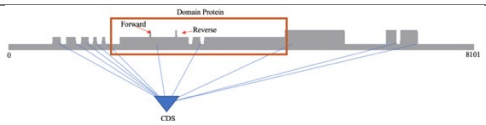

Figure 2 Genomic sequence map aligned with the coding sequence. The relative positions of the forward and reverse primers flanking the targeted coding sequence area are indicated

Furthermore, the SNP calculation has been carried out based on Table 2 data showing that the SNP for IPB 13S cultivation is 29 bases so that a percentage of 6.04% includes indels, deletion, or nucleotide base changes. Meanwhile, the number of SNPs owned by local cultivars of Hawara Bunar is 35 bases or reaches 7.29%. This indicates that Hawara Bunar, which is a local variety, has a considerable difference when compared to Nipponbare rice. Basically, the *eIF4G* gene has 1793 amino acids (Macovei et al., 2018)

Table 2 SNP calculation results on sequencing results in two hybrid and local Indonesian rice varieties

Cultivars	Product Size (bp)	SNP Count	SNP Percentage (%)
IPB 13S	480	29	6,04
Hawara Bunar		35	7,29

In conclusion, this study identified that there was an SNP/difference in nucleotide bases (nucleotide domain regions) between the results of the 13S hybrid variety and the local Hawara Bunar compared to Japonica rice (Nipponbare). The implications of this study can be used as a basis for other RNAi or genome editing so that the results are more precise because they adjust the bases of each variety. Further research is needed to further identify promoter or enhancer regions or other genes associated with tungro to determine how large SNPs are present in these regions.

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Knowledge Regarding Nutrition to Strengthen the Immune System and Food Consumption Behavior During COVID-19

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Purpose and Background:
Nutrition plays an essential role in supporting immune system function by providing the body with necessary vitamins and minerals. During the COVID-19 pandemic, maintaining good dietary habits became especially important for reducing the risk of infection and improving overall health. However, having knowledge about nutrition does not always lead to healthy food consumption behavior, particularly among students.
In Bangkok, changes in daily lifestyle during the pandemic may have negatively affected eating habits. This study aims to examine the relationship between nutrition and immunity-related knowledge and food consumption behavior intended to strengthen immune function among students in Bangkok. The findings may help improve nutrition education strategies for students.

Materials and Methods:
This study was conducted as a cross-sectional analysis based on findings reported in previous research on nutrition knowledge and immune-related food consumption behavior among students in Bangkok. The analysis focused on demographic characteristics, levels of nutrition and immunity-related knowledge, and food consumption behavior related to immune health.
Descriptive statistics were used to summarize overall knowledge and behavior levels. Regression analysis was applied to identify factors associated with food consumption behavior aimed at strengthening immunity.

Results and Discussion
The results showed that most students had a moderate level of nutrition and immunity-related knowledge, while their food consumption behavior to strengthen immunity was generally low. Students who consumed vitamins or dietary supplements during the COVID-19 pandemic demonstrated better food consumption behavior compared to those who did not consume supplements.
These findings indicate a gap between nutrition knowledge and actual dietary practices. Although students may understand the importance of nutrition for immune health, practical factors such as convenience and lifestyle habits may limit healthy food choices. Therefore, nutrition education programs should emphasize practical and achievable dietary behaviors rather than focusing only on theoretical knowledge.

Table 2: Factors affecting Food Consumption Behavior.

Variable	B	S.E.	Beta	t	Sig,	95.0% Confidence Interval for B	
						Lower Bound	Upper Bound
Gender	-0.265	1.634	-0.013	-0.162	0.871	-3.496	2.966
Class	-0.184	0.877	-0.017	-0.21	0.834	-1.917	1.55
Study Program	-1.128	1.176	-0.086	-0.959	0.339	-3.453	1.198
Parent Occupation	0.146	0.519	0.024	0.281	0.779	-0.881	1.173
Congenital Disease	-1.101	1.895	-0.048	-0.581	0.562	-4.849	2.647
Vitamin and Supplement Intake During COVID-19	2.968	0.9	0.267	3.299	0.001	1.189	4.747
Nutrition and Immunity Related Knowledge	0.756	0.399	0.158	1.895	0.06	-0.033	1.544

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STUDY ON THE WAVES CHARACTERISTICS OF THE LOMBOK ISLAND USING REANALYSIS DATA FROM ERA5

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Purpose and Background

Lombok Island in the West Nusa Tenggara Province is widely recognized as one of Indonesia's major tourism destinations. A significant proportion of tourism activities in Lombok are marine based which are mostly concentrated in the western and southern parts of the island, such as Senggigi Beach and the Gili Islands. Marine tourism in Lombok is strongly influenced by oceanographic dynamics, notably ocean waves. For example, wave height may determine the safety of tourists, small vessels, and infrastructure in the coastal area.

Knowledge on the characteristics of waves in the surrounding waters of Lombok is necessary, particularly for tourism and safety planning. This study aims to analyse the wave characteristics in the waters of Lombok Island using ERA5 reanalysis data developed by the European Centre for Medium Range Weather Forecasts (ECMWF).

Materials and Methods

This paper employed a quantitative approach in analysing the wave characteristics in the waters of Lombok Island. The study area is defined within the boundary of 7.5˚- 9.5˚ S and 115˚ - 117˚ E (Figure 1).

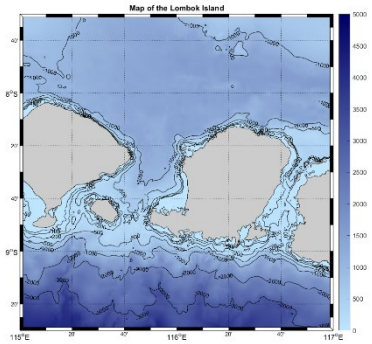

Figure 1 Map of the study area with bathymetry

The dataset used in this study were obtained from the ERA5 hourly data on single level provided by Copernicus Climate Data Store (CDS). Five variables were selected: mean wave period, mean period of total wind waves, mean period of total swell, mean wave direction, and significant height of combined wind waves and swell. The dataset spans the period from 1980 to 2024 (45 years), with spatial resolution of 0.125˚ × 0.125˚ and temporal resolution of 1 hour. The data would be processed using MATLAB and Jupyter Notebook to produce time series graph, spatial plot, and wave rose diagram.

Results and Discussion

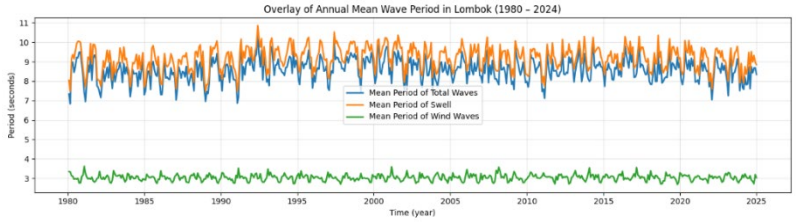

Figure 2 Time series graph of annual mean wave period in Lombok

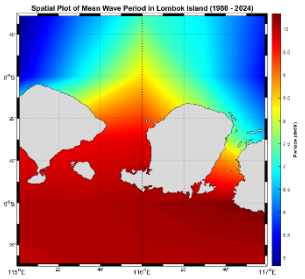

Figure 3 Spatial plot of mean wave period in Lombok

Based on Figure 2, the annual mean wave period (MWP) around Lombok Island during 1980 – 2024 ranges from approximately 7 to 10.5 seconds, indicating the dominance of swell-type waves. According to Holthuijsen (2007), swell typically has periods of around 10 s and is generated by distant wind systems. According to Wu et al. (2024), swell can propagate over long distances and may travel in directions different from the local wind forcing. This is shown in Figure 3 where swell is dominant in the southern waters of Lombok, but able to propagates northward.

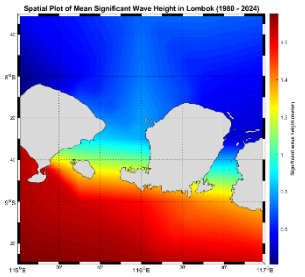

Figure 4 Spatial plot of mean significant wave height in Lombok

Figure 4 shows the spatial distribution of average significant wave height (SWH) in Lombok. There is a contrast between the SWH in the northern and southern waters of the island. Generally, SWH in the southern waters of Lombok is larger. This is because the southern is directly exposed to the Indian Ocean which deep bathymetry and wide-open waters allow minimal obstruction in for wind. This enabled the development of larger and stronger waves. In contrast, the northern water of Lombok is Bali Sea which possesses shallower bathymetry and more landmass that could obstruct wind fetch and limit the development of waves.

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Integrating Economy – Society – Environment Dimensions in Geography Teaching Towards Sustainable Development in General Education to align with school curriculum

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Abstract

In the context of global education aiming toward sustainable development, integrating Economy – Society – Environment content into Geography teaching at the general education level has become an urgent necessity. As an interdisciplinary subject closely linked to real-life contexts, Geography has many advantages in integrating various domains of knowledge, thereby contributing to the development of students' systems thinking, critical thinking, and global citizenship awareness. This paper employs several research methods, including curriculum analysis of the Geography subject, classroom practice surveys at selected high schools, and analysis of the orientation toward competency-based education under the 2018 General Education Curriculum (GEC 2018). A sample of 147 including teachers, teacher students, high school teachers in ….. institutions and schools.

The study revealed that the integration of three pillars enhances student's perception of social and environmental issues. The research findings concluded: (1) The integration of the three pillars of sustainable development in Geography teaching remains fragmented and mostly limited to single-disciplinary knowledge; (2) Teachers have not fully mastered the integrated approach aligned with competency development; (3) Students remain passive in engaging with sustainable development issues. From these findings, the paper proposes several orientations for organizing integrated teaching.

Keywords: *Interdisciplinary integration; Economy – Society – Environment; Sustainable development education; Geography teaching in general education; Education for sustainable development; Competency-based teaching; Integrated teaching; Pedagogical innovation; General Education Curriculum 2018.*

Purpose and Background

In the era of global integration, education for sustainable development has been critical for modern pedagogical frameworks(Eija Yli – Panula,2020). Geography, by its nature as an interdisciplinary subject, serves as a vital bridge between natural sciences and social sciences (Bagoly-Simó, 2023). The primary purpose of this study is to evaluate the integration of the three core pillars—Economy, Society, and Environment—within Geography teaching at the general education level. This integration is essential to align with the 2018 General Education Curriculum (GEC 2018), which shifts from knowledge-based to competency-based instruction. By embedding these dimensions into the curriculum, the research aims to foster students' systems thinking, critical thinking, and global citizenship awareness, empowering them to address complex real-world challenges in the context of global sustainability.

Materials and Methods

The research employs a rigorous combination of qualitative and quantitative methods to provide a comprehensive analysis of the subject matter. The study begins with a detailed curriculum analysis focusing on the 2018 General Education Curriculum (GEC 2018) orientation toward competency-based education and the alignment of the Geography subject with sustainable development goals. Primary data was collected through classroom practice surveys conducted at selected high schools in Hanoi to assess real-world teaching and learning experiences. The sample size consisted of 147 to 150 participants, including in-service teachers, high school educators, and pre-service teachers (teacher students). To ensure scientific accuracy, all accumulated survey data were processed and analyzed using the SPSS application, which allowed the research team to precisely identify the obstacles and specific needs of both teachers and students in integrating the three pillars of sustainable development.

Results and Discussion

The curriculum and the crucial SDGs integration alignment

The current 2018 Geography Curriculum (Vietnam) is characterized by a significant incorporation of practical themes directly relevant to specific economic regions. Furthermore, the 2018 General Education Program (GEP), which adopts a competency-based approach, places the learner at the center, equipping them with the necessary skills and mindsets to address problems at both local and global scales.

The principal issues and topics within this curriculum largely focus on the domains of environment, economy, society, and climate. Crucially, the content in the new program aligns with the core pillars of

sustainable development, closely paralleling the three geographical themes: economic, social, and environmental pillars.

Specifically, within the content of the GEP Geography 2018 for Grade 11, students are mandated to study, explore, and research topics concerning sustainable development and green growth, as well as issues related to population in the era of digitalization and modernization.

Teachers and Students readiness for Economic – Environment - Society integration in Geography curriculum

By surveying more than 150 students and in-service teachers in schools in Hanoi, the research team collected some dominant integrated approaches used in the Geography lessons. They are four approaches including, integrating SDGs content directly in the lesson, relating to current local economic, environment, society in local areas, SDGs experiential learning outside classroom, projects - based learning composing SDGs. The most prominent approach indicated "relating to current local economic, environment, society in local areas".

However, teachers still face some difficulties which prevent them from integrating comprehensively Economy – Society – Environment intertwining SDGs in Geography teaching. The data accumulated from the survey results are analysed in SPSS application to conclude exactly what obstacles they are encountering . 150 teachers and pre-service teachers, the difficulties indicated that they have inadequate guidance/refênces, professional training, time budget for lesson limited, difficulty in designing appropriate integration situation. Moreover, students also stated that they lack awareness of SDGs.

To improve SDGs education integration in Geography lessons in general, and increase more Social - Economic - Environment pillars integration in Geography lessons particularly, it is recommended to add more diverse approaches. They are picked up by teachers and students based on the classroom climate and current curriculum. The most chosen solution is to design more digital learning and resources for in-service teachers to research and bring into their lessons.

In-service teachers also stated that they need the standard criteria to evaluate the effectiveness in integrating Social - Economic - Environment in Geography lessons, furthermore, to assess students competency after learning Social - Economic - Environment integrated lessons.

Regarding student's need to integrate Social-Environment-Economy knowledge in the Geography curriculum, students in junior high school stated six main approaches which make they understand the social issues more deeply. The best option is teaching through video and personal documents.

They also suggested some approaches to learn SDGs knowledge integrated with Social-Environment-Economy perspectives. They are listed as five most selected options which are friendly, approachable to students actively about SDGs education. The data highlights a critical shift toward active learning, with 86.5% of students preferring real-world projects or researching specific phenomena, 83.3% in-service teachers need digital learning resources and standardized tools to assess student competency in integrated lessons.

Conclusion

The research concludes that integrating Economy - Society - Environment dimensions into Geography teaching is an urgent necessity to align with the 2018 General Education Curriculum (GEC 2018). While the GEC 2018 provides a strong competency-based foundation, the practical implementation of these three pillars remains fragmented and mostly limited to single-disciplinary knowledge. Survey data reveals that although "relating to current local economic, environment, society in local areas" is the most prominent approach used by teachers (91.7%), significant obstacles persist, including inadequate professional training, limited time budgets, and a lack of integrated guidance materials. Therefore, successful integration requires moving beyond theoretical instruction to apply project-based and scenario-based teaching methods that transform students into active global citizens capable of solving complex sustainable development challenges.

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NUMERICAL MODELING FOR OCEAN DYNAMICS AND COASTAL FLOODING: INSIGHTS AND APPLICATIONS

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Purpose and Background

Oceanic processes such as currents, tides, eddies, and storm surges play critical roles in shaping coastal environments and influencing the global climate system. Numerical modeling is one of the primary tools used to enhance understanding of these processes, enabling scientists to simulate and predict physical changes that are difficult to observe comprehensively through field measurements alone.

This paper synthesizes insights from three numerical modeling studies that investigate coastal flooding hazards and ocean circulation dynamics across different spatial scales. Coastal flooding caused by storm surges, astronomical tides, and interannual climate variability—such as the El Niño–Southern Oscillation (ENSO)—can inundate low-lying coastal regions, resulting in significant flood heights and inland penetration distances (Hanifah & Ningsih, 2018). Numerical hydrodynamic models quantify these processes by solving the governing equations of fluid motion, including conservation of mass and momentum, under realistic boundary and forcing conditions.

In addition, mesoscale oceanic features such as eddies—large rotating water masses—play an important role in ocean circulation by redistributing momentum, heat, and biogeochemical properties. Numerical models are essential for understanding the formation, evolution, and interaction of eddies with regional circulation systems (Hanifah et al., 2016). At larger spatial scales, numerical circulation models are also used to examine climate-related variability, such as the relationship between ocean temperature anomalies and the Atlantic Meridional Overturning Circulation (AMOC), which has implications for long-term climate variability (Hanifah, 2023).

Materials and Methods:

The three studies reviewed in this paper are based on numerical ocean modeling approaches that solve the governing equations of fluid motion under realistic boundary and atmospheric forcing conditions.

For the coastal flooding study along the northern coast of Java, a two-dimensional hydrodynamic model was applied, incorporating tidal forcing, storm surge effects, and interannual climate variability. A flooding–drying scheme was implemented to simulate seawater propagation over land, enabling estimation of inundation height and inland distance during extreme coastal flooding events (Hanifah & Ningsih, 2018).

The study of eddy dynamics in the southeastern tropical Indian Ocean employed a three-dimensional regional ocean circulation model capable of resolving mesoscale variability. The model simulated velocity, temperature, and circulation fields, allowing identification and tracking of eddy structures. Realistic atmospheric forcing and open boundary conditions were applied to represent regional ocean conditions (Hanifah et al., 2016).

The AMOC-related study utilized a large-scale numerical ocean circulation model to investigate the linkage between temperature variability in the Northwest Atlantic and changes in AMOC strength. The model captured basin-scale circulation patterns and their response to thermal forcing, providing a framework for analyzing long-term ocean variability (Hanifah, 2023).

Model outputs from all studies were evaluated through comparison with available observational datasets, including tidal gauge records, satellite observations, and reanalysis products, to ensure consistency and reliability.

Results and Discussion

Numerical simulations of storm-tide flooding along the northern coast of Java indicate strong spatial variability in both inundation height and inland penetration. Interannual climate variability significantly influences flooding severity, with certain years exhibiting enhanced inundation due to the combined effects of storm surges and tidal conditions (Hanifah & Ningsih, 2018). These results identify areas with higher vulnerability to coastal flooding and demonstrate the importance of numerical modeling for coastal hazard assessment and mitigation planning.

The eddy simulations show that mesoscale eddies in the Southeastern Tropical Indian Ocean (SETIO) are dynamically linked to regional circulation systems, including the South Equatorial Current (SEC), the Indonesian Throughflow (ITF), and the South Java Current (SJC). The numerical model successfully captures eddy generation, evolution, and propagation, highlighting their role in modifying local current structures and redistributing oceanic properties (Hanifah et al., 2016). These eddies, as visualized in Figure 1, illustrate the spatial structure and dynamics captured by the model.

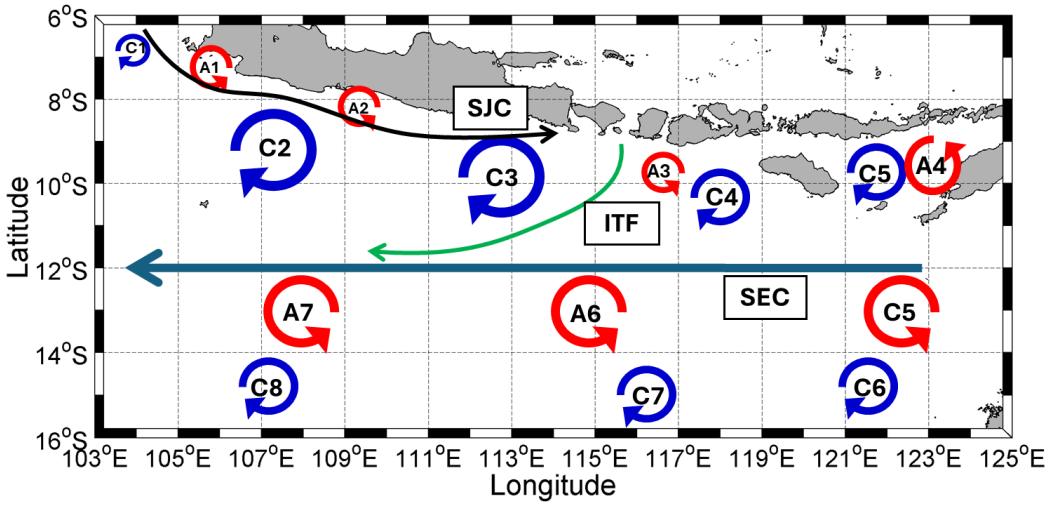

Figure 1. Mesoscale eddies (S1-S8 in the southeastern tropical Indian Ocean formed by interactions among the South Equatorial Current, the Indonesian Throughflow, and the South Java Current, as simulated by a numerical model (Hanifah et al., 2016).

The AMOC study reveals a clear relationship between temperature variability in the Northwest Atlantic and changes in overturning circulation strength. Numerical results illustrate how thermal anomalies can influence large-scale ocean circulation, providing valuable insight into ocean–climate interactions and long-term variability (Hanifah, 2023).

Table 1. Summary of numerical modeling applications and key findings.

Study Topic	Spatial Scale	Numerical Model Focus	Key Result
Coastal flooding (North Java)	Coastal	2D hydrodynamic flooding model	Inundation height and distance affected by storm tides and interannual variability
Eddy dynamics (SETIO)	Regional	3D circulation model	Eddies influence regional circulation and variability
AMOC and temperature linkage	Basin-scale	Large-scale circulation model	Northwest Atlantic temperature linked to AMOC variability

Overall, the three studies demonstrate that numerical models are powerful tools for understanding ocean processes across multiple spatial scales, ranging from coastal flooding to basin-scale circulation dynamics. A summary of the numerical modeling approaches and their key findings is presented in Table 1. These approaches also offer strong potential for future collaborative research on coastal hazards and ocean circulation in East Asia, including Japan, where coastal flooding and climate-driven ocean variability are of growing concern. Such collaboration could contribute to improved regional forecasting and disaster mitigation strategies across the coastal regions of Asia.

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DESIGNING INCREMENTAL SUBSIDIZED HOUSING FOR PRODUCTIVE LIVING IN EAST JAVA

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University of Udayana, Indonesia

Purpose and Background

East Java faces heavy demographics, especially when economic and residential areas reach a high population density of up to 8,727 people per square kilometer (BPS 2023). This causes vigorous competition for survival and increased susceptibility to economic conditions, ultimately affecting residential congestion and infrastructure development (Purnomo, 2012). This condition is worsened by poor housing that doubles as production space, thus causing stress to the environment that threatens the comfort, health, and well-being of the occupants. Therefore, there is a need for government involvement that helps create subsidized designs that will be within reach while accommodating both residential and economic needs of the lower middle class.

Materials and Methods

This research will focus on the region of East Java, utilizing two different study sites: Kampung Lontong, located in Surabaya, and the region of Kabalan, located in Bojonegoro. The reason for selecting Kampung Lontong as a study site was due to its dense housing area, where people live among workplaces, targeting data collection in May 2025. In contrast, Kabalan was selected owing to ease of access and a recommendation from the East Java chapter of the Indonesian Institute of Architects (IAI). This design activity was performed from October to November 2025, aiming to work alongside practicing architects while utilizing both primary and secondary data to cater to lower-middle-class needs. This research aims to integrate both settings, connecting dense urban findings within practical applications of relevant East Java subsidized housing designs.

Results and Discussion

Kampung Lontong is one such representation, where high-density housing emerges naturally, facilitating economic activity for individual households, leading to overlapping functions (Figure 1).

Figure 1. Conditions of Production Houses in Kampung Lontong
Source : Author's Documentation

These informal settlements lack proper planning but, when improperly managed, may easily deteriorate, becoming slums (Yuliastuti & Pratiwi, 2017). In such cases, spontaneous adjustments occur internally, separating dwelling and production areas, thus worsening natural lighting, ventilation, and cooling (Sassi, 2006; Pelsmakers, 2015; Ashadi et al., 2017). A multifunctional design is, therefore, planned for the Bojonegoro area (Figure 2), derived from an online survey related to the existing subsidized Grand Kencana Beji housing complex.

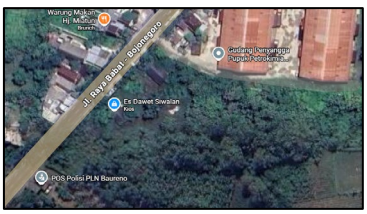

Figure 2. Jl. Raya Baureno, Karan, Gunungsari, Bojonegoro, Kabupaten Bojonegoro, Jawa Timur 62192
Source : Google Maps

The design uses the concept of incremental growth to forecast possible modifications in the size of the family and financial conditions in the future (Aryani & Setiawan, 2019). The most significant aspect of the design involves the use of the "Balinese *natah*" concept, which refers to a central open space in a living area (Suwondo & Arifin, 2023), and transforming it into a functional space to improve lighting and airflow (see Figure 3).

Figure 3. Existing Floor Plan and Elevation of a 1-Story Subsidized House in Bojonegoro Regency
Source : Author's Documentation

The design focuses on vertical growth, given its practical application, to ensure the first floor continues its productive function in the design. The construction costs in the first design and second phase are shown in Table 1, the estimated costs of around a hundred million rupiah satisfy the limit of Rp300,000,000 for the ceiling price.

No	Construction Stage	Total Price (IDR)
1	Initial Condition (1-Story House)	Rp 286,558,128
2	Vertical Expansion (2-Story House)	Rp 158,785,682

Table 1. RAB Table for Building in Final Condition of a 1(One) and 2 (Two) Storey House
Source : Author's Documentation

Finally, the renovated design presented in Figure 4 illustrates the practical application of the proposed design for vertical optimization to ensure spatial efficiency and financial sustainability without compromising the use of the home for its productive function.

Figure 4. Existing Floor Plan and Appearance of a 2-Story Subsidized House in Bojonegoro Regency
Source : Author's Documentation

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RECYCLING USED COOKING OIL INTO SOAP AS A STRATEGY TO REDUCE COASTAL AND MARINE POLLUTION IN SUPPORT OF SDG 12: RESPONSIBLE CONSUMPTION AND PRODUCTION

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Purpose and Background

Coastal and marine pollution is an increasingly serious environmental issue, particularly in areas with high population density and intensive domestic activities. One often overlooked source of pollution is used cooking oil from households and small-scale culinary businesses, which is frequently disposed of directly into drainage systems and water bodies without proper treatment, eventually reaching rivers, coastal, and marine environments. In aquatic systems, used cooking oil can form a thin surface layer that inhibits oxygen exchange, disrupts aquatic organism metabolism, and degrades coastal ecosystems such as mangroves, seagrass beds, and coral reefs. Over time, these impacts contribute to the degradation of marine environments and the decline of coastal ecosystem services.

Despite its negative environmental impacts, used cooking oil still has potential to be recycled. One simple and practical approach is converting used cooking oil into soap through a saponification process, which reduces oil waste released into the environment while producing a value-added product for daily use. This recycling strategy aligns with the Sustainable Development Goals (SDGs), particularly SDG 12 on Responsible Consumption and Production, and serves as a practical solution to reduce coastal and marine pollution.

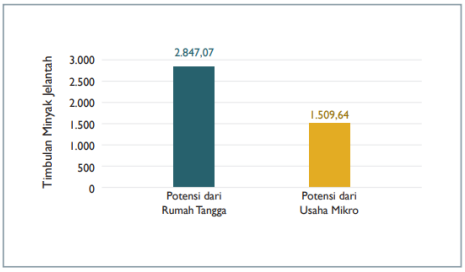

Figure 1. Potential availability of used cooking oil in java-bali

(Source:TractionEnergyAsia,2023)

Materials and Methods

This paper uses a descriptive-qualitative approach based on literature studies and field experience related to community-based waste management. Data and information were obtained from various sources on used cooking oil pollution, soap making processes, and waste management practices by the Bening Saguling Foundation on November 29, 2025.

Materials

The main materials used in the process of making soap from used cooking oil include collected used cooking oil, caustic soda (NaOH), and clean water. Additional materials include activated charcoal, which is used to purify the used cooking oil, food coloring (optional), and natural fragrances as optional aroma enhancers.

Methods

1. The used cooking oil that has been collected is first filtered to remove any remaining solids.
2. The oil was purified using activated charcoal to reduce odor and dark color.
3. Mix the filtered used cooking oil that has undergone the purification process with a caustic soda solution.

4. Stir the mixture slowly until it thickens.
5. After thickening, pour the mixture into molds and let it harden for 24 hours.
6. After hardening, cut the soap into pieces and let it sit for several weeks to allow the saponification process to complete.

Results and Discussion

The results of used cooking oil processing show that oil waste can be utilized to produce solid soap with good cleaning power, with the color of the soap ranging from yellowish to light brown depending on the level of purification. This soap product is suitable for household use, such as washing utensils and clothes, so it still has functional value. From an environmental perspective, recycling used cooking oil contributes to reducing water pollution by reducing oil discharge into waterways that potentially flow into coastal areas and the sea, thereby playing a role in maintaining the quality of coastal ecosystems. This practice supports SDG 12 (Responsible Consumption and Production), SDG 14 (Life Below Water) and SDG 6 (Clean Water and Sanitation) by reducing water pollution. Thus, processing used cooking oil into soap encourages the community to manage waste creatively and sustainably, rather than simply disposing of it into the environment.

Figure 2. Examples of soap products made from used cooking oil

Figure 3. Cleansing results using soap made from used cooking oil

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A Quantitative Framework for Taste Characterization Using Biosensor Arrays and Machine Learning Algorithms

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Purpose and Background:

Sensory evaluation is critical to food and beverage research and development; however, current methods rely primarily on human sensory panels, and many are based on methods established decades ago. While this may be effective for a descriptive analysis, these methods are subjective, susceptible to fatigue, and difficult to standardize across cultures and regions. Consequently, sensory data generated through conventional approaches often lack reproducibility and cross-regional comparability, repeated experimentation, and high rates of product failure during development. The purpose of this research is to investigate an objective and data-driven framework for sensory evaluation through the digitization of taste and flavor attributes. By integrating biosensor technologies capable of detecting taste and flavor attributes. By integrating biosensor technologies, the study aims to convert physical food samples into quantifiable and reproducible sensory representations. Such an approach seeks to lower reliance on subjective human sensory evaluation while enabling high-resolution, standardized sensory measurements. Ultimately, this research aims to enhance decision-making in food formulation, support healthier product development, and reduce material waste in food research and innovation, while supporting rather than replacing human expertise.

Materials and Methods:

This study will investigate an objective, data approach to sensory evaluation by digitizing taste and flavor attributes using biosensor technologies and machine learning analysis. Physical food samples will be analysed under controlled laboratory conditions and equilibrated to room temperature before analysis. Sensory data will be collected using an integrated Sensing platform comprising an electronic tongue, electronic nose, and acoustic sensing system to capture chemical, aromatic, and textural signals. The sensors will be calibrated according to established protocols to ensure measurement accuracy. Raw signals will be recorded in real time, digitized, and processed using machine learning techniques, including noise reduction, normalization, and feature extraction. Multimodal sensory data will be integrated into a quantified taste vector, representing each sample's sensory profile, allowing for reproducible comparisons across samples and experimental conditions. Model training will incorporate geographically diverse datasets, and no personal data will be used.

Results and Discussion:

In Table 1, consensus machine learning models outperformed a single-model approach in sweet taste prediction, with the FP(Molecular Fingerprints) + GNN(Graph Neural Networks) model achieving the highest accuracy (0.898) and F2 score (0.852). This indicates that combining global molecular fingerprints with graph-based structural features improves predictive performance**.**

Model	TP	FP	TN	FN	Acc.	Prec.	Sens.	Spec.	F1
Consensus FP	141	24	318	37	0.883	0.855	0.792	0.930	0.822
Consensus CNN	138	41	301	40	0.844	0.771	0.775	0.880	0.773
Consensus GNN	142	23	319	36	0.887	0.861	0.798	0.933	0.828
FP + CNN	156	40	302	22	0.881	0.796	0.876	0.883	0.834
FP + GNN	153	28	314	25	0.898	0.845	0.860	0.918	0.852
CNN + GNN	141	26	316	37	0.879	0.844	0.792	0.924	0.817
FP + CNN + GNN	153	29	313	25	0.896	0.841	0.860	0.915	0.850

Table 1. Performance comparison of 7 consensus models for predicting sweet taste.

Figure 1 further demonstrates that graph-based and consensus architectures consistently yielded superior classification results, highlighting the importance of connectivity aware representationsfor taste modelling.

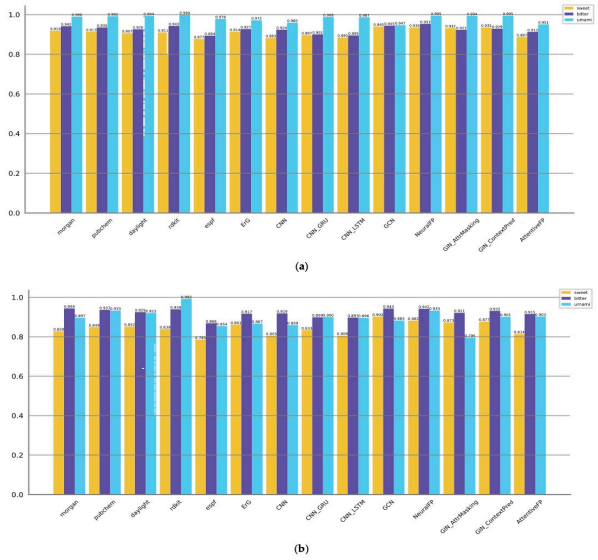

Figure 1. Performance metrics of top-performing machine learning architectures for taste classification

In addition, Table 2 shows that the e-nose system across diverse food applications closely aligns with humansensory evalutation, supporting the reliability of biosensor-based approaches. Together, these results suggest that integratingbiosensor arrays with advanced machine learning enables accurate, scalable, and reproducible sensory evaluation suitable for industrial food research

E-nose	Sensor array	Application	Sensory evaluation	Statistic	Reference
Heracles II, Alpha MOS	MS based method	Flavor comparison of cocoa cultivars	Descriptive sensory analysis (n=12)	PCA, PLSR	Rottiers et al., 2019
		Sensory quality evaluation of parenica cheese	Acceptance test (n=169)	PCA	Štefániková et al., 2020
FOX2000, Alpha MOS	6 MOS	Changes in aroma profiles of oyster during storage	Preference tests Non-trained panel (n=19)	PCA, correlation	Kawabe et al., 2019
FOX4000, Alpha MOS	18 MOS	Sensory changes in gluten-free oat biscuits during storage	Descriptive sensory analysis (n=10)	PCA	Duta et al., 2019
		Suitability of tea cultivars for processing oolong tea	Aroma quality by experts (n=3)/ acceptance by consumers (n=63)	PCA, correlation	He et al., 2022
PEN3.5, Intelligent	10 MOS	Evaluation of aroma characteristics of sugarcane juice	Triangle test (n=36)	PCA, LDA, PLSR	Wang et al., 2019
Lab made	10 MOS	Freshness evaluation of meats	Freshness sensory evaluation (experienced assessors, n=18)	PCA, DFA	Chen et al., 2019
	7 MOS	Detection of freshness quality of spinach	Descriptive sensory analysis (n=10)	SVL model	Huang et al., 2019

Table 2. Examples of recent e-nose applications and comparisons with sensory evaluation

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Difficulties Faced by Homeroom Teachers in Working with Children with Developmental Disabilities in Regular Elementary School Classrooms

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Purpose and Background

In recent years, the promotion of inclusive education has increased the need for regular classrooms to support children with developmental disabilities. At the same time, elementary school teachers face heavy workloads and growing mental health challenges, making teacher well-being and staff shortages serious concerns. Under these conditions, responding to the needs of children with developmental disabilities places a substantial burden on homeroom teachers.

The purpose of this study is to clarify the difficulties faced by homeroom teachers in regular elementary school classrooms and to provide insights into appropriate school roles and support systems.

Materials and Methods

Semi-structured interviews were conducted with homeroom teachers in regular elementary school classrooms. Participants were asked to describe the difficulties they experience in their daily interactions with children who have developmental disabilities. The collected data were analyzed using qualitative methods, and the types and characteristics of the difficulties faced by homeroom teachers were systematically organized and categorized.

Results

Semi-structured interviews were conducted with six mid-career elementary school teachers (with 10–20 years of teaching experience) who had experience as homeroom teachers in regular classrooms that included children with developmental disabilities or suspected developmental disabilities.

As a result of the qualitative analysis, it was revealed that homeroom teachers in regular elementary school classrooms experienced difficulties mainly in the following four areas: (1) communication and collaboration with parents, (2) performance of homeroom teacher duties, (3) responding to children's diverse developmental disabilities, and (4) responding to parents of other children in the classroom.

In addition, regarding the desired school support system, seven categories were extracted:

(1) school administrators understand the difficulties faced by homeroom teachers and are actively involved in providing support;(2) a collaborative system in which teachers work together to support children with developmental disabilities;(3) school nurses collaborate with homeroom teachers to support children;(4) support systems are established from the time of school entry;(5) support staff are assigned to work collaboratively with homeroom teachers to support children with developmental disabilities;(6) flexible personnel are available to respond to the diverse needs of children; and(7) systems are in place to facilitate smooth collaboration with external professional agencies.

Discussion

1. Difficulties Faced by Homeroom Teachers in Regular Classrooms

This study revealed that homeroom teachers in regular elementary school classrooms experience difficulties related to communication with parents, execution of homeroom duties, responding to children's developmental disabilities, and responding to parents of other children. These difficulties arise from the need to address diverse and complex demands simultaneously and suggest that the current school support system places excessive responsibility on individual homeroom teachers.

2. Necessity of Reconsidering Teachers' Working Conditions

Supporting children with developmental disabilities further increases teachers' workload under already demanding conditions. Sustaining inclusive education through individual effort alone is not sustainable, and improvements in working conditions and workload distribution are necessary.

3. Importance of a Collaborative School Support System

The lack of daily support personnel contributes significantly to teachers' burden. Establishing a collaborative system in which support staff regularly assist in classrooms is essential. Such systems should consider not only staff numbers but also their experience and ability to respond flexibly, along with collaboration with external agencies to ensure sustainable support.

Table 1. Participant Characteristics

Elementary school	Participants	Age	Years of teaching experience	Years of experience as a homeroom teacher	Special education teaching license	Experience in special needs classes/schools	Training experience related to developmental disabilities
X	A	40s	16	16	No	No	Yes
	B	40s	15	14	No	No	Yes
	C	40s	14	14	No	No	Yes
Y	D	30s	14	14	No	No	Yes
	E	30s	11	10	No	No	Yes
	F	30s	14	14	No	No	Yes

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Implementation of Tri Hita Karana as a Sustainable Development Model In Desa Adat Bedulu

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Purpose and Background

Tri Hita Karana (THK) is a Balinese local wisdom that emphasizes harmonious relationships between humans and God (*Parahyangan*), humans and fellow humans (*Pawongan*), and humans and nature (*Palemahan*). This concept is deeply rooted in Balinese Hindu philosophy and guides daily behavior, social relations, and environmental practices (Titib, 2003; Sura, 2001). Several studies have shown that THK contributes to sustainable development by integrating cultural values into social and environmental governance (Hopwood et al., 2005; Punia & Nugroho, 2020).

Most previous studies discuss THK at the conceptual or policy level, particularly in tourism and development planning, while limited attention has been given to its concrete implementation in traditional village life. Desa Adat Bedulu is a traditional village that continues to preserve strong customary institutions, religious practices, and environmental values. Therefore, this study aims to describe how Tri Hita Karana is practiced in the daily life of Desa Adat Bedulu and how these practices support sustainability based on local wisdom.

Materials and Methods

This study employed a descriptive qualitative approach to explore the implementation of Tri Hita Karana practices in Desa Adat Bedulu. Data were collected through in-depth interviews, participant observation, and documentation. Informants included traditional village leaders (*Kelian Adat*), religious leaders (*Pemangku*), Subak Leader (*Ketua Subak*), and youth representative (*Ketua Pemudi*). Informants were selected using purposive sampling to obtain rich and relevant data (Sugiyono, 2019).

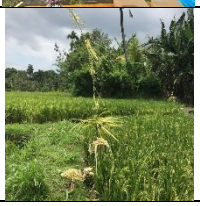
Data analysis was conducted using an interactive model consisting of data reduction, data display, and conclusion drawing (Miles *et al*., 2018). To ensure data credibility, triangulation of sources and techniques was applied (Widyantara, 2021).

Results and Discussion

The research shown that Tri Hita Karana in Desa Adat Bedulu is practiced through everyday activities that begin within the household and gradually extend into broader social and communal contexts. These practices emerge from daily religious observance, social interaction, and environmental care, and are maintained continuously as part of community life.

In the Parahyangan aspect, religious practices start at home through daily worship at household temples (*sanggah/merajan*), routine paying and offerings. These practices then expand into collective worship within kinship groups and *banjar*. Strengthened through communal ceremonies at village temples. Pawongan values are first learned through family interactions and are reinforced through social cooperation such as *ngayah* and *menyama braya* within the banjar, as well as collective participation in customary activities at the village level. Palemahan practices begin with simple environmental care at home and extend to shared agricultural rituals and community-based environmental management.

Overall, these findings indicate that Tri Hita Karana functions as an interconnected set of practices linking individual behavior with collective responsibility. Through this process, spiritual balance, social harmony, and environmental preservation are integrated into daily life, supporting sustainable development rooted in local culture.

Tri Hita Karana Aspect	Household Practices	Traditional Village Practices	Research Documentation
Parahyangan (Humans with God in Desa Adat bedulu)	Family temple, clan temples, muspa (praying), banten Saiban (after cooking), Banten canang (flower offerings).	Khayangan temple (Desa, Puseh, Dalem,) Self Purification temple, healer temple, Samuan Tiga temple, Ceremony (15 days, 30 days, 6 months, 1 year) and Human Rituals.	
Pawongan (Human with Humans in Desa Adat Bedulu)	Balinese house	Bale banjar (community hall), village Organization, Ngoopan, Mebraya and Aban.	
Palemahan (Human with nature in Desa Adat Bedulu)	Balinese house, and Cleaning the house	Subak system, Caru, Tumpek, Nyepi Day, Pohon mewastra (tree cover by fabric) and TPS 3 R	

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Teacher Shortage and Teaching Quality Decline in K–12 Education: The Case of Israel with a Comparative Reference to China

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Purpose and Background

In recent years, teacher shortages and declining teaching quality have become global challenges in K–12 education, undermining instructional effectiveness, widening educational inequality, and threatening long-term human capital development (Donitsa-Schmidt, 2025). Israel exemplifies this trend: despite substantial investment in educational innovation and technology, its K–12 system continues to face persistent teacher shortages and declining teaching quality, particularly in core subjects such as mathematics, science, and language education (Taub Center for Social Policy Studies in Israel, 2023). OECD PISA data show that more than one-third of Israeli students attend schools reporting shortages of qualified teachers, well above the OECD average (OECD, 2023). These challenges are structural rather than purely numerical, as out-of-field teaching, large class sizes, and the unequal distribution of qualified teachers disproportionately affect socioeconomically disadvantaged communities (Israel Central Bureau of Statistics, 2023).

By contrast, China does not face an overall national teacher shortage but continues to experience imbalanced teacher distribution, heavy workloads, and pronounced quality disparities between urban and rural schools. Comparing Israel and China therefore offers insight into how teacher shortages and quality decline operate under different governance and policy contexts, and how targeted interventions may mitigate their negative effects.

Materials and Methods

Documentary research and qualitative comparative policy analysis are used to examine the teacher shortage and decline in teaching quality in K–12 education, with Israel as the primary case and China as a comparative reference.

Results and Discussion

Teacher shortages in Israel have far-reaching consequences for teaching and learning, most notably through widespread out-of-field teaching. Official statistics show that nearly half of primary school mathematics teachers and over 60% of Hebrew teachers lack formal subject qualifications, with even higher proportions at the lower secondary level (Israel Central Bureau of Statistics, 2023). This weakens subject-specific pedagogy, limits responsiveness to diverse student needs, and undermines students' mastery of foundational skills. Teacher shortages also contribute to large class sizes, placing Israel among the most crowded classrooms in the OECD and intensifying teacher burnout and attrition (OECD, 2023). These effects are particularly pronounced in disadvantaged Arab, Bedouin, and ultra-Orthodox (Haredi) communities, where difficulties in attracting and retaining qualified teachers exacerbate social and ethnic inequalities (Arar & Ibrahim, 2018; Blass, 2022). Teacher shortages in Israel thus represent not only a labor market challenge but also a systemic barrier to educational equity.

While Israel faces challenges in both teacher quantity and qualification, China's problem is more structural than absolute. China has largely maintained sufficient teacher numbers nationwide following large-scale recruitment and training reforms, yet severe regional imbalances persist. Urban and economically developed areas attract more highly qualified teachers, whereas rural and underdeveloped regions rely more on less experienced staff and face higher turnover (Zhang, Fang, & Jiang, 2025). Heavy administrative demands, large teaching loads, and high performance pressures further undermine teaching quality and professional motivation in China (Zhang & Liu, 2020). In contrast, in Israel, relatively low social status and limited career advancement opportunities discourage talented graduates from entering or remaining in the profession. Despite these differences, both countries share common risks, including declining professional attractiveness, uneven teaching quality, and rising demands without adequate support.

Policy responses should therefore focus on improving teacher attraction, quality, and retention through competitive salaries, clear career pathways, and targeted incentives for service in high-need areas (Donitsa-Schmidt, 2025). High-quality induction and continuous professional development, particularly for out-of-field teachers, remain essential to sustaining teaching quality amid shortages (Even-Zahav et al., 2022). Reducing administrative burdens and strengthening teacher autonomy may further enhance job satisfaction and long-

term retention (Peng & Tang, 2022).

Table 1: Pathways of Teacher Shortages and Quality Decline: Israel vs. China

Dimension	Israel	China
Teacher supply	Visible shortages; unfilled positions	Overall sufficient at national level
Quality decline	Publicly acknowledged; linked to lack of qualified teachers	More implicit; linked to workload and uneven capacity
Teacher attrition	High mobility; market-driven exits	intensifying competition with diminishing returns; burnout
Policy response	Targeted incentives and professional development	Administrative allocation and employment security mechanisms

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NEXT-GEN SCIENCE INSTRUCTION: REVOLUTIONIZING TEACHING THROUGH THE NEARPOD APPLICATION FOR INTERACTIVE LESSON DELIVERY

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Purpose and Background:

The Philippine education system continues to face major challenges in science education, as reflected in the 2024 PISA results. Filipino students performed below the OECD average in science, with only 23% reaching at least Level 2 proficiency compared to the OECD's 76%. These findings highlight the urgent need for innovative teaching strategies that promote student engagement and deeper understanding of scientific concepts.

Research suggests that interactive lessons can significantly improve science learning. Studies by Hwang et al. (2020) and Kuo et al. (2021) show that interactive and technology-enhanced instruction increases student engagement, interest, and academic performance while encouraging scientific inquiry and critical thinking. Such approaches move beyond traditional lecture-based methods and support active learning.

Interactive platforms like the Nearpod application offer opportunities for dynamic science instruction through real-time feedback, quizzes, polls, multimedia resources, and virtual simulations. These features cater to diverse learning styles and help develop higher-order thinking skills essential for scientific literacy.

At Poblacion Polomolok National High School, particularly within the Science, Technology, and Engineering (STE) Program, teachers have noted difficulties in engaging students using conventional teaching methods. Integrating interactive tools such as Nearpod aligns with the Department of Education's efforts to improve instructional quality and address learning gaps identified by international assessments like PISA.

Materials and Methods:

The implementation of the Nearpod App involved the following steps:

Training Sessions: Conducted workshops for teachers to familiarize them with the Nearpod platform and its functionalities.

Lesson Development: Teachers created interactive lessons using Nearpod, incorporating multimedia resources and formative assessments.

Classroom Implementation: The Nearpod lessons were delivered during science classes, allowing students to interact with the content in real-time.

Data Collection: Pre- and post-test scores were administered to measure the impact of Nearpod on student learning outcomes.

Results and Discussion:

Pre-test Scores Summary

The experimental group had a mean score of 35.0 which is a little bit higher than that of the control group which is 34.8 mean score.

Pre-test Scores Significant Difference

The independent samples t-test produced a t-statistic of 0.25 with a p-value of 0.80, indicating no significant difference between the two groups' pre-test scores. This suggests that both groups had similar baseline knowledge of the science concepts before the intervention.

Posttest Scores Summary

The experimental group had a mean score of 42.6 which is a significantly higher than that of the control group which is 37.4 mean score.

Posttest Scores Significant Difference

The independent samples t-test for post-test scores yielded a t-statistic of 3.45 and a p-value of 0.0012. Since the p-value is less than 0.05, this suggests that the use of the Nearpod application in the experimental group positively impacted student learning outcomes in science, resulting in significantly higher post-test scores compared to the control group.

Pre-test and Posttest Scores of the Control Group (Paired Sample T-test)

The paired samples t-test for the control group (Grade 10 Ohms) produced a t-statistic of 2.10 and a p-value of 0.046. Since the p-value is less than the conventional alpha level of 0.05, it indicates that there is a significant difference between the pre-test (mean score of 34.8) and post-test scores (mean score of 37.4) for the control group. This suggests that traditional instruction improved students' understanding of the science concepts, albeit not as substantially as observed in the experimental group.

Pre-test and Posttest Scores of the Experimental Group (Paired Sample T-test)

The paired samples t-test for the experimental group (Grade 10 Ampere) yielded a t-statistic of 5.67 and a p-value of 0.0001. Since the p-value is significantly less than 0.05, it indicates that there is a statistically significant difference between the pre-test (mean score of 35.0) and post-test scores (mean score of 42.6) for the experimental group. This result suggests that the use of the Nearpod application substantially improved students' understanding of science concepts.

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Supplements

Ice Cream and Muffin Made from Global Rice
~Recreating Japanese Taste~

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Purpose

Amazake is known as drinking drip in Japan, it was also used as medicine in older days in Japan. Since there are a lot of health benefits in amazake, we want to be able to create the same Japanese amazake with jasmine rice, one of the most eaten rice around the world, so that we can provide more opportunities for others to consume nutrients.

Materials and Methods

We made rice koji, amazake, ice cream and muffins. The materials and methods are as follows.

1. Make rice koji by incubating jasmine rice and Aspergillus oryzae for 24 hours.
2. Mix 200 g of Jasmine rice, 100 g of rice koji, and 300 mL water.
3. Ferment the mixture for 24 hours.
4. Heat the amazake to concentrate and take 150 g of the amazake.
5. Add 100 g of cream and 25 g of condensed milk.
6. Mix and freeze the mixture. Ice cream is complete.

<Muffin>

1. Mix 35 g of amazake and 30 g of oil into the beaten eggs.
2. Add 50 g of cake flour and 3 g of baking powder to the mixture and stir.
3. Pour into a mold and bake at 170 ℃ for 15 minutes.

How to Evaluate

The taste was evaluated by sixteen students. The evaluation criteria were sweetness, bitterness, saltiness, and sourness. A score of 4 is just right, 7 is too strong, and 1 is too weak.

Result 1

Ice cream: Sweetness was 2.8, Bitterness was 3.3, Saltiness was 2.9, and Sourness was 3.0. In other opinions, the texture was oily and chewy.

Muffin: Sweetness was 1.58, Bitterness was 3.67, Saltiness was 3.42, and Sourness was 3.42.

Additional Experiment

Ice cream: Since the first experiment the sweetness was not sweet enough, we extended the fermentation time for the rice koji and amazake from 24 to 72 hours while keeping the ingredients the same.

We changed evaluation criteria to sweetness, oiliness, texture, and smell because it was contradictory that we needed to increase both the sweetness and the bitterness to make the evaluation just right and the saltiness and sourness was unnecessary to making ice cream.

Muffin: We added our fermentation time by 10 hours and added 5g of milk to add more moisture in the texture and make it sweeter.

Result 2

Ice cream: Sweetness was 3.9, Oiliness was 4.3, Texture was 4.5, and Smell was 3.8.

Muffin: Sweetness was 3.27, Bitterness was 3.94, Saltiness was 3.67, and Sourness was 3.56.

Conclusion

Extending the fermentation time increased the sweetness. This is because the rice koji had more time to turn the rice starch into sugar. Also, we think the texture improved because the rice was broken down more during the long fermentation.

Future Work

Ice cream: In the future, we want to make sweet ice cream without using any condensed milk. We also want to try making different flavors of amazake ice cream.

Muffin: We want to make muffins that are sweet and not dry feeling. Last time, we added milk to get rid of the dry feeling, but we thought that by adding more amazake instead of milk, the sweetness would increase and we could make muffins without a dry feeling.

Amazake and Senbei Made from Global Rice
~ Recreating Japanese Taste~

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Purpose and Background

Amazake is a very healthy Japanese food that is good for beauty and health and has long been used as a nutritional supplement. We would like to find a way to produce amazake overseas and provide it to countries and people who struggle to maintain a healthy diet. Also, as rice shortage is a problem in Japan, we are aiming to develop rice crackers made from rice and koji so that people who don't like the unique sweetness of amazake can enjoy it as well, in order to create dishes that can be eaten without using Japanese rice.

Materials and Methods

Materials: Japonica rice (300 g), Jasmine rice (300 g), koji mold (1 g per sample), water (as needed), rice cooker, amazake maker, and incubator.

How to make rice koji

1. Cook Japonica rice and Jasmine rice separately using a rice cooker.
2. Weigh 300 g of each cooked rice.
3. Add 1 g of koji mold to each portion of rice and incubate for 1 day in an incubator.
4. Completion of rice Koji

How to make Amazake

1. Mix 200 g of cooked rice with 100 g of rice koji and water.
2. Place the mixture in an amazake maker and incubate.
3. Completion amazake.

How to make rice senbei

1. Press rice Koji onto the frying pan.
2. Grill both sides of rice Koji.
3. Dip the rice senbei in a sauce made from sugar and soy sauce.
4. Completion of rice senbei.

How to evaluate

Approximately 10 participants completed a survey and rated the taste of the amazake and rice crackers on a 7-point scale based on four components: sweetness, saltiness, bitterness, and sourness (7.0: strong, 4.0: just right, 1.0: weak). The researchers calculated an average rating, and the results are presented in the next section.

Result

For Amazake, we compared experiments 1(basic), 2, and 3. In Experiment 1 (Time 6 h, Water 300 ml), both Japonica and Jasmine rice amazake showed low sweetness (1.73 and 1.90, respectively). Other taste scores were around 3. In Experiment 2 (48 h, 300 mL), the amazake smelled too sour and we couldn't evaluate. In Experiment 3 (48 h, 350 mL), sweetness remained low (1.78 for Jasmine and 1.33 for Japonica), while sourness increased, especially in the Japonica rice amazake (5.44). As for senbei, the first experiment identified insufficient saltiness as an issue. The second experiment received positive feedback that all aspects were just right.

Considerations and further prospects

For amazake, we believed the rice koji fermentation was not progressing well due to dryness. To address this issue, we conducted control experiments using a deep dish, covering it with a damp cloth, adding water halfway through the process, and stirring halfway through. It was also thought that increasing the fermentation time would enhance bacterial activity and increase sourness. As for senbei, we decided to conduct three additional experiments to improve the taste of the rice crackers. The first experiment involved seasoning the senbei with soy sauce before baking. The second involved sprinkling salt on the senbei after baking. The third involved using mitarashi sauce to enhance the sweetness of the koji. We plan to carry out these additional experiments to improve the overall flavor.

Project Report: Research and Practice of "Kodomo Shokudo”

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Introduction

We decided to research "Kodomo Shokudo" (Children’s Cafeterias) to understand their current situation and let more people know about them. Kodomo Shokudo is a place that provides free or low-cost meals. But it is not just about food; it is also a warm space where local people can gather and talk.

Our Project: "Everyone’s Cafeteria"

To learn more, we ran our own pop-up cafeteria called "Everyone’s Cafeteria" in Sakura City.

- First, we volunteered at a local cafeteria. We learned that food safety is the most important thing, and that these places are vital for the community.
- Working with the Community: A local farmer gave us fresh vegetables and "Okamura Home" let us use a beautiful old Japanese house as our venue.
- Results: We served Keema curry using local ingredients. It cost 50 yen for children and 150 yen for adults. It was hard work, but seeing people enjoy the meal was a great experience!

Comparing Japan and Germany

We went to Germany to present our project at Düsseldorf University and the Japanese Consulate. We also studied the "Kindertafel" system in Germany. We found some interesting differences:

	Japan (Kodomo Shokudo)	Germany (Kindertafel)
Who runs it?	Volunteers and local groups.	Public groups and large organizations.
Main Goal	Solving loneliness and poverty.	Supporting low-income families.
Money	Donations and sponsorships.	Taxes and government support.
Who is it for?	Everyone in the community.	Mainly for people in need.

Conclusion and Our Ideas

Through this project, we realized that while the systems are different, both countries want to help children. For the future of Japanese children’s cafeterias, we think:

- Be Open to Everyone: We should make it easier for anyone to visit without feeling shy.
- Support the Organizers: Running a cafeteria is hard, so we need to find ways to help the staff.
- Government Help: We believe the government should provide more financial support to keep these places going.

We hope our research helps people think more about the importance of children's cafeterias. Thank you!

Why the World Is Obsessed with Japanese Food: Unraveling the Value of Japanese Cuisine

Misato NISHIHATA

Ichihara Chuo High School, Japan

Purpose and Background: Realizing "Normal" Was Special

In summer 2024, I joined a two-week study abroad program in New Zealand—my first time living outside Japan. The bread-based, larger, high-calorie meals made managing my chronic digestive condition difficult, and I realized I had taken Japanese food for granted. Living abroad helped me see how distinctive Japanese food culture is and made me want to understand what makes it special.

Three Values of Japanese Cuisine

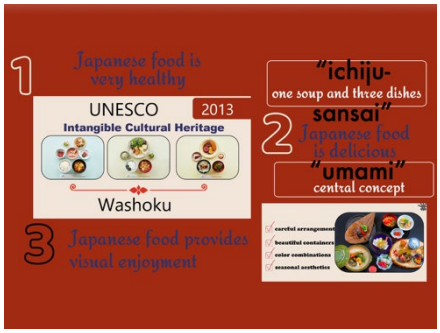

Figure1: Three Values of Japanese Cuisine

3.1 Health: balance built into the meal structure

A key foundation is "*ichiju-sansai*" ("one soup, three dishes"), typically combining a staple (often rice), soup, a main protein, and vegetable-based sides. This structure makes nutritional balance easier to achieve in everyday life. In 2013, "*washoku*" was registered as a UNESCO Intangible Cultural Heritage, noted for its strong connection to seasonality and its balanced dietary practices (UNESCO, 2013). Japan's high life expectancy is often discussed alongside these traditional patterns.

3.2 Deliciousness: umami and respect for ingredients

Japanese cuisine values "*umami*" and techniques (such as '*dashi*') that deepen flavor without heaviness. Rather than masking ingredients with strong seasoning, many dishes aim to highlight natural taste and texture. This approach creates satisfaction while maintaining moderation.

3.3 Visual beauty: eating as an aesthetic experience

Presentation is treated as part of the meal itself. Color balance, seasonal motifs, and appropriate dishware communicate care and attentiveness. These turns eating into a cultural experience, not just consumption.

Practice Case: Learning '*Yakiudon*' to Share Japanese Home Cooking

To share these values in an approachable way, I practiced making "*yakiudon*" (stir-fried udon). It uses familiar elements—noodles, vegetables, mushrooms, pork (or alternatives), and green onions—seasoned with soy sauce and '*dashi*'. Because the flavor is mild and ingredient-centered, it represents "*everyday washoku*" that can be shared with people from other countries. Learning from nutrition-focused role models also helped me view cooking as a skill that connects enjoyment with health.

Conclusion

Japanese food's true value is not only that it is healthy, delicious, and beautiful, but that these qualities are linked by a consistent philosophy: "respect for ingredients, nutritional balance, seasonality, and care in preparation and presentation." This is why Japanese cuisine continues to captivate the world—and why I hope to develop my language and cooking skills to serve as a bridge for cultural understanding.

REFERENCES

UNESCO. (2013). "Washoku, traditional dietary cultures of the Japanese, notably for the celebration of New Year". Retrieved February 2, 2026, from https://ich.unesco.org/en/RL/washoku-traditional-dietary-cultures-of-the-japanese-notably-for-the-celebration-of-new-year-00869

Making Life Easier for Foreign Children in Japan

Waka Chin, Runa Hidaka, Honoka Otake

Chiba Prefectural Sakura High School, Japan

Introduction and Background

We are focusing on supporting children with limited Japanese proficiency and are exploring an effective way to support these children in educational settings.

Purpose

Based on the identified language barriers, this study aims to support foreign children in acquiring basic Japanese skills so that they can better understand school life and communicate with others.

Activities and Methods

Field research was conducted at Asahi Dai-ni Junior High School, where two Assistant Language Teachers (ALT) from the United States were interviewed. The ALTs revealed that daily life in Japan can be challenging due to technical vocabulary, the use of honorific expressions and cultural differences. To help address this challenge, the ALTs emphasized that immersion in a target-language environment facilitates language learning and highlighted the importance of speaking without fear of making mistakes. So, we created a Sugoroku-style Japanese learning board game based on this advice.

Figure 1. Sugorou Learning Game

Figure 2. Word Cards

Implementation and Results

The game was tested in a Japanese language classroom with students whose Japanese proficiency and grade level varied widely. A large cardboard dice was prepared to encourage physical movement and increase engagement. During the gameplay, students with higher proficiency naturally supported peers, enabling collaborative participation. Feedback from participants indicated high enjoyment and motivation to continue playing. Visual support, physical activity, and a psychologically safe environment also encouraged language use without fear.

Further Work

A Japanese language teacher evaluated the activity and suggested incorporating level-based tasks, such as kanji-usage for advanced learners. Incorporating level-based vocabulary and expanding the range of words to reflect everyday life contexts also would be beneficial.

SDGs Workshop

Purpose of the SDGs workshop

SDGs (Sustainable Development Goals) are important actions to improve and set up a sustainable world. All the seventeen goals raised in the SDGs are critical and urgent issues. We should collaborate to find the direction to solve those issues, especially since their causes are diverse even in the local areas. Therefore, mutual understanding of the causes of the SDGs matters is vital to reach a starting point for cooperation. This workshop is one way to establish comprehension of SDGs among people in Asia.

We hope you, the workshop attendants, will discuss with students from other countries, and make friends with each other. Human network is essential to solving global issues, and this is the opportunity to start building the network.

SDGs Workshop

Room 2111 (Satoshi MATSUI, Chiba University)

Group A		Name	University / School	Country/ Region
1	Facilitator	CHATREE FAIKHAMTA	Kasetsart University	Thailand
2	Learner	ARIERTA PUJITRESNANI	University of Indonesia	Indonesia
3	Learner	TOLETE JOROME CASTUERA	University of San Carlos	Philippines
4	Learner	NISHIHATA Misato	Ichihara Chuo High School	Japan
5	Learner	ISHIZAKI Yuka	Chiba Keiai Senior High School	Japan
6	Learner	HAMADA Morihiro	Chiba Municipal Chiba High School	Japan
7	Learner	NOGAWA Mariko	Chiba University	Japan
8	Learner	YAKUSHIJI Shunya	Chiba University	Japan

Group B		Name	University / School	Country/ Region
1	Facilitator	SURAPONG RATTANAKUL	King Mongkut's University of Technology Thonburi	Thailand
2	Learner	RAIHAN EKO SUGIYANTO	Bandung Institute of Technology	Indonesia
3	Learner	SATO Nozomi	Chiba Prefectural Chiba Higashi High School	Japan
4	Learner	SHINOTSUKA Eita	Chiba Keiai Senior High School	Japan
5	Learner	HATANAKA Yuri	Chiba Municipal Chiba High School	Japan
6	Learner	TAKAOKA Ryosei	Chiba Municipal Inage International Secondary School	Japan
7	Learner	SASAKI So	Chiba University	Japan

Group C		Name	University / School	Country/ Region
1	Facilitator	THITI YANPRECHASET	Slipakorn University	Thailand
2	Adviser	ZHANG JIAN YUN-YI	National Taiwan Normal University	Taiwan
3	Learner	RISKA ANDRIANI	Bandung Institute of Technology	Indonesia
4	Learner	KAMIO Kazusa	Chiba Prefectural Kisarazu High School	Japan
5	Learner	YAMADA Soei	Chiba Keiai Senior High School	Japan
6	Learner	OHHORI Momoa	Chiba Municipal Chiba High School	Japan
7	Learner	SUGAWARA Karen	Chiba Prefectural Funabashi High School	Japan
8	Learner	SUGIYAMA Sakura	Chiba University	Japan

Group D		Name	University / School	Country/ Region
1	Facilitator	CHRISTINE LOURRINE S. TABLATIN	Pangasinan State University	Philippines
2	Learner	FANISA DWI AULIA MILANI	Udayana University	Indonesia
3	Learner	CHU RONGJUN	Mahidol University	China
4	Learner	HIRAGA Yuna	Chiba Prefectural Chiba Higashi High School	Japan
5	Learner	TAKAMI Yui	Chiba Keiai Senior High School	Japan
6	Learner	KITANO Natsuki	Chiba University	Japan
7	Learner	OKUBO Shota	Chiba University	Japan

Group E		Name	University / School	Country/ Region
1	Facilitator	DODI SUDIANA	Universitas Indonesia	Indonesia
2	Adviser	SUTHIPORN SAJJAPANROJ	Mahidol University	Thailand
3	Learner	GUISANDO LUCKY FAITH BALAME	University of San Carlos	Philippines
4	Learner	WATANABE Yumina	Chiba Prefectural Kisarazu High School	Japan
5	Learner	NISHIYAMA Rimpei	Chiba Keiai Senior High School	Japan
6	Learner	AIBARA Miho	Chiba Municipal Chiba High School	Japan
7	Learner	ISHII Leon	Chiba Prefectural Chosei High School	Japan
8	Learner	SHOJI Yuya	Chiba University	Japan

SDGs Workshop

Room 2111 (Satoshi MATSUI, Chiba University)

Group F		Name	University / School	Country/ Region
1	Facilitator	PUTU AYU ASTY SENJA PRATIWI	Udayana University	Indonesia
2	Advisor	WITCHAYADA NAWANIDBUMRUNG	Chulalongkorn University	Thailand
3	Learner	BANIQUED MALILLIN RODOLFO JR.	Pangasinan State University	Philippines
4	Learner	TAKAZAWA Mari	Chiba Prefectural Kisarazu High School	Japan
5	Learner	ITO Yuki	Chiba Keiai Senior High School	Japan
6	Learner	FUJITA Tomohiro	Chiba Municipal Chiba High School	Japan
7	Learner	NARAHASHI Atsuki	Yokohama Soei Senior High School	Japan
8	Learner	HOSONO Atsushi	Chiba University	Japan

Group G		Name	University / School	Country/ Region
1	Facilitator	Roxana Mayhin Del Rocio Quispe Cuadros	Chiba University	Peru
2	Learner	DARA NUR SABRINA	Bogor Agricultural University	Indonesia
3	Learner	XIONG YIQI	Mahidol University	China
4	Learner	YAMAZAKI Taro	Chiba Prefectural Chiba Higashi High School	Japan
5	Learner	MIYAO Yuuri	Tokyo Metropolitan High School of Science and Technology	Japan
6	Learner	MASUDA Chiho	Chiba Prefectural Funabashi High School	Japan
7	Learner	TOYAMA Anju	Chiba University	Japan

Group H		Name	University / School	Country/ Region
1	Facilitator	SUJIRA MUKDA	Mahidol University	Thailand
2	Facilitator	SOVARITTHON CHANSAENGSEE	Mahidol University	Thailand
3	Learner	FIRDHA CHAYLIA AYU RACHMANDIKA	Bogor Agricultural University	Indonesia
4	Learner	HATORI Mayu	Chiba Prefectural Kisarazu High School	Japan
5	Learner	SHIBATA Hiroto	Chiba Prefectural Makuhari Sogo High School	Japan
6	Learner	HASEGAWA Ayane	Chiba University	Japan
7	Learner	NARUSE Hina	Chiba University	Japan

Group I		Name	University / School	Country/ Region
1	Facilitator	Rabiatul Hazirah binti Idris	Chiba University	Malaysia
2	Advisor	PAYU KLEEBBUA	Mahidol University	Thailand
3	Learner	GHINA NUR ROHMAH	Universitas Pendidikan Indonesia	Indonesia
4	Learner	KAMIOKA Manami	Chiba Prefectural Kisarazu High School	Japan
5	Learner	WAKUNO Uta	Tokyo Metropolitan High School of Science and Technology	Japan
6	Learner	KUNIYASU Ema	Chiba Municipal Chiba High School	Japan
7	Learner	SHIMA Botan	Seijo Gakuen Senior High School	Japan
8	Learner	KASAHARA Hina	Chiba University	Japan

Group J		Name	University / School	Country/ Region
1	Facilitator	Fakih Irsyadi	Chiba University	Indonesia
2	Learner	WILLIZA MAÑA CORDOVA	University of San Carlos	Philippines
3	Learner	Dharmatouch Pourpongpun	Chulalongkorn University Demonstration Secondary School	Thailand
4	Learner	OTSUKA Rin	Chiba Prefectural Chosei High School	Japan
5	Learner	KASE Yuya	Chiba Prefectural Funabashi High School	Japan
6	Learner	KOMURO Haruna	Chiba University	Japan
7	Learner	WATANABE Sawa	Chiba University	Japan

SDGs Workshop

Room 2208 (Shuji SHIMONAGATA, Chiba University)

Group K		Name	University / School	Country/ Region
1	Facilitator	Rizvon Suleimanov	Chiba University	Tajikistan
2	Learner	APRILIA SARAH KRISTINA	University of Indonesia	Indonesia
3	Learner	CHUNG PEI-YU	National Taiwan Normal University	Taiwan
4	Learner	OKAMOTO Rika	Chiba Prefectural Kisarazu High School	Japan
5	Learner	HOSOGAI Yuri	Chiba Prefectural Sakura High School	Japan
6	Learner	YAMASHITA Ryoya	Hyogo Prefectural Kakogawa Higashi High School	Japan
7	Learner	YAMADA Ayu	Chiba University	Japan
8	Learner	NAKAMURA Toranosuke	Chiba University	Japan

Group L		Name	University / School	Country/ Region
1	Facilitator	YAYA SUKJAYA KUSUMAH	Universitas Pendidikan Indonesia	Indonesia
2	Learner	PHUREE THONGPAITOON	Chulalongkorn University	Thiailand
3	Learner	KASAI Yuuhi	Chiba Prefectural Kisarazu High School	Japan
4	Learner	ONO Misaki	Chiba Prefectural Sakura High School	Japan
5	Learner	TACHIBANA Chiune	Chiba Municipal Chiba High School	Japan
6	Learner	SAGARA Misaki	Chiba University	Japan
7	Learner	YAGI Takuo	Chiba University	Japan

Group M		Name	University / School	Country/ Region
1	Facilitator	Armilia Ramandha	Chiba University	Indonesia
2	Facilitator	Kunti Khoirunnisaa	Chiba University	Indonesia
3	Learner	LAPAT TILOKRUANGCHAI	Chulalongkorn University	Thailand
4	Learner	MURAKOSHI Kaho	Chiba Prefectural Kisarazu High School	Japan
5	Learner	EBATO Rio	Chiba Prefectural Sakura High School	Japan
6	Learner	YAMAUCHI Mayuko	Shibaura Institute of Technology Kashiwa High School	Japan
7	Learner	YOKOYAMA Yuma	Hyogo Prefectural Kakogawa Higashi High School	Japan
8	Learner	KATO Hiroto	Chiba University	Japan

Group N		Name	University / School	Country/ Region
1	Facilitator	FATMASARI SIREGAR	Bogor Agricultural University	Indonesia
2	Learner	TRAN THU PHUONG	Vietnam National University of Education	Vietnam
3	Learner	Natnisha Leelahavanichkul	Chulalongkorn University Demonstration Secondary School	Thailand
4	Learner	HAKAMATA Sawako	Chiba Prefectural Sakura High School	Japan
5	Learner	YAMAZAKI Mao	Shibaura Institute of Technology Kashiwa High School	Japan
6	Learner	OKADA Itsuki	Chiba University	Japan
7	Learner	TAKAHASHI Hiyori	Chiba University	Japan

Group O		Name	University / School	Country/ Region
1	Facilitator	TOCH PHEAKDEY	Royal University of Phnom Penh	Cambodia
2	Learner	RINASARI WIJAYANTI	Universitas Gadjah Mada	Indonesia
3	Learner	GONG PING	Mahidol University	China
4	Learner	SHIBAO Kazuki	Chiba Prefectural Kisarazu High School	Japan
5	Learner	TANAKA Iroha	Chiba Prefectural Sakura High School	Japan
6	Learner	SHIRAI Natsuki	Chiba Prefectural Funabashi High School	Japan
7	Learner	SONODA Kaori	Chiba University	Japan

SDGs Workshop

Room 2208 (Shuji SHIMONAGATA, Chiba University)

Group P		Name	University / School	Country/ Region
1	Facilitator	NUR SULIANTI SUCI PERTIWI	Bogor Agricultural University	Indonesia
2	Advisor	PANCHIT LONGPRADIT	Mahidol University	Thailand
3	Learner	PHAM THI MY DUYEN	Vietnam National University of Education	Vietnam
4	Learner	ISHIMORI Haruto	Chiba Prefectural Kisarazu High School	Japan
5	Learner	HATAKEYAMA Kosuke	Chiba Prefectural Sakura High School	Japan
6	Learner	Perera Kavidhi	Shumei Yachiyo High School	Japan
7	Learner	TACHIBANA Hinata	Chiba University	Japan
8	Learner	YAMAZAKI Sakura	Chiba University	Japan

Group Q		Name	University / School	Country/ Region
1	Facilitator	TAGALOG, RITA MAY PATIÑO	University of San Carlos	Philippines
2	Learner	VIA AINI	Universitas Pendidikan Indonesia	Indonesia
3	Learner	ZHANG NINGYU	Mahidol University	China
4	Learner	UCHIDA Keita	Chiba Prefectural Kisarazu High School	Japan
5	Learner	CHIN Waka	Chiba Prefectural Sakura High School	Japan
6	Learner	FURUKAWA Miyu	Hyogo Prefectural Kakogawa Higashi High School	Japan
7	Learner	KOBORI Mei	Chiba University	Japan
8	Learner	SUZUKI Haruta	Chiba University	Japan
9	Learner	NOJIRI Kotaro	Chiba Municipal Chiba High School	Japan

Group R		Name	University / School	Country/ Region
1	Facilitator	Yuhui Liao	Chiba University	China
2	Learner	FARRAH HANIFAH	Bandung Institut of Technology	Indonesia
3	Learner	SUZUKI Yuto	Chiba Prefectural Kisarazu High School	Japan
4	Learner	HIDAKA Runa	Chiba Prefectural Sakura High School	Japan
5	Learner	Ichha Kharel	Shumei Yachiyo High School	Japan
6	Learner	NAGASE Chiaki	Chiba University	Japan
7	Learner	HIRABAYASHI Miyu	Chiba University	Japan

Group S		Name	University / School	Country/ Region
1	Facilitator	IVONNE MILICHRISTI RADJAWANE	Bandung Institute of Technology	Indonesia
2	Learner	NGUYEN BAO TRAN	Vietnam National University	Vietnam
3	Learner	Pluemkamon Thongkham	Chulalongkorn University Demonstration Secondary School	Thailand
4	Learner	OHTAKE Honoka	Chiba Prefectural Sakura High School	Japan
5	Learner	SUZUKI Ayame	Shibaura Institute of Technology Kashiwa High School	Japan
6	Learner	TSUJI Arisa	Chiba Prefectural Funabashi High School	Japan
7	Learner	YAMAZAKI Kyoko	Chiba Municipal Chiba High School	Japan
8	Learner	INOUE Ryoichi	Chiba University	Japan

SDGs Workshop

Room 2207 (Kohei WATANABE, Chiba University)

Group T		Name	University / School	Country/ Region
1	Facilitator	MOHAMMAD ISNAINI SADALI	Universitas Gadjah Mada	Indonesia
2	Learner	GIOVAN CHRISTOFFEL SIHOMBING	University of Indonesia	Indonesia
3	Learner	SUN HUI-YUN	National Taiwan Normal University	Taiwan
4	Learner	ISOGAI Koichi	Chiba Prefectural Kisarazu High School	Japan
5	Learner	KAWASHIMA Gaku	Chiba Municipal Chiba High School	Japan
6	Learner	KATO Hanon	Showa Gakuin Shuei Senior High School	Japan
7	Learner	SOMEYA Yui	Chiba Prefectural Funabashi-higashi High School	Japan
8	Learner	YOKOGAWA Manami	Chiba University	Japan

Group U		Name	University / School	Country/ Region
1	Facilitator	Zai Qurratu' Ainie Zainal Abbidin	Chiba University	Malaysia
2	Learner	SUPITCHAYA PANGBUBPHA	Kasetsart University	Thailand
3	Learner	TAKAGI Sakura	Chiba Prefectural Kisarazu High School	Japan
4	Learner	NAGANO Sae	Chiba Municipal Chiba High School	Japan
5	Learner	YOSHIDA Sachiho	Hyogo Prefectural Kakogawa Higashi High School	Japan
6	Learner	ICHIKAWA Toma	Chiba University	Japan
7	Learner	OGAMI Mizuki	Chiba University	Japan

Group V		Name	University / School	Country/ Region
1	Facilitator	Savira Aristi	Chiba University	Indonesia
2	Advisor	CHAINARONG JARUPONGPUTTANA	Chiang Mai University	Thailand
3	Learner	HEIN THURA AUNG	King Mongkut's University of Technology Thonburi	Myanmar
4	Learner	NISHIJIMA Takumi	Chiba Prefectural Kisarazu High School	Japan
5	Learner	HAYASHI Waka	Chiba Municipal Chiba High School	Japan
6	Learner	TANIGAKI Hayato	Hyogo Prefectural Kakogawa Higashi High School	Japan
7	Learner	KIMURA Hiroto	Chiba Municipal Chiba High School	Japan
8	Learner	KINOSHITA Keito	Chiba University	Japan

Group W		Name	University / School	Country/ Region
1	Facilitator	Punnat Changsalak	Chiba University	Thailand
2	Learner	SHIVDUTT KUSHWAHA	Mahidol University	India
3	Learner	ISOBE Shiori	Chiba Prefectural Kisarazu High School	Japan
4	Learner	KADOWAKI Ayui	Chiba Municipal Chiba High School	Japan
5	Learner	KUTSUMIZU Rion	Shibuya Kyoiku Gakuen Makuhari Junior and Senior High School	Japan
6	Learner	MATSUDA Sho	Chiba University	Japan
7	Learner	MIKAMI Maki	Chiba University	Japan

Group X		Name	University / School	Country/ Region
1	Facilitator	VU CAM TU	Vietnam National University	Vietnam
2	Advisor	WANDEE KASEMSUKPIPAT	Kasetsart University	Thailand
3	Learner	INNEZAHRA AURELLIA TITANI	University of Indonesia	Indonesia
4	Learner	TATSUKO Mei	Chiba Keiai Senior High School	Japan
5	Learner	HANEISHI Reo	Chiba Municipal Chiba High School	Japan
6	Learner	YAMAMOTO Yuina	Hyogo Prefectural Kakogawa Higashi High School	Japan
7	Learner	MIYAJIMA Takeru	Chiba Municipal Chiba High School	Japan
8	Learner	IZUNOME Chihiro	Chiba University	Japan

SDGs Workshop

Room 2207 (Kohei WATANABE, Chiba University)

Group Y		Name	University / School	Country/ Region
1	Facilitator	ARISARA LEKSANSERN	Mahidol University	Thailand
2	Facilitator	POSCHANAN NIRAMITCHAINONT	Mahidol University	Thailand
3	Learner	NI MADE SOMAWATI	Udayana University	Indonesia
4	Learner	YOSHIDA Sakura	Chiba Keiai Senior High School	Japan
5	Learner	ARAI Ririka	Chiba Municipal Chiba High School	Japan
6	Learner	TOMITA Ayane	Hyogo Prefectural Kakogawa Higashi High School	Japan
7	Learner	FUJII Kanade	Chiba University	Japan
8	Learner	KIMURA Shuhei	Chiba University	Japan

Group Z		Name	University / School	Country/ Region
1	Facilitator	KUO JUNG-JUNG	National Taiwan Normal University	Taiwan
2	Learner	SATRIO BUDIMAN	Gadjah Mada University	Indonesia
3	Learner	Prin Anantawong	Chulalongkorn University Demonstration Secondary School	Thailand
4	Learner	KOJIMA Yuishi	Hyogo Prefectural Kakogawa Higashi High School	Japan
5	Learner	SAGIUCHI Mei	Shibuya Kyoiku Gakuen Makuhari Junior and Senior High School	Japan
6	Learner	KOZU Fumino	Sacred Heart School in Tokyo	Japan
7	Learner	ITO Tatsuki	Chiba University	Japan

Group AA		Name	University / School	Country/ Region
1	Facilitator	Margaret Bro	Chiba University	Papua New Guinea
2	Advisor	YUSLI WARDIATNO	Bogor Agricultural University	Indonesia
3	Learner	BOO ZI YEN	National Taiwan Normal University	Malaysia
4	Learner	KANEMATSU Shoko	Chiba Keiai Senior High School	Japan
5	Learner	NAGASHIMA Mayuko	Chiba Municipal Chiba High School	Japan
6	Learner	SAWADA Taiki	Hyogo Prefectural Kakogawa Higashi High School	Japan
7	Learner	MIYAO Nanoka	Chiba University	Japan
8	Learner	NUMABE Kanta	Chiba University	Japan

Group AB		Name	University / School	Country/ Region
1	Facilitator	ROLANDO V. OBIEDO	University of San Carlos	Philippines
2	Learner	KEVIN AULIA ARYASENA	Bandung Insititute of Technology	Indonesia
3	Learner	Theerapat Permpolchokkna	Chulalongkorn University Demonstration Secondary School	Thailand
4	Learner	MANABE Eitaro	Hyogo Prefectural Kakogawa Higashi High School	Japan
5	Learner	MATOBA Ema	Shibaura Institute of Technology Kashiwa High School	Japan
6	Learner	JOZUKA Sakura	Chiba Prefectural Funabashi-higashi High School	Japan
7	Learner	IGETA NAU	Chiba University	Japan
8	Learner	KAWAMURA Kanaha	Chiba University	Japan

Poster

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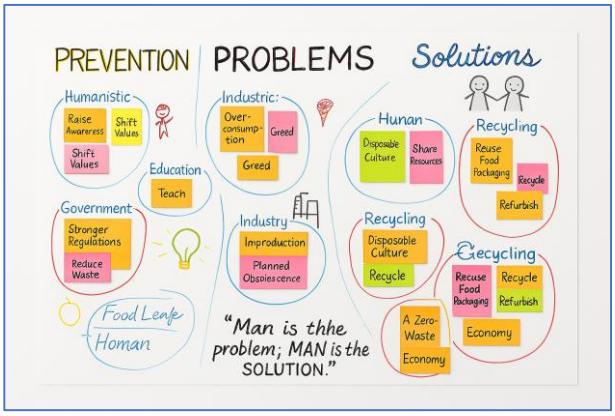
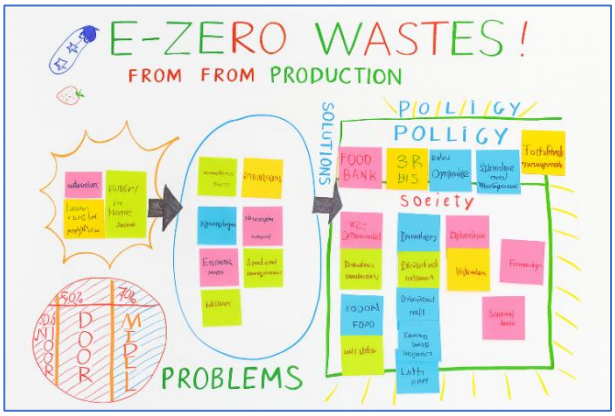
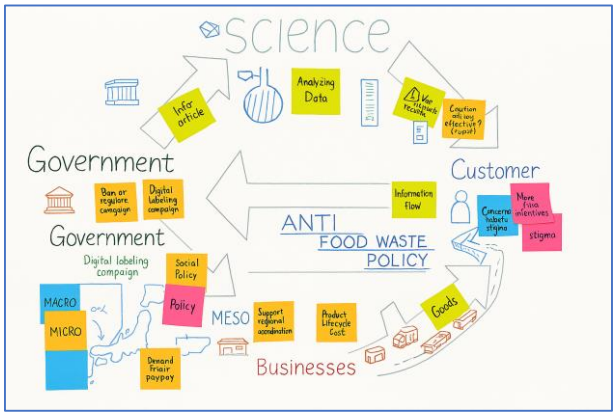
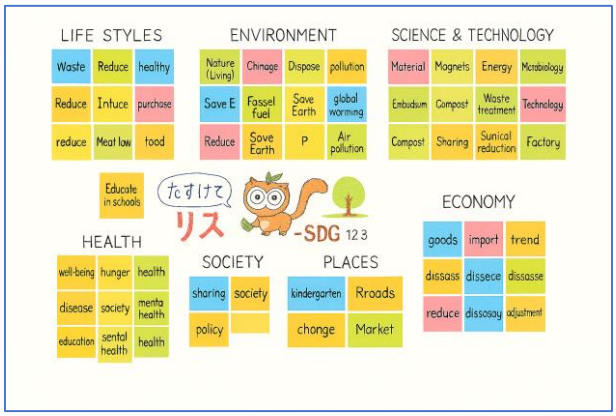
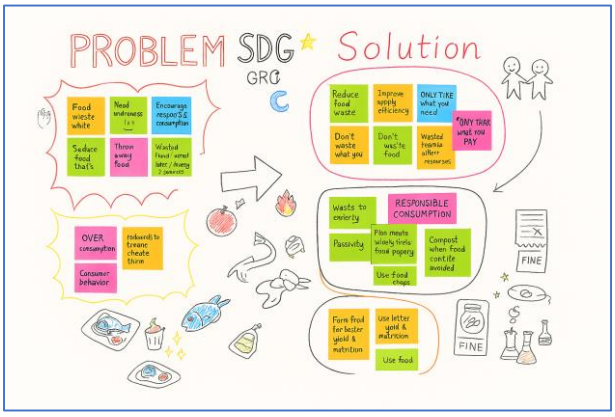


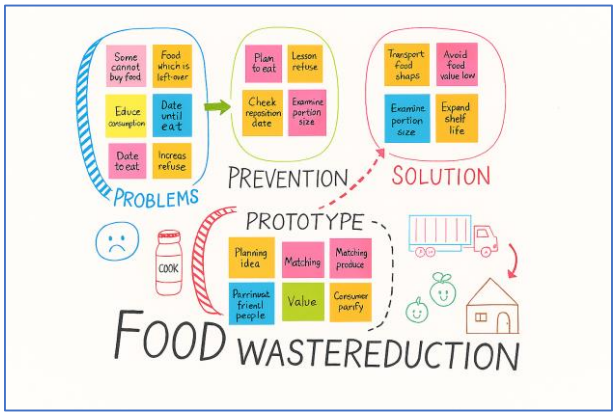




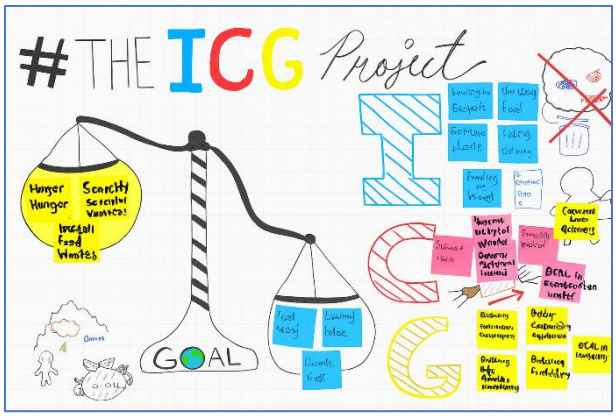

No Food Waste
Save The World
Tomorrows dinner
50% OFF
Smile
GROUP
JELLY
KAZUI
TATSUKI
SHINZU
IKOMA
FOOD WASTE PROBLEMS

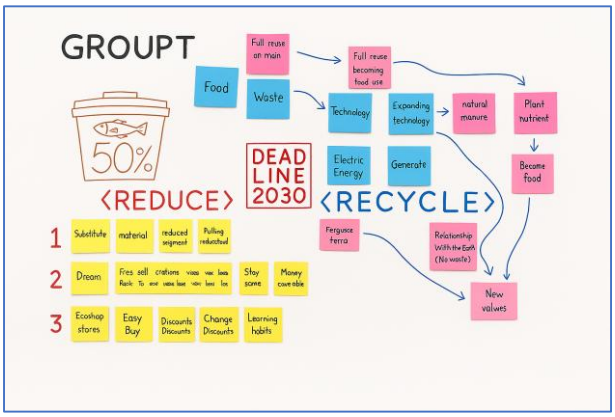

LIFE STYLES
ENVIRONMENT
SCIENCE & TECHNOLOGY
HEALTH
SOCIETY
PLACES
ECONOMY
たすけて
リス
SDG 12 3

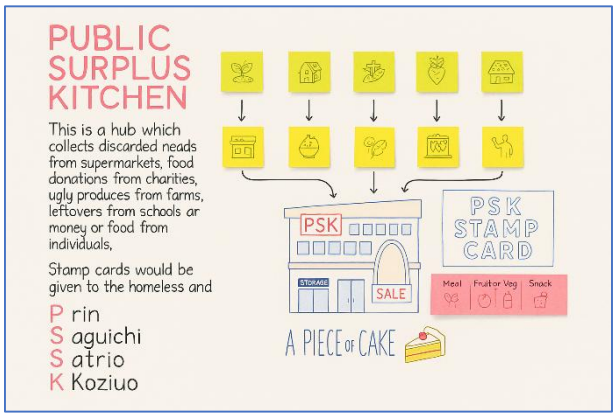

PROBLEM
SDG
GRO
Solution
RESPONSIBLE CONSUMPTION
FINE

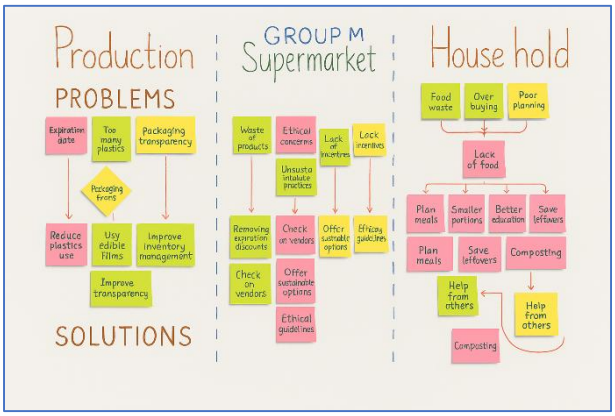

PROBLEMS
PREVENTION
SOLUTION
PROTOTYPE
FOOD WASTEREDUCTION

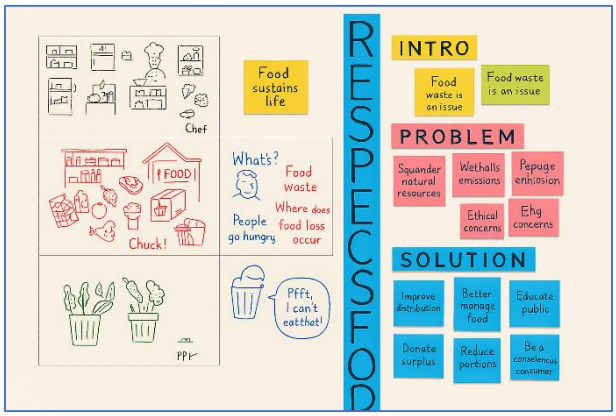

G.X SDGs 12-3
1. Problems Production
Seller
User/Consumer
Solution
Lows
Effects
FACTORY
SURVEY
Smelly
Land fill
SDGs 12-3

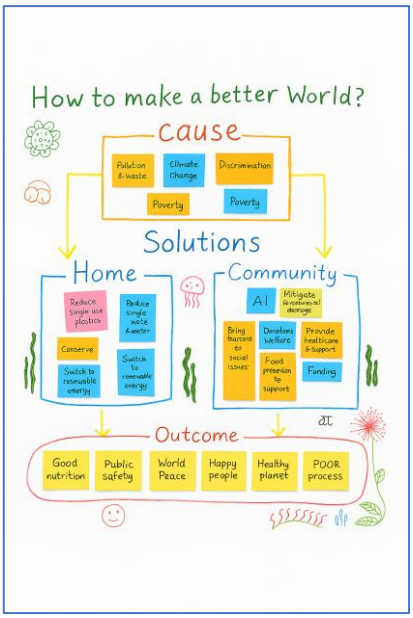

#THE ICG Project
Hunger
Scarcity
GOAL


GROUP T
Food
Waste
50%
DEAD LINE 2030
〈REDUCE〉
〈RECYCLE〉
Technology
Expanding technology
natural manure
Plant nutrient
Become food
Electric Energy
Generate
New values


PUBLIC SURPLUS KITCHEN
This is a hub which collects discarded neads from supermarkets, food donations from charities, ugly produces from farms, leftovers from schools ar money or food from individuals,
Stamp cards would be given to the homeless and
P rin
S aguichi
S atrio
K Koziuo
PSK
STORAGE
SALE
PSK STAMP CARD
A PIECE OF CAKE


Production
PROBLEMS
Expiration date
Too many plastics
Packaging transparency
Packaging Items
Reduce plastics use
Use edible films
Improve inventory management
Improve transparency
SOLUTIONS
GROUP M
Supermarket
Waste of products
Ethical concerns
Lack of incentives
Lack incentives
Unsuste intainable practices
Removing expiration discounts
Check on vendors
Offer sustainable options
Efficacy guidelines
Check on vendors
Offer sustainable options
Ethical guidelines
House hold
Food waste
Over buying
Poor planning
Lack of food
Plan meals
Smaller portions
Better education
Save leftovers
Plan meals
Save leftovers
Composting
Help from others
Help from others
Composting

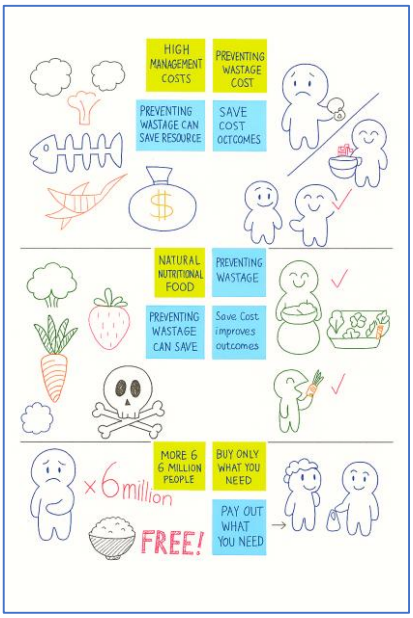

Food sustains life
Chef
FOOD!
Chuck!
What's?
Food waste
Where does food loss occur
People go hungry
Pfft, I can't eatthat!
RESPECSFOD
INTRO
Food waste is an issue
Food waste is an issue
PROBLEM
Squander natural resources
Wethalls emissions
Pepuge enfiosion
Ethical concerns
Ehg concerns
SOLUTION
Improve distribution
Better manage food
Educate public
Donate surplus
Reduce portions
Be a conselencus consumer


How to make a better World?
cause
Pollution & waste
Climate Change
Discrimination
Poverty
Poverty
Solutions
Home
Reduce single use plastics
Reduce single waste & water
Conserve
Switch to renewable energy
Community
AI
Mitigate environmental damages
Donations welfare
Provide healthcare support
Bring awareness to social issues
Food provision to support
Funding
Outcome
Good nutrition
Public safety
World Peace
Happy people
Healthy planet
POOR process


S team
Production of Food
organizer
JJ
Info
Ino
HOUSEHOLDS
SUPERMARKET
On left-overs, festivals, events = too much pool production
Don't Produce Products Don't Food
Buy too much can't eat all
Don't waste food
→ Keep in refrigerator
balance consumption & production (supply & demand)
@enough portion
cook too much
food waste
Surplus
Economy
reduce
Organize leftovers
food waste
Don't waste Food
Future option
solutions!
-composE
-App
Home
App
Cannot Save

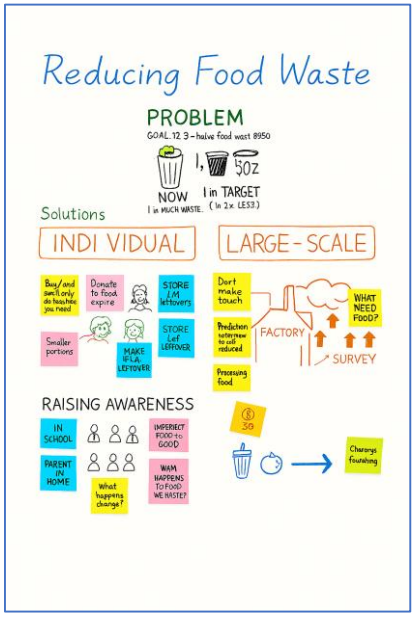

2026 Reduce Food waste
Change
Food waste
Buy too much
Production issue
Consumer issue
Spoilt
food loving times
@enough p
€ fees
Cook too much
Solution
Bio-waste handling
Storted remaining food
Storing remaining food (next)
Check!!!
← Before you go shopping!
Smart buying
Final Goal
Minimum Food waste around / us!

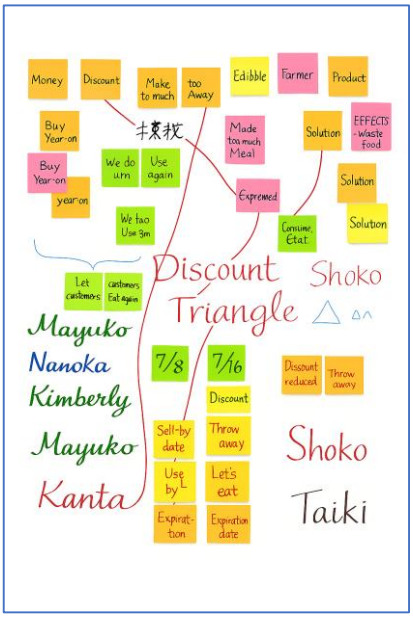

GROUP Y
Food wasted
CAUSE
Distribution
damaged
transport
waste afterage
turd much
worse
preparaged
House Holds
expired
Food loving tuses
time
Truch
Production
overpuic
Food
Excess
cook use
too-short harvess
solution
Program's
compost
food bank
food buing
food banking
educate awarenes
Earth


HIGH MANAGEMENT COSTS
PREVENTING WASTAGE COST
PREVENTING WASTAGE CAN SAVE RESOURCE
SAVE COST OUTCOMES
NATURAL NUTRITIONAL FOOD
PREVENTING WASTAGE
PREVENTING WASTAGE CAN SAVE
Save Cost improves outcomes
MORE 6 6 MILLION PEOPLE
BUY ONLY WHAT YOU NEED
PAY OUT WHAT YOU NEED
×6million
FREE!


Experation Dote
Soit sellor
Label products
Encourage reopenents consumption
Educe consumption
Throw away food
Wasted foods baits
Leftover, Waste
Food trade
Reuse
Review shaps
Eat leftovers
Observe food habits
Wasted food
Calculate properly
Food Production
Food
Passive
Proper amount
COOK
Limited Package goods
Avoid food
block buying
Avoid block
Consumer parity
-o BUYers
Limited Package goods
Avoid novelty
Consumer parity
Avoid to nuch
Consumer parity
Mottainai
Use
Use all part of
Use
Be creative
Value
Consumer parity
discount
Buy expory entege
+20%
20%


THE PERFECT PLAN FOR TARGET SDGS12.3
BEFORE THROWING AWAY PRODUCE
IF THERE ARE WASTE
PREVENTION
Sell at reduced price
Donate to food kitchen
Transport FOOD shops
Send onet cheape
THROWING Food snaps
Animal food fertilizers
Examine portion size
No CO_2
TRANSPORTATION
Restaurant
store
market
sales
house
household
DISPOSAL
Harvest energy
Clean energy
home


Reducing Food Waste
PROBLEM
GOAL 12.3 – halve food wast 8950
1,350z
NOW
1 in MUCH WASTE
1 in TARGET
(is 2x LESS)
Solutions
INDI VIDUAL
LARGE-SCALE
Buy/and smell only do heashes you need
Donate to food expire
STORE I/M leftovers
STORE let LEFTOVER
Smaller portions
MAKE IFLA LEFTOVER
Don't make touch
Predichon tatterhew to sell reduced
Processing food
FACTORY
WHAT NEED FOOD?
SURVEY
RAISING AWARENESS
IN SCHOOL
IMPERFECT FOOD is GOOD
PARENT IN HOME
WHAM HAPPENS TO FOND WE WASTE?
What happens change?
30
Changes Finishing


Money
Discount
Make too much
too Away
Edible
Farmer
Product
Buy Year-on
Made too much Meal
Solution
EFFECTS -waste food
Buy Year-on
year-on
We do um
Use again
Expressed
Solution
We too Use 3m
Consume Etat
Solution
Let customers
customers Eat Again
Discount Triangle
Shoko
Mayuko
Nanoka
Kimberly
Mayuko
Kanta
7/8
7/16
Dissount reduced
Throw away
Discount
Self-by date
Throw away
Use by
Let's eat
Shoko
Taiki
Expirat-tion
Expiration date


Ways to reducing food loss
Before
Preparing
After
Other
FINISH UR FOOD
ZERO FOOD WASTE
Leftovers
A take out box
Summary
WE NEED TO CHANGE OUR MINDSET
TAKE YOUR FIRST STEP

Name & Room List

■ASEAN Faculty Members

Name	University	Research Session		Workshop	
ARISARA LEKSANSERN	Mahidol University	Chairperson	2208	2207-Y	Facilitator
CHAINARONG JARUPONGPUTTANA	Chiang Mai University	Panelist	2109	2207-V	Adviser
CHATREE FAIKHAMTA	Kasetsart University	Chairperson	2203	2111-A	Facilitator
CHRISTINE LOURRINE S. TABLATIN	Pangasinan State University	Panelist	2112	2111-D	Facilitator
DODI SUDIANA	Universitas Indonesia	Chairperson	2112	2111-E	Facilitator
FATMASARI SIREGAR	IPB University	Panelist	2111	2208-N	Facilitator
IVONNE MILICHRISTI RADJAWANE	Bandung Institute of Technology	Chairperson	2109	2208-S	Facilitator
KUO JUNG-JUNG	National Taiwan Normal University	Panelist	2205	2207-Z	Facilitator
MOHAMMAD ISNAINI SADALI	Universitas Gadjah Mada	Panelist	2111	2207-T	Facilitator
NUR SULIANTI SUCI PERTIWI	IPB University	Panelist	2208	2208-P	Facilitator
PANCHIT LONGPRADIT	Mahidol University	Panelist	2205		
PAYU KLEEBBUA	Mahidol University	Panelist	2204	2111-I	Adviser
POSCHANAN NIRAMITCHAINONT	Mahidol University	Chairperson	2208	2207-Y	Facilitator
PUTU AYU ASTY SENJA PRATIWI	Udayana University	Chairperson	2205	2111-F	Facilitator
ROLANDO V. OBIEDO	University of San Carlos	Chairperson	2111	2207-AB	Facilitator
SOVARITTHON CHANSAENGSEE	Mahidol University	Chairperson	2207	2111-H	Facilitator
SUJIRA MUKDA	Mahidol University	Chairperson	2202	2111-H	Facilitator
SURAPONG RATTANAKUL	King Mongkut's University of Technology Thonburi	Chairperson	2108	2111-B	Facilitator
SUTHIPORN SAJJAPANROJ	Mahidol University	Chairperson	2202	2111-E	Adviser
TAGALOG, RITA MAY PATIÑO	University of San Carlos	Panelist	2208	2208-Q	Facilitator
THITI YANPRECHASET	Slipakorn University	Chairperson	2201	2111-C	Facilitator
TOCH PHEAKDEY	Royal University of Phnom Penh	Panelist	2203	2208-O	Facilitator
VU CAM TU	Vietnam National University	Panelist	2202	2207-X	Facilitator
WANDEE KASEMSUKPIPAT	Kasetsart University	Panelist	2201	2207-X	Adviser
WITCHAYADA NAWANIDBUMRUNG	Chulalongkorn University	Panelist	2207	2111-F	Adviser
YAYA SUKJAYA KUSUMAH	Universitas Pendidikan Indonesia	Panelist	2108	2208-L	Facilitator
YUSLI WARDIATNO	Bogor Agricultural University	Chairperson	2204	2207-AA	Adviser
ZHANG JIAN YUN-YI	National Taiwan Normal University	Panelist	2109	2111-C	Adviser

■ASEAN Students

Name	University	Research Session		Workshop	
APRILIA SARAH KRISTINA	University of Indonesia	2204	Presenter	2208-K	Learner
ARIERTA PUJITRESNANI	University of Indonesia	2202	Presenter	2111-A	Learner
BANIQUED MALILLIN RODOLFO JR.	Pangasinan State University	2202	Presenter	2111-F	Learner
BOO ZI YEN	National Taiwan Normal University	2112	Presenter	2207-AA	Learner
CHU RONGJUN	Mahidol University	2208	Presenter	2111-D	Learner
CHUNG PEI-YU	National Taiwan Normal University	2109	Presenter	2208-K	Learner
DARA NUR SABRINA	IPB University	2112	Presenter	2111-G	Learner
FANISA DWI AULIA MILANI	Udayana University	2207	Presenter	2111-D	Learner
FARRAH HANIFAH	Bandung Institut of Technology	2205	Presenter	2208-R	Learner
FIRDHA CHAYLIA AYU RACHMANDIKA	IPB University	2204	Presenter	2111-H	Learner
GHINA NUR ROHMAH	Universitas Pendidikan Indonesia	2109	Presenter	2111-I	Learner
GIOVAN CHRISTOFFEL SIHOMBING	University of Indonesia	2112	Presenter	2207-T	Learner
GONG PING	Mahidol University	2111	Presenter	2208-O	Learner
GUISANDO LUCKY FAITH BALAME	University of San Carlos	2201	Presenter	2111-E	Learner
HEIN THURA AUNG	King Mongkut's University of Technology Thonburi	2108	Presenter	2207-V	Learner
INNEZAHRA AURELLIA TITANI	University of Indonesia	2203	Presenter	2207-X	Learner
KEVIN AULIA ARYASENA	Bandung Insititute of Technology	2205	Presenter	2207-AB	Learner
LAPAT TILOKRUANGCHAI	Chulalongkorn University	2204	Presenter	2208-M	Learner
NGUYEN BAO TRAN	Vietnam National University	2201	Presenter	2208-S	Learner
NI MADE SOMAWATI	Udayana University	2208	Presenter	2207-Y	Learner
PHAM THI MY DUYEN	Vietnam National University of Education	2205	Presenter	2208-P	Learner
PHUREE THONGPAITOON	Chulalongkorn University	2207	Presenter	2208-L	Learner
RAIHAN EKO SUGIYANTO	Bandung Institute of Technology	2108	Presenter	2111-B	Learner
RINASARI WIJAYANTI	Universitas Gadjah Mada	2111	Presenter	2208-O	Learner
RISKA ANDRIANI	Bandung Institute of Technology	2207	Presenter	2111-C	Learner
SATRIO BUDIMAN	Gadjah Mada University	2111	Presenter	2207-Z	Learner
SHIVDUTT KUSHWAHA	Mahidol University	2202	Presenter	2207-W	Learner
SUN HUI-YUN	National Taiwan Normal University	2108	Presenter	2207-T	Learner
SUPITCHAYA PANGBUBPHA	Kasetsart University	2109	Presenter	2207-U	Learner
TOLETE JOROME CASTUERA	University of San Carlos	2208	Presenter	2111-A	Learner
TRAN THU PHUONG	Vietnam National University of Education	2205	Presenter	2208-N	Learner
VIA AINI	Universitas Pendidikan Indonesia	2203	Presenter	2208-Q	Learner
WILLIZA MAÑA CORDOVA	University of San Carlos	2111	Presenter	2111-J	Learner
XIONG YIQI	Mahidol University	2203	Presenter	2111-G	Learner
ZHANG NINGYU	Mahidol University	2201	Presenter	2208-Q	Learner

■ASCENT-6E Students

Name	University/School	Research Session		Workshop	
ISHII Leon	Chiba Prefectural Chosei High School	2201	Presenter	2111-E	Learner
KATO Hanon	Showa Gakuin Shuei Senior High School	2204	Presenter	2207-T	Learner
KIMURA Hiroto	Chiba Municipal Chiba High School	2203	Presenter	2207-V	Learner
KOZU Fumino	Sacred Heart School in Tokyo	-	Audience	2207-Z	Learner
MATOBA Ema	Shibaura Institute of Technology Kashiwa High School	-	Audience	2207-AB	Learner
NAKAJIMA Yuto	Chiba Municipal Inage High School	2111	Presenter	-	-
NARAHASHI Atsuki	Yokohama Soei Senior High School	-	Audience	2111-F	Learner
SHIMA Botan	Seijo Gakuen Senior High School	2201	Presenter	2111-I	Learner
SUZUKI Yuri	Ibaraki Prefectural Koga Secondary School	2205	Presenter	-	-
TAKAOKA Ryosei	Chiba Municipal Inage International Secondary School	-	Audience	2111-B	Learner
TAKASUGI Kanna	Chiba Meitoku High School	2203	Presenter	-	-
UMEDA Miwako	Jumonji Junior High School	-	Audience	-	-

■High School Students

Name	University/School	Research Session		Workshop	
AIBARA Miho	Chiba Municipal Chiba High School	2111	Presenter	2111-E	Learner
ARAI Ririka	Chiba Municipal Chiba High School	2202	Presenter	2207-Y	Learner
Ariya Thammakunma	Chulalongkorn University Demonstration Secondary School	2108	Presenter	-	-
BEPPU Chihiro	Shibaura Institute of Technology Kashiwa High School	2207	Presenter	-	-
CHIN Waka	Chiba Prefectural Sakura High School	2207	Presenter	2208-Q	Learner
DAIGO Naoya	Chiba Prefectural Funabashi High School	2204	Presenter	-	-
Dharmatouch Pourpongpun	Chulalongkorn University Demonstration Secondary School	2112	Presenter	2111-J	Learner
EBATO Rio	Chiba Prefectural Sakura High School	2204	Presenter	2208-M	Learner
FUJITA Tomohiro	Chiba Municipal Chiba High School	2111	Presenter	2111-F	Learner
FURUKAWA Miyu	Hyogo Prefectural Kakogawa Higashi High School	2202	Presenter	2208-Q	Learner
HAKAMATA Sawako	Chiba Prefectural Sakura High School	2204	Presenter	2208-N	Learner
HAMADA Morihiro	Chiba Municipal Chiba High School	2109	Presenter	2111-A	Learner
HANEISHI Reo	Chiba Municipal Chiba High School	2202	Presenter	2207-X	Learner
HATAKEYAMA Kosuke	Chiba Prefectural Sakura High School	2204	Presenter	2208-P	Learner
HATANAKA Yuri	Chiba Municipal Chiba High School	2109	Presenter	2111-B	Learner
HATORI Mayu	Chiba Prefectural Kisarazu High School	2203	Presenter	2111-H	Learner
HAYASHI Waka	Chiba Municipal Chiba High School	2108	Presenter	2207-V	Learner
HIDAKA Runa	Chiba Prefectural Sakura High School	2207	Presenter	2208-R	Learner
HIRAGA Yuna	Chiba Prefectural Chiba Higashi High School	2109	Presenter	2111-D	Learner
HIRANO Yuika	Chiba Prefectural Kogane High School	2208	Presenter	-	-
HOSOGAI Yuri	Chiba Prefectural Sakura High School	2208	Presenter	2208-K	Learner
Ichha Kharel	Shumei Yachiyo High School	2207	Presenter	2208-R	Learner
ISHIMORI Haruto	Chiba Prefectural Kisarazu High School	2201	Presenter	2208-P	Learner
ISHIZAKI Yuka	Chiba Keiai Senior High School	-	-	2111-A	Learner
ISOBE Shiori	Chiba Prefectural Kisarazu High School	2201	Presenter	2207-W	Learner
ISOGAI Koichi	Chiba Prefectural Kisarazu High School	2201	Presenter	2207-T	Learner
ITO Yuki	Chiba Keiai Senior High School	-	-	2111-F	Learner
JOZUKA Sakura	Chiba Prefectural Funabashi-higashi High School	2109	Presenter	2207-AB	Learner
KADOWAKI Ayui	Chiba Municipal Chiba High School	2108	Presenter	2207-W	Learner
KAMIO Kazusa	Chiba Prefectural Kisarazu High School	2203	Presenter	2111-C	Learner
KAMIOKA Manami	Chiba Prefectural Kisarazu High School	2203	Presenter	2111-I	Learner
KANEMATSU Shoko	Chiba Keiai Senior High School	2204	Presenter	2207-AA	Learner
KASAI Yuuhi	Chiba Prefectural Kisarazu High School	2203	Presenter	2208-L	Learner
KASE Yuya	Chiba Prefectural Funabashi High School	-	-	2111-J	Learner
KAWASHIMA Gaku	Chiba Municipal Chiba High School	2108	Presenter	2207-T	Learner
KOJIMA Yuishi	Hyogo Prefectural Kakogawa Higashi High School	2205	Presenter	2207-Z	Learner
KUNIYASU Ema	Chiba Municipal Chiba High School	2201	Presenter	2111-I	Learner
KUTSUMIZU Rion	Shibuya Kyoiku Gakuen Makuhari Junior and Senior High School	2208	Presenter	2207-W	Learner
MANABE Eitaro	Hyogo Prefectural Kakogawa Higashi High School	2205	Presenter	2207-AB	Learner
MASUDA Chiho	Chiba Prefectural Funabashi High School	2111	Presenter	2111-G	Learner
MIYAJIMA Takeru	Chiba Municipal Chiba High School	2112	Presenter	2207-X	Learner
MIYAO Yuuri	Tokyo Metropolitan High School of Science and Technology	2112	Presenter	2111-G	Learner
MURAKOSHI Kaho	Chiba Prefectural Kisarazu High School	2203	Presenter	2208-M	Learner
NAGANO Sae	Chiba Municipal Chiba High School	2112	Presenter	2207-U	Learner
NAGASHIMA Mayuko	Chiba Municipal Chiba High School	2202	Presenter	2207-AA	Learner
Natnisha Leelahavanichkul	Chulalongkorn University Demonstration Secondary School	2111	Presenter	2208-N	Learner
NISHIHATA Misato	Ichihara Chuo High School	2205	Presenter	2111-A	Learner

■High School Students

Name	University/School	Research Session		Workshop	
NISHIJIMA Takumi	Chiba Prefectural Kisarazu High School	2201	Presenter	2207-V	Learner
NISHIYAMA Rimpei	Chiba Keiai Senior High School	-	-	2111-E	Learner
NOJIRI Kotaro	Chiba Municipal Chiba High School	2203	Presenter	2208-Q	Learner
OHHORI Momoa	Chiba Municipal Chiba High School	2109	Presenter	2111-C	Learner
OHTAKE Honoka	Chiba Prefectural Sakura High School	2207	Presenter	2208-S	Learner
OKAMOTO Rika	Chiba Prefectural Kisarazu High School	2203	Presenter	2208-K	Learner
OKUMURA Momoko	Chiba Prefectural Chosei High School	2203	Presenter	-	-
ONO Misaki	Chiba Prefectural Sakura High School	2208	Presenter	2208-L	Learner
OTSUKA Rin	Chiba Prefectural Chosei High School	2108	Presenter	2111-J	Learner
Perera Kavidhi	Shumei Yachiyo High School	2207	Presenter	2208-P	Learner
Phoomjai Thienthammajak	Chulalongkorn University Demonstration Secondary School	2108	Presenter	-	-
Pluemkamon Thongkham	Chulalongkorn University Demonstration Secondary School	2203	Presenter	2208-S	Learner
Prin Anantawong	Chulalongkorn University Demonstration Secondary School	2112	Presenter	2207-Z	Learner
Ronnapat Srivoravilai	Chulalongkorn University Demonstration Secondary School	2108	Presenter	-	-
SAGIUCHI Mei	Shibuya Kyoiku Gakuen Makuhari Junior and Senior High School	2208	Presenter	2207-Z	Learner
SATO Nozomi	Chiba Prefectural Chiba Higashi High School	2109	Presenter	2111-B	Learner
SAWADA Taiki	Hyogo Prefectural Kakogawa Higashi High School	2205	Presenter	2207-AA	Learner
SHIBAO Kazuki	Chiba Prefectural Kisarazu High School	2201	Presenter	2208-O	Learner
SHIBATA Hiroto	Chiba Prefectural Makuhari Sogo High School	2109	Presenter	2111-H	Learner
SHINOTSUKA Eita	Chiba Keiai Senior High School	-	-	2111-B	Learner
SHIRAI Natsuki	Chiba Prefectural Funabashi High School	-	-	2208-O	Learner
SOMEYA Yui	Chiba Prefectural Funabashi-higashi High School	2109	Presenter	2207-T	Learner
SUGAWARA Karen	Chiba Prefectural Funabashi High School	2202	Presenter	2111-C	Learner
SUGISHITA Satsuki	Chiba Prefectural Sakura High School	2109	Presenter	-	-
SUZUKI Ayame	Shibaura Institute of Technology Kashiwa High School	2207	Presenter	2208-S	Learner
SUZUKI Mihiro	Chiba Prefectural Kogane High School	2205	Presenter	-	-
SUZUKI Yuto	Chiba Prefectural Kisarazu High School	2201	Presenter	2208-R	Learner
TACHIBANA Chiune	Chiba Municipal Chiba High School	2201	Presenter	2208-L	Learner
TAKAGI Sakura	Chiba Prefectural Kisarazu High School	2201	Presenter	2207-U	Learner
TAKAMI Yui	Chiba Keiai Senior High School	-	-	2111-D	Learner
TAKAZAWA Mari	Chiba Prefectural Kisarazu High School	2203	Presenter	2111-F	Learner
TANAKA Iroha	Chiba Prefectural Sakura High School	2204	Presenter	2208-O	Learner
TANIGAKI Hayato	Hyogo Prefectural Kakogawa Higashi High School	2205	Presenter	2207-V	Learner
TANIGUCHI Rina	Chiba Prefectural Kogane High School	2205	Presenter	-	-
TATSUKO Mei	Chiba Keiai Senior High School	2207	Presenter	2207-X	Learner
Theerapat Permpolchokkna	Chulalongkorn University Demonstration Secondary School	2203	Presenter	2207-AB	Learner
TOMITA Ayane	Hyogo Prefectural Kakogawa Higashi High School	2202	Presenter	2207-Y	Learner
TSUBOUCHI Amane	Chiba Municipal Chiba High School	2111	Presenter	-	-
TSUJI Arisa	Chiba Prefectural Funabashi High School	2204	Presenter	2208-S	Learner
UCHIDA Keita	Chiba Prefectural Kisarazu High School	2201	Presenter	2208-Q	Learner
UEHARA Natsuki	Chiba Prefectural Kogane High School	2208	Presenter	-	-
WAKUNO Uta	Tokyo Metropolitan High School of Science and Technology	2112	Presenter	2111-I	Learner
WATANABE Yumina	Chiba Prefectural Kisarazu High School	2203	Presenter	2111-E	Learner
YAMADA Soei	Chiba Keiai Senior High School	-	-	2111-C	Learner
YAMAMOTO Yuina	Hyogo Prefectural Kakogawa Higashi High School	2202	Presenter	2207-X	Learner
YAMASHITA Ryoya	Hyogo Prefectural Kakogawa Higashi High School	2202	Presenter	2208-K	Learner
YAMAUCHI Mayuko	Shibaura Institute of Technology Kashiwa High School	2204	Presenter	2208-M	Learner
YAMAZAKI Kyoko	Chiba Municipal Chiba High School	2201	Presenter	2208-S	Learner
YAMAZAKI Mao	Shibaura Institute of Technology Kashiwa High School	2205	Presenter	2208-N	Learner
YAMAZAKI Taro	Chiba Prefectural Chiba Higashi High School	2109	Presenter	2111-G	Learner
YANO Momoka	Chiba Prefectural Sakura High School	2109	Presenter	-	-
YODA Mana	Chiba Prefectural Chosei High School	2203	Presenter	-	-
YOKOYAMA Yuma	Hyogo Prefectural Kakogawa Higashi High School	2205	Presenter	2208-M	Learner
YOSHIDA Sachiho	Hyogo Prefectural Kakogawa Higashi High School	2202	Presenter	2207-U	Learner
YOSHIDA Sakura	Chiba Keiai Senior High School	2207	Presenter	2207-Y	Learner

■TWINCLE Students

Name	University	Research Session		Workshop	
FUJII Kanade	Chiba University	2201	Timekeeper	2207-Y	Learner
HASEGAWA Ayane	Chiba University	2203	Timekeeper	2111-H	Learner
HIRABAYASHI Miyu	Chiba University	2201	Audience	2208-R	Learner
HOSONO Atsushi	Chiba University	2108	Audience	2111-F	Learner
ICHIKAWA Toma	Chiba University	2109	PC Assistant	2207-U	Learner
IGETA NAU	Chiba University	2202	PC Assistant	2207-AB	Learner
INOUE Ryoichi	Chiba University	2112	Timekeeper	2208-S	Learner
ITO Tatsuki	Chiba University	2109	Audience	2207-Z	Learner
IZUNOME Chihiro	Chiba University	2204	Timekeeper	2207-X	Learner
KASAHARA Hina	Chiba University	2112	Audience	2111-I	Learner
KATO Hiroto	Chiba University	2111	Audience	2208-M	Learner
KAWAMURA Kanaka	Chiba University	2202	Audience	2207-AB	Learner
KIMURA Shuhei	Chiba University	2207	Timekeeper	2207-Y	Learner
KINOSHITA Keito	Chiba University	2208	Audience	2207-V	Learner
KITANO Natsuki	Chiba University	2108	Timekeeper	2111-D	Learner
KOBORI Mei	Chiba University	2205	Audience	2208-Q	Learner
KOMURO Haruna	Chiba University	2111	Timekeeper	2111-J	Learner
MATSUDA Sho	Chiba University	2108	PC Assistant	2207-W	Learner
MIKAMI Maki	Chiba University	2112	PC Assistant	2207-W	Learner
MIYAO Nanoka	Chiba University	2201	Audience	2207-AA	Learner
NAKAMURA Toranosuke	Chiba University	2203	Audience	2208-K	Learner
NARUSE Hina	Chiba University	2111	Audience	2111-H	Learner
NOGAWA Mariko	Chiba University	2204	PC Assistant	2111-A	Learner
NUMABE Kanta	Chiba University	2203	Audience	2207-AA	Learner
OGAMI Mizuki	Chiba University	2202	Timekeeper	2207-U	Learner
OKADA Itsuki	Chiba University	2205	Audience	2208-N	Learner
OKUBO Shota	Chiba University	2207	Audience	2111-D	Learner
SAGARA Misaki	Chiba University	2204	Audience	2208-L	Learner
SASAKI So	Chiba University	2205	Timekeeper	2111-B	Learner
SHOJI Yuya	Chiba University	2201	PC Assistant	2111-E	Learner
SONODA Kaori	Chiba University	2112	Audience	2208-O	Learner
SUGIYAMA Sakura	Chiba University	2208	Timekeeper	2111-C	Learner
SUZUKI Haruta	Chiba University	2208	PC Assistant	2208-Q	Learner
TACHIBANA Hinata	Chiba University	2208	Audience	2208-P	Learner
TAKAHASHI Hiyori	Chiba University	2109	Timekeeper	2208-N	Learner
TOYAMA Anju	Chiba University	2207	PC Assistant	2111-G	Learner
WATANABE Sawa	Chiba University	2207	Audience	2111-J	Learner
YAGI Takuo	Chiba University	2203	PC Assistant	2208-L	Learner
YAKUSHIJI Shunya	Chiba University	2111	PC Assistant	2111-A	Learner
YAMADA Ayu	Chiba University	2202	Audience	2208-K	Learner
YAMAZAKI Sakura	Chiba University	2204	Audience	2208-P	Learner
YOKOGAWA Manami	Chiba University	2205	PC Assistant	2207-T	Learner

■Chiba University (Presenter)

Name	University	Research Session		Workshop	
NAGASE Chiaki	Chiba University, Faculty of Education	2208	Presenter	2208-R	Learner
TSUCHIYA Ayako	United Graduate School of Child Development, Osaka University, Kanazawa University, Hamamatsu University School of Medicine, Chiba University and University of Fukui	2201	Presenter	-	-

■Chiba University (International Students)

Name	Faculty	Research Session		Workshop	
Armilia Ramandha	Graduate School of Science and Engineering	2203	Panelist	2208-M	Facilitator
Fakih Irsyadi	Graduate School of Science and Engineering	2111	Panelist	2111-J	Facilitator
Kunti Khoirunnisaa	Graduate School of Science and Engineering	2109	Panelist	2208-M	Facilitator
Margaret Bro	Faculty of Education	2205	Panelist	2207-AA	Facilitator
Punnat Changsalak	Graduate School of Science and Engineering	2203	Panelist	2207-W	Facilitator
Rabiatul Hazirah binti Idris	Faculty of Education	2108	Panelist	2111-I	Facilitator
Rizvon Suleimanov	Graduate School of Humanities and Studies on Public Affairs	2202	Panelist	2208-K	Facilitator
Roxana Mayhin Del Rocio Quispe Cuadros	Faculty of Education	2204	Panelist	2111-G	Facilitator
Savira Aristi	Graduate School of Science and Engineering	2112	Panelist	2207-V	Facilitator
Yuhui Liao	Graduate School of Horticulture	2201	Panelist	2208-R	Facilitator
Zai Qurratu' Ainie Zainal Abbidin	Faculty of Education	2207	Panelist	2207-U	Facilitator