



observe

ISSUE NO 2
APRIL 2024

SCIENCE MAGAZINE

Flagship Programme

STEM in PT PERTAMINA HULU ROKAN
STEM in South Sulawesi

Regional Training

Science Classroom Supervision
Holistic Science Teaching Workshop
In Country Training Malaysia

SEAQIS Corner

Capacity Building



Toxic is Mine



Our Flagship Programmes



STEM LEARNING



COMPUTATIONAL THINKING



**(SEA-CEP)
Southeast Asia Climate Change Education Programme**

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Greeting From Seaqis

Dear our beloved QIServe,

We are delighted to announce the release of our second edition of Observe Science Magazine, marking another milestone in our dedication to providing valuable educational resources in Southeast Asia.

Over the past six months, SEAQIS is proud to continue the efforts in contributing to Southeast Asian societies. Our ongoing collaborations mark the beginning of our journey towards better education quality. We believe that by working together with our partners and stakeholders, we can make significant strides in improving educational standards across the region.

Furthermore, SEAQIS remains committed to fostering innovation and excellence in education. Through our collaborative initiatives and continuous improvement efforts, we aim to empower educators and students alike, ensuring they have access to the resources and opportunities needed to thrive in today's rapidly evolving world.

As we move forward, let us all remain dedicated to our shared goal of creating a brighter future through science education. Together, we can make a difference.


Enjoy your reading!

Zuhe Safitra
SEAQIS Acting Director





Editorial Message



Source: Unsplash.com



Welcome back, QIServe!

As we dive into another edition of Observe, we would like to express our tremendous gratefulness to the Almighty God for the success in launching the second volume of our magazine. We also owe a great thanks to the editorial team and contributors of this magazine for their dedication that has made this release possible.

Observe aims to reflect on various SEAQIS events and programmes, including the Training Course on Science Classroom Supervision, the 12th SEAMEO-Tsukuba University Symposium, and many more. We also discuss an assortment of perspectives regarding science and education. Through this magazine, we hope to provide and disseminate a comprehensive insight into issues in science and education across Southeast Asia.

We apologise for any mistakes or inaccuracies that may occur in this publication. We are open to criticisms and suggestions in order to improve the next edition of this magazine.

We are immensely grateful to our readers, and we wish you a pleasant reading experience!

The Desk

Advisors

Board of Director
Head of Division

Editor in Chief

Zuhe Safitra

Managing Editor

Lintang Ratri Prastika

Copy Editor

Adhiva Raia Nahrisa
Adzahra Siti Robyati
Adawiah
Anastasya Salsabila
Ayu Intan Harisbaya
Novianti
Priscilia Tsany Darajat
Putu Tatyana Prami D
Rasya Salsabila Nasution
Sarah Aiko Adhritama
Sheren Agustin

Design & Layout Manager

Octo Litadiputra Reinaldy

Design & Layout

Citra Waldaniati
Vinka Alza Safana
Nabila Shirin Thowusi

Contributor

Adhiva Raia Nahrisa
Amallia Yuliana
Ayu Intan Harisbaya
Beni Yodi
Citra Waldaniati
Dimas Juni Ardiansyah
Lintang Ratri Prastika
Nabila Shirin Thowusi
Natasya Rosye Claudi Pandean
Novianti
Nunik Nurriah
Octo Litadiputra Reinaldy
Priscilia Tsany Darajat
Putu Tatyana Prami Dewanty
Rasya Salsabila Nasution
Sheren Agustin
Tami Sedlakova
Tiara Puspa Isnayana
Untung Saepuloh
Vannya Choirunnisa
Vergel F. Carreon
Vinka Alza Safana
Zuhe Safitra

Published by

SEAMIO QITEP In Science
Kompleks Balai Besar Guru Penggerak (BBGP) Provinsi Jawa Barat,
Gedung B, Jl. Dr. Cipto No.9, Bandung, West Java 40171, Indonesia
secretariat@qitepinscience.org www.qitepinscience.org

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+62 821 2345 0630

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illustration by Winona Putri

Genius Gene

The idea behind creating this piece is to explore how scientists dissect extremely tiny matters, even beyond minuscule, and the future implications for human life. Each type of letter naturally yields different meanings and outcomes, akin to the genes or DNA of humans

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Toxic is Mine

Engines hum, and motors roar,
A symphony of progress, we can't ignore.

But within this melody, a dissonance is clear,
Toxic particles, whispers we fear.

In the depths of the polluted air,
Hope lingers, resilient and rare.
For with awareness and actions aligned,
We can cleanse the air, leave toxicity

Deny Chaidar Valentino
illustrator

<http://linktr.ee/kendylan>

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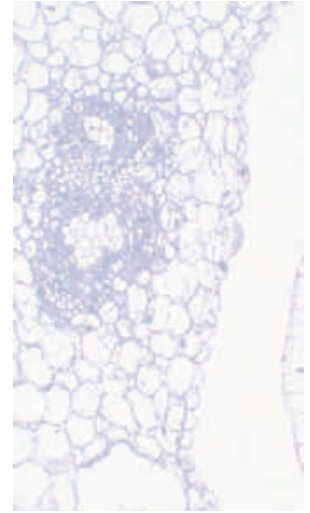
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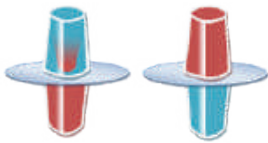
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SEAQIS and PT Pertamina Hulu Rokan Continue Their Collaborative Journey

SEAQIS and PT Pertamina Hulu Rokan (PHR) once again organised STEM Teacher Competency Enhancement Training in the Rokan working area from 18 to 21 December 2023 as a manifestation of PHR's commitment to strengthen the quality and relevance of education which is in line with the development of the competencies and character of students. This programme focuses on improving the competencies of teachers, school principals, and school supervisors in four districts within the working area of PHR WK Rokan: (1) Siak; (2) Kampar; (3) Rokan Hilir; and (4) Bengkalis.



Dr Indrawati (Director of SEAQIS) and Mr Pinto Budi Laksono (Manager of Corporate Social Responsibility at PT PHR) delivered their remarks in this training, while Ms Riesky Bestari (Head of the Professional Development Centre for Educators of Riau Province) was representing the Secretary of the Directorate General of Teachers and Education Personnel to officially open the training.



48 teachers, 24 school principals, and eight school supervisors from primary and secondary schools in the four districts participated in this training at Furaya Hotel, Pekanbaru. Several important topics delivered in this training were: (1) STEM Learning and Its Characteristics; (2) Analysis of STEM Topics and Strengthening Science Concepts; (3) STEM Project Design; (4) Implementation of the STEM Approach in Kurikulum Merdeka; and (5) Empowerment of Learning Communities.

This training was part of In Service 1 from the IN-ON-IN programme series. Meanwhile, the On-the-Job Learning (OJL) phase will be held from January to February 2024, followed by In Service 2 at the end of February 2024. In the OJL phase, participants will develop various STEM teaching materials, such as lesson plans and student worksheets. After that, participants will disseminate the training results to the learning communities in their respective areas during the In Service 2.



Spreading STEM Education in South Sulawesi

In order to mutually support and bolster programmes among the technical implementation units under the Directorate General of Teachers and Educational Personnel from Indonesian Ministry of Education, Culture, Research, and Technology, SEAQIS has initiated several collaborations with Professional Development Centre for Educators in Indonesia. In 2024, SEAQIS started to collaborate with Professional Development Centre for Educators of South Sulawesi Province through STEM training for science teachers at the primary, junior, and senior high levels.

This training took place from 3 to 7 February 2024 at Aryaduta Hotel, Makassar, and was attended by 132 participants with 44 persons at each level. Mr Reza Setiawan, Mr Lukman Nulhakim, Ms Lintang Ratri Prastika, Mr Septian Karyana, and Mr Gunawan Muhammad were assigned as facilitators for this training. The training was officially opened by Mr Harisman, the Head of General Department from Professional Development Centre for

Educators of South Sulawesi Province. He conveyed that this training was aimed at enhancing science teachers' skills and strengthening the concept of Profil Pelajar Pancasila by integrating STEM.



The participants broaden their knowledge on the definition and characteristics of STEM as well as how to develop STEM-based learning tools for intracurricular and co-curricular activities. They produced the drafts for lesson plans or modules of Profil Pelajar Pancasila's strengthening project based on STEM. Those drafts will be further developed and implemented after the participants come back to their respective schools.

At the end of this training, Mr Harisman expressed that the Professional Development Centre for Educators of South Sulawesi highly appreciated and would like to continue the collaboration programme with SEAQIS, so that there will be more teachers in South Sulawesi who try to implement STEM in science learning.



Science Classroom Supervision



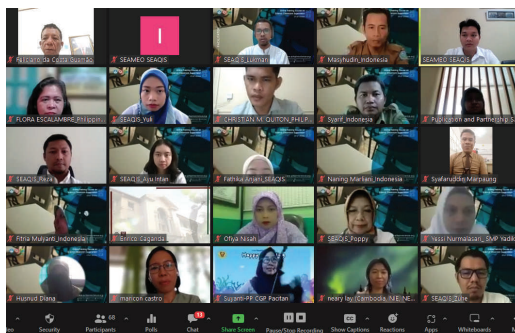
Path to Excellence in Science Classroom Supervision : a Glimpse of SCS 2023

SEAQIS recently concluded one of its flagship programmes, the Training Course on Science Classroom Supervision (SCS). This five-day course was conducted through an online platform from 23 to 27 October 2023 with 69 participants from several SEAMEO member countries (Indonesia, Philippines, Timor Leste, Cambodia, and Malaysia). This course was officially opened by Prof Dr Nunuk Suryani – Director General of Teachers and Educators Personnel of the Indonesian Ministry of Education, Culture, Research, and Technology.

Distinguished experts in the field were instrumental in facilitating the event, such as Dr Harry Firman (Universitas Pendidikan Indonesia); Prof Udin Syaefuddin Sa’ud (Universitas Pendidikan Indonesia); Dr Ho Thanh My Phuong (SEAMEO RETRAC); Dr Suraiya Hameed (Queensland University); and the SEAQIS academic team. These speakers delivered valuable materials to the participants, including Trends and

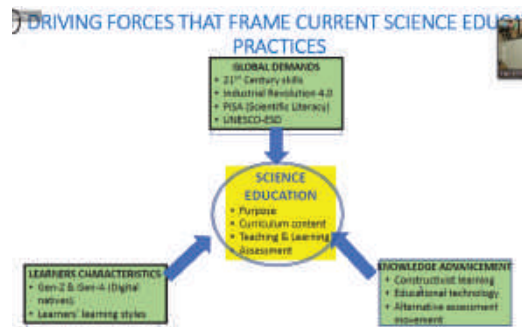
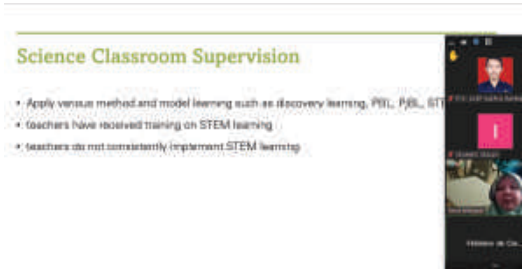
Issues on Global Science Education, Nature of Science, Science Classroom Supervision: New Paradigm on Supervision, Characteristics of STEM Learning, and Instructional Leadership.

Participants did more than passively absorb information throughout the event; they actively engaged in discussions, group-based learning, and hands-on activities to deepen their comprehension of the materials presented. Moreover, a post-test was administered at the end of the course to assess their understanding.



One of the participants, Ms Sherie May from the Philippines – the Principal of Dona Arsenia Elementary School – shared her impressions and message about SCS 2023. She emphasised the course’s remarkable value, noting that the knowledge she acquired truly benefited her role as a school principal and elevated her capabilities in instructional leadership. In addition, she expressed heartfelt gratitude to the facilitators and conveyed her enthusiasm for any future opportunities to partake in training courses organised by SEAMEO.

The Training Course on Science Class Supervision 2023 was officially closed by Mr Zuhe Safitra as the SEAQIS Deputy Director of Administration. This activity proved to be an enlightening experience for school principals and supervisors. It has undoubtedly fortified their competencies in supervising science education and conducting instructional leadership in their schools and respective countries. While the event has come to an end, the expectation is that the participants will carry forward their knowledge and skills to generate a positive impact on academic supervision.





Breaking Barriers: Empowering Science Teachers through Holistic-Science Teaching Fellowship and Workshop

In this cutting-edge era, it is undeniable that science has limits. The teaching of science in our society is often compartmentalised with science teachers presenting material in the classroom without connecting it to the outside world or highlighting knowledge from other disciplines, such as history, philosophy, religion, and ethics. Therefore, as science teachers, it is important to enrich our knowledge with other disciplines to answer questions that science alone cannot address.

Starting from 8 to 11 November 2023, SEAQIS successfully conducted the Holistic Science Teaching Fellowship and Workshop at the Grandia Hotel in Bandung, Indonesia. In collaboration with World Science Collaborative Ltd

(United Kingdom), Lahore University of Management Sciences (LUMS), The Aga Khan University-Institute of Education Development (AKU-IED), and Qatar University, alongside partners Khawarzimi Science Society (KSS)-Lahore; Pakistan Innovation Foundation-Pakistan ; STEMx-STEM School for the World - Islamabad, SEAQIS presented an innovative workshop to assist teachers in exploring and mastering the holistic teaching of science.

A total of 40 participants—three Malaysians, two Bruneians, and 35 Indonesians—assembled to gain insights from other disciplines and, at the very least, to foster discussions and address students' questions that might intersect with other realms of non-scientific

Knowledge. 10 leading researchers and scholars from Pakistan and Indonesia imparted their knowledge in this workshop: Prof. Nidhal Guessom, Prof. Noman ul Haq, Prof. Indarjani Soeratno, Mr Reza Setiawan, Dr. Athar Osama, Dr. Faisal Khan, Prof. Muhammed Abubakr, Dr. Zainal Abidin Bagir, Dr. Tasneem Anwar, and Prof. Sabieh Anwar.

Ms Nurathirah Yahya from Brunei Darussalam and Ms Ayu Yuana from Indonesia shared their positive experiences after participating in this seminar and workshop. Overall, their impressions of this event were highly favourable as it significantly broadened their knowledge in previously unexplored fields. When it comes to their favorite topics, Ms Nurathirah relished the materials presented by Prof. Nidhal Guessom on Astronomy. Conversely, Ms Ayu found it challenging to select a single topic due to the interconnected and intriguing nature of all the materials presented.

Moreover, they both expressed their hopes and expectations after attending the event. Ms Nurathirah expressed her desire for all teachers who attended the workshop to apply the knowledge gained over the four days, fostering an environment where students are encouraged to ask philosophical questions, thereby nurturing open-mindedness in the quest for future scientists, ideally from the Muslim community. In contrast, Ms Ayu expressed her

personal goal to refine her teaching methods and concentrate on enriching her students' knowledge. She also expressed her wish for SEAQIS to host more events that would attract and facilitate the participation of more teachers. In today's educational landscape, teaching science holistically is undeniably crucial. Students' curiosity and their interest in connecting various fields of knowledge should not be curbed, yet creating those connections requires the right approach. Therefore, orchestrating this Holistic Science Teaching Fellowship and Workshop can be a valuable step towards enhancing teachers' knowledge and their ability to teach science holistically.



Born-Again Empowerment: Revolutionising Science Instruction Skills for Indonesian Teachers in Kinabalu

In a proactive move to uplift the capabilities of Indonesian educators, a successful training programme was recently conducted by SEAQIS. The Innovation in Science Learning in the Implementation of Kurikulum Merdeka was held from 2 to 4 December 2023 with a focus on reinforcing the teaching of science and empowering teachers with advanced pedagogical and professional skills.

The three-day training held at Sekolah Indonesia Kota Kinabalu (SIKK) in Malaysia was attended by teachers from various levels of education—Primary and Secondary Schools, Vocational High School, as well as Community Learning Centre (CLC). Mr Sahyuddin as the Principal of SIKK warmly welcomed the SEAQIS team: Dr Indrawati, Mr Zuhe Safitra, Dr Poppy Kamalia Devi, and Mr Hamriana.

“Our goal is to empower teachers with the skills and knowledge needed to inspire and engage students in the ever-evolving landscape of science education,” said Dr Indrawati, the director of SEAQIS, as well as the facilitator of the programme. For this reason, this curriculum course aims to enhance teachers’ understanding of science concepts and process skills with STEM and Computational Thinking (CT) in their instructional practices.



SEKOLAH INDONESIA KOTA KINABALU



The training initiative received positive feedback from participants, who praised the hands-on and interactive nature of the sessions along with the expanded networking opportunities for educators. Teachers expressed their gratitude for the opportunity to collaborate with peers, share best practices, and learn from experienced facilitators.

The success of this training initiative underscores SEAQIS' commitment to quality education and teachers' ongoing professional development. As the teachers return to their respective institutions, the impact of this training is expected to resonate in classrooms, contributing to an enriched learning experience for students.



12th SEAMEO-University of Tsukuba Symposium: Bridging Borders in Education and AI



The 12th SEAMEO-University of Tsukuba Symposium, a dynamic convergence of educators, researchers, and policymakers, unfolded at the Tokyo Campus of the esteemed University of Tsukuba. Under the theme “Challenges and Ways Forward in the Era of Generative AI with Reflection on 25 Years of 21st Century Education,” this symposium transcended geographical boundaries to address critical issues shaping the future of education. This event was conducted from 27 to 28 February 2024. SEAQIS was represented by Mr Zuhe Safitra, the Deputy Director for Administration, and Mr Reza Setiawan, the Deputy Director for Programme.

The symposium ingeniously blended face-to-face interactions with virtual participation via the SEAMEO Secretariat YouTube live stream. Educators from Southeast Asia, Japan, and beyond engaged in spirited discussions, leveraging technology to bridge gaps and foster collaboration. Participants delved into the impact of Artificial Intelligence (AI) on education. “How can AI enhance learning outcomes? What ethical considerations arise?” These questions animated the symposium. Additionally, the development of an AI resource repository emerged as a shared goal. Educators sought ways to harness AI’s potential while safeguarding its responsible use.



As AI permeates classrooms, teacher competencies must evolve. The symposium explored strategies for equipping educators with the skills to navigate this transformative landscape. From data literacy to adaptive pedagogies, the dialogue centred on empowering teachers to thrive alongside AI. Mr Reza Setiawan, representing SEAQIS, took the stage as a speaker. His session, “Adapting the Curriculum to the 21st Century,” resonated with educators seeking innovative approaches. “How can curricula evolve to prepare students for an AI-driven world?” Mr Setiawan’s insights ignited conversations on curriculum design, assessment methods, and student-centred learning.

Symposium also served as a reflective platform. Over the past quarter-century, educational paradigms have shifted. From chalkboards to smartboards, from textbooks to digital resources, educators have adapted. Now, generative AI beckons a tool that can personalise learning experiences, automate administrative tasks, and revolutionise education. The symposium’s intellectual wealth will find its home in the Journal of Southeast Asian Education, Issue 2024, Volume 1, slated for release by October 2024. Educators, policymakers, and researchers are invited to contribute their insights, ensuring a robust exchange of ideas.



In summary, the 12th SEAMEO -University of Tsukuba Symposium transcended borders, fostering a global community committed to shaping education’s future. As AI becomes our ally, educators stand at the forefront, guiding students towards a future where innovation and compassion coexist.

A Remarkable Journey from Indonesia to Guangxi and Chongqing



The first team consisted of Max Clifford Brockmann and Marc Clayton Brockmann from Trimulia Middle School, Riane Athalia Talita from Bandung 20 State High School, Airel Rafa Natadikarta and Abdiel Ahmad Daffa Saiful from Darul Hikam International Middle School for the Teenager Maker Camp. Meanwhile, for the Teacher Workshop, there were Ms Eka Ingrianty from Trimulia Middle School and Mr Girindra Adyapradana from SEAQIS.

From 5 to 11 November 2023, SEAQIS delegated Indonesian teachers and students to the 7th Belt and Road Teenager Maker Camp & Teacher Workshop in Nanning, Guangxi. This event was held by the China Association for Science and Technology and the Ministry of Science and Technology of the People's Republic of China. It was mainly held in Nanning, but this year, the event took place in several cities across China by dividing Indonesian delegates into two groups: the first team took part in activities in Nanning, and the second team was in Chongqing.

Besides that, there were also five students from the second team that participated in the Teenager Maker Camp: Bhisma Sutan Danusiri, Keisha Daffa Aryani, and Putranda Renata from Jakarta 8 State High School; as well as Angely Aura Loveana Nindi, and Putri Dian Iswanto from Darul Ulum 1 Peterongan High School. Intan from Junior High





School. Moreover, there were Ms Neni Syarifatun Nisan (a representative of the Directorate General of Teachers and Education Personnel, the Ministry of Education, Culture, Research, and Technology of Indonesia) and Mr Fakhrizal Arsi (a teacher from Jakarta 8 State High School) who attended the Teacher Workshop.

During the camp, all students learnt about Ecological Restoration of Coral Reefs, Creative Bridge, and Artificial Intelligence. Meanwhile, the teachers were joining various workshops, and one of them was “How to Develop In-depth and Creative Experiments by Using Common Materials in Life”.

Amidst the series of this event, on 7 November 2023, The Annual Belt and Road International Science Education Consortium (BRISEC) 2023 was also convened. It was held at the CPLaza Hotel, Chongqing, China. As one of the members of the consortium, SEAQIS delegated Mr Rizwan Darmawan to be the representative on this meeting, highlighting SEAQIS’ achievements in organising several activities such as training courses for science teachers and education personnel, students’ STEM competitions, and an internship programme for international students. It



also discussed potential collaborations that could be established among the consortium members.

By joining the 7th Belt and Road Teenager Maker Camp & Teacher Workshop as well as the annual meeting of BRISEC, cross-cultural exchange was strengthened, innovation among the young generation as well as science teachers’ abilities to promote mutual learning were achieved, and the development of a platform for science education information was boosted.





STEM Fun Learning with VEX Robotics

On Friday, 26 January 2023, SEAQIS successfully held the “STEM Teachers Workshop in Collaboration with VEX Robotics.” This activity which was attended by 26 participants from various regions, aimed to enrich the skills and knowledge of teachers in the fields of Science, Technology, Engineering and Mathematics (STEM). Mr Andy Lee, the President of Innovation First International (Hong Kong), was present as the main facilitator for this workshop.

In this workshop, the participants not only discussed theoretical concepts but also were directly involved in designing and coding simple robots using VEX GO. At the end of this activity, there was a robot competition for the participants to show off the technical abilities of the robots that had been made.

SEAQIS hopes that this activity will provide a deeper and more applicable understanding regarding the integration of STEM in the educational environment of each participant.

A Collaborative Endeavour for Educational Empowerment in Kupang



In a resounding declaration of commitment to educational enhancement, 4 March 2024 marked not only the commencement of a transformative training session but also the formalisation of a joint agreement between esteemed educational entities. The opening ceremony, held with grandeur at Neo Eltari Hotel in Kupang, bore witness to the signing of a landmark agreement. This accord, inked jointly by representatives from six SEAMEO Centres Indonesia; the Education Quality Assurance Centre and the Professional Development Centre for Educators from East Nusa Tenggara Province; the Mayor of Kupang Regency; the Mayor of Kupang City; and the Education Offices of Kupang Regency and Kupang City epitomised a collaborative pledge towards educational advancement in East Nusa Tenggara Province.



Mr Reza Setiawan (Deputy Director for Programme) brought his expertise and commitment to the table as he joined hands with other dignitaries to sign the joint agreement. His presence underscored SEAQIS's unwavering dedication to the cause of educational excellence in the region. Meanwhile, the training

excellence in the region. Meanwhile, the training session, started from 4 to 7 March 2024, was officially inaugurated by Mr Korinus Masneno (the Mayor of Kupang Regency). His opening remarks resonated with a profound sense of commitment to fostering educational excellence in the region, setting the tone for an event brimming with promise and potential.

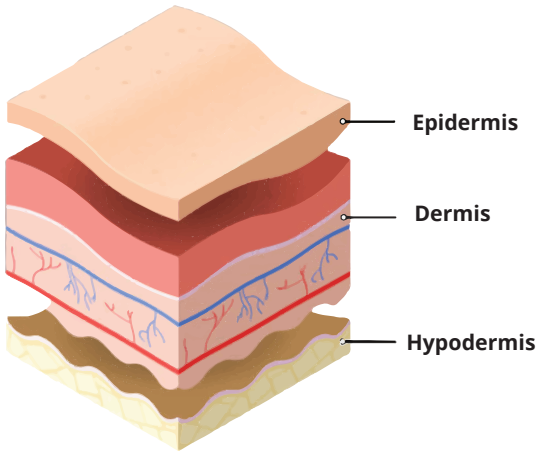
Under the aegis of this joint agreement, a multi-faceted approach to elevate the quality of learning in East Nusa Tenggara Province is set to unfold. The focal point of this endeavour lies in empowering teachers through a series of training and mentoring activities. Dr Poppy Kamalia Devi and Ms Lintang Ratri

Prastika led this training, guiding 40 dedicated educators through immersive experiences, such as working on hands-on science activities and learning the development of student worksheets utilising the DARTs (Directed Activities Related to Texts) method. By equipping educators with enhanced pedagogical skills and knowledge, the aim is to catalyse a substantial improvement in students' literacy, numeracy, and critical thinking skills.



Get to Know More about Epidermis

As the largest organ, skin protects the body against bacteria as well as regulates body temperature and chemical exposure. Skin is also associated with the nervous system, as the primary organ for sense of touch.



Source: <https://sublimelife.in/blogs/sublime-stories/find-out-how-moisturisers-work-and-which-is-the-one-for-you>

There are three layers of skin including epidermis, dermis, and hypodermis. Now, let's talk about the outermost layer first, which is epidermis!

An epidermis is the outer layer of the skin that we can see and touch. It's made

from keratin along with other proteins. Epidermis works as:

Protective barrier

Epidermis keeps bacteria and germs from entering our body and bloodstream which can cause infections.

New skin provider

Our skin cells shed every day, so the new cells replace approximately 40000 old skin cells.

Part of immune system

There are Langerhans cells in the epidermis that are part of the body's immune system. They help fight off germs and infections

Skin colour provider

The epidermis also contains melanin, the pigment that gives skin colour. The amount of melanin determines the colour of our skin, hair, and eyes.

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How can we protect our skin?

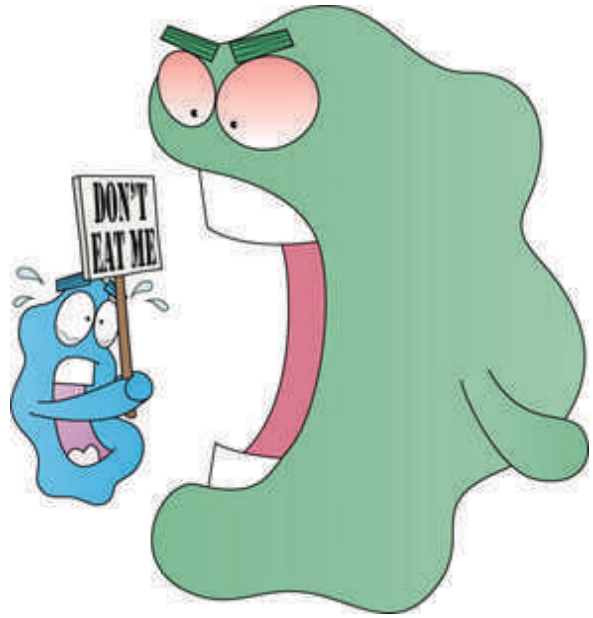
Our skin is not just a barrier between us and our environment. It protects us from disease and exposure.

We can take good care of our skin by applying sunscreen every day, staying hydrated, and taking plenty of vitamins namely vitamin A, C, E and K. Moreover, please do contact a health care professional if you find excessive bruises, trouble healing wounds, bleeding moles, painful cysts, or skin that tears easily.

Source: <https://www.realsimple.com/beauty-fashion/skincare/suncare/sunscreens/how-to-apply-sunscreen>



Our Brains Eat Itself!



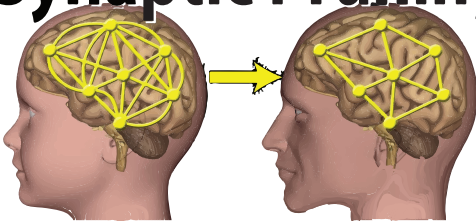
Source: <https://www.nature.com/articles/nrneurol.2017.46>

Gruesome, isn't it? It is called phagocytosis. It's a process where cells consume smaller cells or molecules to remove them from the system. It's basically cells eating other cells or substances. Phagocytosis happens a lot in the brain at any time. While keeping pathogens and other invaders out is obviously very important, phagocytosis happens to maintain homeostasis in the brain.

Our Brain Needs Phagocytosis to clear up debris

All these processes will create a lot of debris that has to be rid of because otherwise, it builds up and disrupts things. This is when our brain needs Phagocytosis to clear up those debris.

Synaptic Pruning



Source: Synaptic Pruning, Animation by Alila Medical Media

Source: <https://www.sciencefocus.com/the-human-body/does-the-brain-eat-itself>

The connections in the brain need to be removed or changed. When we hit adolescence, a process called 'pruning' is initiated, where all the unused neurological connections we accumulate during childhood are got rid of. The resources they were hogging unhelpfully are redirected to more useful things that will make the brain more efficient and ready for adult life. All this happens because the brain is eating itself.



JOAQUIN PHOENIX

A TODD PHILLIPS FILM

JOKER

OCTOBER 4

BASED ON DC CHARACTERS FROM DC
WRITTEN BY TODD PHILLIPS & SCOTT SILVER
DIRECTED BY TODD PHILLIPS

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CONDUCTOR: J. B. IRVING

www.jokerfilm.com

Joker: A Delve into The Madman's Mind



Director: Todd Phillips
Writers: Todd Phillips, Scott Silver
Stars: Joaquin Phoenix, Robert De Niro, Zazie Beetz
Genre: Crime, Drama, Thriller

Joker is an American psychological thriller film that premiered at the Venice Film Festival on 31 August 2019 and was released in the United States on 4 October 2019 and Indonesia two days earlier. Joker is Batman's first live-action film to earn an R classification from the Motion Picture Association of America for strong bloody violence, disturbing behaviour, inappropriate language, and brief sexual images. The Joker film was directed by Todd Phillips and was also produced by him along with Bradley Cooper and Emma Tillinger Koskoff. The screenplay was also written by Todd Phillips with Scott Silver and took

approximately one year in the making, due to many obstacles in the production process. The script references Martin Scorsese's films such as *Taxi Driver* (1976), *Raging Bull* (1980), and *The King of Comedy* (1983), as well as Todd's *The Hangover Trilogy*. Distributed by Warner Bros Pictures, Joker was produced by Warner Bros Pictures and DC Films in association with Village Roadshow Pictures, Bron Creative and Joint Effort.

Joker was a film about Arthur Fleck, a clown and stand-up comedian who lived in a rundown apartment with his mother, Penny, in the crime-ridden city of Gotham

during the recession of the early 1980s. Arthur suffered from a nervous breakdown that caused him to laugh randomly and uncontrollably, requiring medication that he received from social services. Arthur struggled to find himself in Gotham City, where the injustice between the rich and the poor was evident, and eventually rebelled to become one of the most famous criminal figures with a large following. The Joker film delves into the character's struggle with social isolation and the collapse of societal structures, making it a thought-provoking and introspective film.

With the well-developed and neat story by Todd Phillips and Scott Silver, as well as the extraordinary acting from Joaquin Phoenix, and of course the important role of the crew behind the scenes, the Joker film managed to get a rating of 8.5 out of 10 by IMDb, while the film's rating on Metacritic was 59 per cent and Rotten Tomatoes was 68 per cent. This film got 200 nominations and won 96 prestigious awards. Not only the film, but the lead actor, Joaquin Phoenix, also won the 2020 Oscar for Best Performance by an Actor in a Leading Role. He showed incredible dedication by losing a significant amount of weight, to deepen his role as Arthur. Another nomination was The Best Achievement in Music Written for a Film (Original Score). Joaquin also won an award at the 2020 Golden Globes, in the category of The Best Performance by an Actor in a Film - Drama. However, the film that managed to become a dark horse in the world of cinema only spent a fairly low cost for an adaptation of a comic, which only amounted to 55-70 million US dollars.

Joker's Illness

Does it make sense for someone to suddenly laugh endlessly and without cause? Could the story this film is based on be real, and how could someone experience this? Have you ever felt or experienced the same thing that Arthur did?

In Joker, Arthur is portrayed to often laugh endlessly, for no reason, and even in inappropriate situations. You might think that he is just joking and being dismissive of something. But it turns out that what Arthur is experiencing is a serious case in the medical world called gelastic seizure epilepsy.

A Gelastic Seizure (GS) is a rare focal seizure that causes uncontrolled laughing or giggling even in the absence of joy or happiness. A focal seizure is a seizure that begins in one part of your brain as opposed to generalised seizures that develop in your whole brain.

Gelastc seizures are rapid and last between 5 to 60 seconds. Nonetheless, these seizures can occur many times throughout the day. People have reported experiencing anywhere from 5 to 100 seizures in one day.

People often describe having gelastic seizures as having the urge to laugh without having any reason, thought, or emotion. "It's nothing like your normal laugh. It's just a weird feeling," shared a MyEpilepsyTeam member. Because of their unique characteristics, gelastic seizures tend to go unnoticed for years.

Symptoms of Gelastic Seizures

The most common symptom of gelastic seizures is inappropriate and

exhibit an early onset of GS may have bursts of cooing, smiling, or increased breathing. Before having a seizure, a person with GS will have an aura (a warning feeling) and may be startled. They may look afraid or in a state of panic.

Other symptoms include:

- Laughing abruptly
- Grunting
- Smacking one's lips
- Smiling that looks forced
- Mumbling
- Fidgeting

Causes

The most common cause of gelastic seizures is a benign brain tumour that develops in early infancy, called a Hypothalamic hamartoma (HH). Signs of seizures usually begin in childhood. If someone has HH, they often experience other types of seizures from time to time. In addition, it can be caused when experiencing early puberty.

Children with both gelastic seizures and HH usually have normal learning and communication skills before the seizure. A third of children with HH will develop learning disabilities, developmental delays, speech impairment, or below-average intelligence and communication skills. They may also develop behavioural problems, such as aggression, anxiety, and mood disorders.

Changes

Seizures are periods of abnormal electrical activity in your brain that can cause changes to you:

- Consciousness

- Behaviour
- Feeling
- Memory
- Physical movements

Sources:

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<https://facts.net/movie/38-facts-about-the-movie-joker/>

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<https://www.healthline.com/health/epilepsy/gelastic-seizure#summary>

<https://www.myepilepsyteam.com/resources/what-you-need-to-know-about-gelastic-seizures-symptoms-and-treatment>






MARVEL STUDIOS

LOKI

Disney+

Exploring Time Travel with Loki



Director: Kate Herron
Writer: Michael Waldron
Stars: Tom Hiddleston, Sophia Di Martino, Owen Wilson
Genre: Action, Adventure, Fantasy, Sci-Fi

Disney Plus is quickly becoming an integral part of the Marvel Cinematic Universe, starting with shows like *WandaVision* and *The Falcon and the Winter Soldier*, and now with one of their latest ones, *Loki*. Every episode of this show was beautifully made, with immense credit going to director Kate Herron, head writer Michael Waldron, and the creative team. The cast of well-known all-stars like Tom Hiddleston, Owen Wilson, and Gugu Mbatha-Raw, blended with new all-stars like Sophia Di Martino and Wunmi Mosaku, did a remarkable job. The show was nominated for various awards,

including the Art Directors Guild Awards, Critics Choice Super Awards, Saturn Awards, and Nickelodeon Kids' Choice Awards.

The series opens with a scene from *Avengers: Endgame*, in which Marvel's mightiest heroes have time-travelled back to the events of the first *Avengers* movie and bumped into the God of Mischief. Loki steals the Tesseract and encounters a mysterious organisation named Time Variance Authority (TVA) that gives him an ominous ultimatum, to

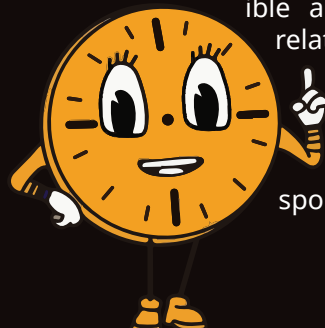
either fix the timeline or cease to exist completely.

Have you ever dreamed of travelling through time, like what Loki does when he steals the Tesseract? Or when Loki uses the TempPad when he's in TVA? For centuries, the concept of time travel has captivated people's imaginations. Time travel is the concept of moving between different points in time, just like you move between different places. In the Loki series, you might have seen Loki using the TempPad to travel backwards or forward in time.

But is this just a fun idea for movies, or could it really happen?

Our modern understanding of time and causality comes from general relativity. Theoretical physicist Albert Einstein's theory combines space and time into a single entity "spacetime" and provides a remarkably intricate explanation of how they both work, at a level unmatched by any other established theory. This theory has existed for more than 100 years and has been experimentally verified to extremely high precision, so physicists are fairly certain it provides an accurate description of the causal structure of our universe.

For decades, physicists have been trying to use general relativity to figure out if time travel is possible. It turns out that you can write down equations that describe time travel and are fully compatible and consistent with relativity. But physics is not mathematics, and equations are meaningless if they do not correspond to anything.



Arguments against time travel

There are two fundamental issues which make us think these equations may be unrealistic. The first issue is a practical one: building a time machine seems to require exotic matter, which is matter with negative energy. All the matter we see in our daily lives has positive energy—matter with negative energy is not something you can just find lying around. From quantum mechanics, we know that such matter can theoretically be created, but in too small quantities and for too short times. However, there is no proof that it is impossible to create exotic matter in sufficient quantities. Furthermore, other equations may be discovered that allow time travel without requiring exotic matter. Therefore, this issue may just be a limitation of our current technology or understanding of quantum mechanics.

The second issue is less practical but more significant: it is the observation that time travel seems to contradict logic, in the form of time travel paradoxes. There are several types of such paradoxes, but the most problematic are consistency paradoxes. A popular trope in science fiction, consistency paradoxes happen whenever there is a certain event that leads to changing the past, but the change itself prevents this event from happening in the first place. For example, consider a scenario where we enter my time machine, use it to go back in time for five minutes, and destroy the machine as soon as we get to the past. Now that we destroyed the time machine, it would be impossible for us to use it five minutes later. However, the time machine is destroyed if and only if it is not destroyed. Since it cannot be both destroyed and not destroyed simultaneously, this scenario is inconsistent and paradoxical.

Eliminating the paradoxes

There's a common misconception in science fiction that paradoxes can be "created." Time travellers are usually warned not to make significant changes to the past and to avoid meeting their past selves for this exact reason. Examples of this may be found in many time travel movies, such as the Back to the Future trilogy.

In physics, a paradox is not an event that can actually happen—it is a purely theoretical concept that points towards an inconsistency in the theory itself. In other words, consistency paradoxes don't merely imply time travel is a dangerous endeavour, they imply it simply cannot be possible.

This was one of the motivations for theoretical physicist Stephen Hawking to formulate his chronology protection conjecture, which states that time travel should be impossible. However, this conjecture so far remains unproven. Furthermore, the universe would be a much more interesting place if instead of eliminating time travel due to paradoxes, we could just eliminate the paradoxes themselves.

One attempt at resolving time travel paradoxes is theoretical physicist Igor Dmitriyevich Novikov's self-consistency conjecture, which essentially states that you can travel to the past, but you cannot change it.

According to Novikov, if we tried to destroy the time machine five minutes in the past, we would find that it was impossible to do so. The laws of physics would somehow conspire to preserve consistency.



My Experience Participating Online Training Course on Earth and Space Science 2023

Vergel F. Carreon
Teacher Oro Site High School, Legazpi City Division, Philippines



As I was browsing Facebook (FB), I happened to stumble upon the FB page of QITEP in Science with its announcement for the online training course in June 2023. I registered for the online training course in Earth and Space Science since I wanted to be updated on the recent discoveries and information about Earth and Space. I also encouraged some of my co-teachers to register but

they failed to do so. On 8 June 2023, my name was listed as one of the participants on the online training course together with other fellow Filipino participants from other regions and the neighbouring countries in Southeast Asia. I was excited and couldn't wait for the training course to start.

The online training course started with the pre-test that I eagerly answered. I was not sure of some of my answers, but I answered it anyway. The first topic was Current Trend and Issues in Earth and Space Learning. I was jotting down important facts while the resource speaker was discussing this topic. The information that I had was shared with my fellow teachers in science. The discussion was informative because the resource speaker really addressed most of the questions and we were given substantial information that was important in our subjects.

First, the discussion about "Earth Science: Solid Earth and Theory of Plate Tectonics" was a refresher. There was information that has been long forgotten, but the topic was some sort of review through the discussion and further reading. Second, the discussion about "Meteorology: Climate Issues" was informative, and every new piece of information was surely written in my notebook. Questions were posted on the comment section, and they were addressed by the resource speaker. For the "Space Science: Our Solar System", the discussion was a refresher: the presentation and visuals used by the resource speaker were eye-catching.

The resource speaker who discussed "Disaster Risk Reduction and Mitigation" was an expert in his field. His broad knowledge about DRRM was helpful to the participants through the information that the speaker imparted. Meanwhile, the use of digital media in teaching Earth and Space Education as discussed in the training course was helpful to the teachers in the field since the suggested apps and websites can be accessed and utilised by the teachers and students as well.

In general, my participation in the Online Training Course on Earth and Space Science was a learning experience. Knowledge in Earth and Space Science was shared among the participants through active discussion and sharing. After that, the facts and information were shared to our students during the teaching process. Because of this experience, I frequently look for new online training courses that QITEP in Science will be offering, and I also introduce the FB page to my colleagues in school and fellow teachers in the field. The learning experience through this training course will be beneficial to the teachers and students in the teaching and learning process.

Change Lesson Change Class: Executive Function in Students' Atomic Habits of Walking

Benny Yodi
SMA Katolik Santu Petrus, Pontianak, West Kalimantan, Indonesia

Introduction

A meta synthesis of walking habits shows a beneficial relationship to a person's physical and mental health conditions (Kelly, et al., 2017). At least walking will create a sense of well-being (well-being) by reducing feelings of anxiety, depression, loneliness, and social isolation (Kelly, et al., 2018). However, there is a trend of decreasing walking intensity for urban communities, especially in academic environments (Basuki, 2014; Wahyuningsih, 2015).

This is closely related to the Indonesian slang term "mager" (malas gerak means lazy to move) which is often expressed by today's young generation. In addition, the policy of doing activities at home during the pandemic has further grounded this lazy habit of moving. If this continues, this young generation will face many physical and mental obstacles.

Realising the importance of the habit of walking, SMA Katolik Santu Petrus initiated the habit of walking which was integrated into the learning schedule.

This is done with the aim of making students accustomed to doing good things whose implementation and changes can be enjoyed by themselves. It is hoped that doing a few small things can provide the greatest benefit for students.

Discussion

The habit of doing things that are simple and have a big impact is known as atomic habits introduced by Clear (2018). The formation of this atomic habit goes through four simple stages, namely signalling (cue), longing (craving), perception (response), and reward (reward). Cue will drive the mind to initiate a behavior. Craving in the form of things that motivate habits should be done. Response refers to actual actions shown. Rewarding aims to satisfy and teach ourselves for the perception that is done. In discussing the habit of walking integrated with this learning schedule, we will refer to the four stages of the formation of the atomic habit.

1. Cue/signalling stage

This stage aims to explain to students about the habituation that will be carried out. The habit you want to do must be easy to understand by the students who do it. This starts with the Pre-Introduction to the School Environment (Pre-ISE) activities. New students are introduced to the ISE activity schedule which is equipped with a list of locations/activity areas that are different at each change of material and are dynamic (because the schedule can change at any time according to existing needs).

In ISE activities, students are introduced to a moving class system: every time they change subjects, they need to move to a different room/location. This room transfer is also adjusted to the

needs of students, for example by reviewing the ease of mobility between classes, the distance to the laboratory location, the physical condition/health of students, and the flexibility of school activities. The class movement intensity also adapts to the type of subject so that class X will get fewer daily steps. Figure 1 provided information regarding the minimum number of steps students take at school from Monday to Friday in the odd semester of the 2023-2024 academic year. The minimum step in question is that students only come to school and move at the change of hours which are calculated based on the current lesson schedule. The average minimum daily steps of students were 1171 on the 10th grade, 1518 on the 11th grade, and 1457 on the 12th grade.

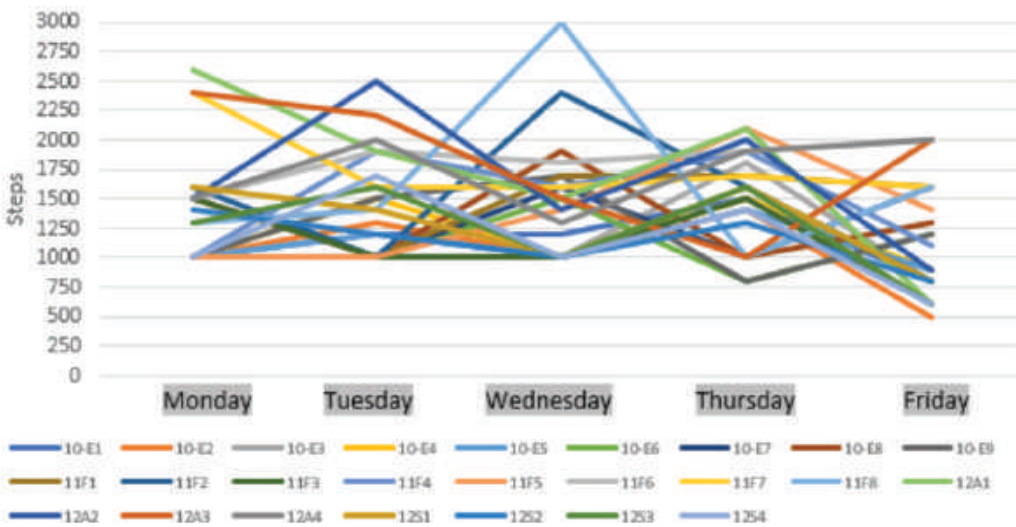


Figure 1. Minimum Students Steps at School

This scheduling and moving class system was created as part of training executive functions learners. Executive function (EF) shows a set of processes related to managing oneself and the resources one has in achieving academic goals (Kryza, 2014). EF consists of two domains, namely behavioural regulation and metacognition (Gioia et al., 2000). This regulation of behaviour is also called mindsets, consisting of the ability to restrain oneself (inhibition), flexibility (shift), emotional control (emotional control), and initiation (initiation). Metacognition is also called skill sets consisting of working memory, planning, resource organiser (organisation of materials), and self-monitoring (Goldstein & Naglieri, 2014; Kryza, 2014). Those two domains will support the success of learning itself.

The EF components that are expected to be trained in the habit of walking at SMA Katolik Santu Petrus are flexibility and planning. Through moving rooms, students will learn to plan how many steps are needed while moving to another room based on distance considerations and learning activities. In this way, students can easily switch from one classroom condition to another classroom ecosystem.

2. Craving stage

This stage aims to make the habit interesting. In ISE, students are explained that the moving class system conducted by SMA Katolik Santu Petrus will provide many benefits during the learning process: produce a more stimulative and dynamic learning atmosphere, train executive functions, and maintain students' physical and mental health. At this stage students must form motivation within themselves. Without desire/motivation at a certain level,

students have no reason to act (Clear, 2018). Students must construct their own understanding of the habits they will carry out so they can do them willingly. Even though it was found that some students complained about this system, the power of these "rules" forced students to do it. This compulsion needs to be transferred into understanding by teachers when interacting with students.

3. Response stage

This stage shows how easy this habit to be done. The responses given by students are observed based on the habituation carried out. If you look closely at students' daily activities, the number of steps taken is always the same as the minimum value (as shown in Figure 1). The interaction before class, during breaks, while asking permission to go to the restroom, and activities outside the classroom (sports or other out-of-class observations) enable students to move around 2,000-3,000 steps per day. In one week, a student who is healthy and actively involved in school activities can achieve 15,000 steps. This value meets the recommended minimum weekly steps for training body strength (Kunz, 2023).

In some cases, students train their ability to restrain themselves and control their emotions to comply with this habit. Self-control helps in forming new habits (Adriaanse, et al., 2014). When new habits develop, old habits (habits from previous schools) also continue to exist in students. If you force yourself too hard into new habits, this will be ineffective and the old habits will actually get stronger (Horvath, et al., 2022). This habit takes time and needs appropriate techniques to be ingrained in students, for example, the 10th grade students who have just entered high school need to be given a

good and cooperative understanding so that the habitual indoctrination goes as expected.

Training students' flexibility indirectly allows students to choose which activities have a better impact on their health (Allom, et al., 2018). This flexibility in scheduling class locations will help students to improve their habituation routines (Beshears, et al., 2020). This is proven by the response of students who enjoy the class change. Planning for students' walking activities demands a good working memory on the studying locations. This working memory load will increase habit formation (van Timmeren, et al., 2022).

4. Reward stage

This final stage is to clarify whether the habituation provides satisfaction, such as finding the goals and benefits from the intimation stage. In habit formation, the perception of context triggers various related responses. For those who see this as a rule, repeated responses are aimed at targeting the evasion of sanctions. Meanwhile, for those who see this as a goal, repeated responses are intended as motivation to achieve the goal (Wood & Neal, 2007).

Explicit goals influence habit formation because students can immediately imagine what they will get if they do certain things (Wood, et al., 2022). If students could not understand the purpose of the moving class system, the activities would only be temporary habits that could be lost at any time. This habit must be a goal-oriented action so that students will remember and appreciate that (Buoton, 2021).

Conclusion

Executive function is an important strategy in forming atomic habits at SMA Katolik Santu Petrus. Each component needs to be present in the four stages of getting used to walking. This habit will start with indications from the school's schedule and regulations so that the students will understand and achieve the goals. Assisting in the habit formation process is important to maintain students' consistency and motivation. By building the awareness that this atomic habit of walking can have a big impact on them, the habitual action will stick with them permanently (not as a mere habit but as a meaningful, goal-oriented action).

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Dismantling Science in Typography

Typography is the art and science of displaying text (or "setting type" as print designers call it). The key concept of typography concerns font (the shapes of letters and other characters) and spacing (the white space around letters, words, lines, and paragraphs). Both are important to successful text display; without adequate spacing, the shape of the text is much harder for the eye to discriminate.

History Typoraphy

The history of typography development begins with the use of pictograms. This language was used by, among others, the Norwegian Vikings and the Sioux Indians. In Egypt, the Hieratic type of letter was developed, known as Hieroglyphs, around 1300 BC. This typography is the root of the Demotic form, which began to be written using a special pen.

Figure 1: Ancient Egyptian letters



This form of typography eventually was developed in Crete, spreading to Greece and throughout Europe. The peak of typographic development occurred approximately in the 8th century BC in Rome when the Romans began to establish their power. Because the Romans did not have their own writing system, they studied the Etruscan writing system which was native to Italy and perfected it, thus forming Roman letters. Currently, typography is experiencing development from the phase of creation by hand to computerisation. The computerisation phase makes the use of typography easier and in a faster time with hundreds of types to choose from.

The Science of Word Recognition

Evidence from the last 20 years of work in cognitive psychology indicates that we use the letters within a word to recognise a word. Many typographers and other text enthusiasts insist that words are recognised by the outline made around the word shape. Some have used the term 'bouma' as a synonym for word shape. The term 'bouma' appears in Paul Saenger's 1997 book "Space Between Words: The Origins of Silent Reading". It is stated that we recognise words from their word shape and that "Modern psychologists call this image the 'Bouma shape.'"

Model #1: Word Shape

The concept of word shape suggests that words are perceived as complete entities rather than collections of individual letters. It is one of the earliest models in psychological literature, likely originating before the existence of such literature. The idea is that we perceive words as holistic patterns rather than mere combinations of letters. Some argue that the key information used in word recognition relates to the arrangement of ascending, descending, and neutral characters within a word. Alternatively, another perspective suggests focusing on the overall outline or envelope formed by the word's shape. These word patterns become recognisable to us through repeated exposure in our experiences. James Cattell (1886) was the pioneering psychologist who first proposed this model of word recognition. He is widely acknowledged as a seminal figure in the establishment of psycholinguistics, the scientific discipline concerned with the study of language processing, including reading comprehension.

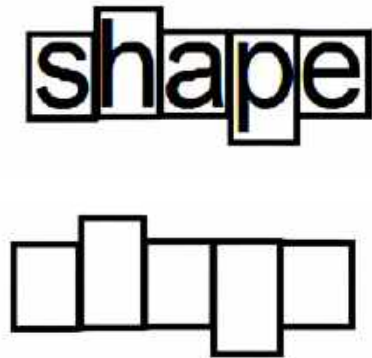


Figure 2: Word shape recognition using the pattern of ascending, descending, and neutral characters

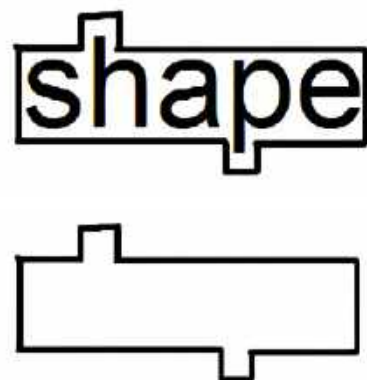


Figure 3: Word shape recognition using the envelope around the word

Cattell supported the word shape model because it provided the best explanation for the available experimental evidence. He discovered a fascinating effect that we now call the Word Superiority Effect. In his experiments, Cattell presented letter and word stimuli to subjects for a very brief period (5-10ms) and observed that subjects were more accurate at recognising the words than individual letters. He concluded that subjects were more adept at recognising whole words in a short period because words are the units we recognise.

Model #2: Serial Letter Recognition

The shortest-lived model of word recognition suggests that words are read letter-by-letter, sequentially from left to right. Gough (1972) proposed this model because it was easy to understand and far more testable than the word shape model of reading. In essence, recognising a word in the mental lexicon was likened to looking up a word in a dictionary. You start by finding the first letter, then the second, and so on until you recognise the word.

This model aligns with Sperling's (1963) finding that letters can be recognised at a rate of 10-20ms per letter. Sperling presented participants with strings of random letters for brief periods, asking if a particular letter was in the string. He found that if participants were given 10ms per letter, they could complete the task. For instance, if the target letter was in the fourth position and the string was presented for 30ms, the participant couldn't complete the task, but with a presentation time of 40ms, they could. Gough noted that a rate of 10ms per letter would be consistent with a typical reading rate of 300 words per minute.

Model #3: Parallel Letter Recognition

This model suggests that the letters within a word are recognised simultaneously, and this letter information is utilised to recognise the words. It's a highly active area of research, with numerous specific models falling into this general category.

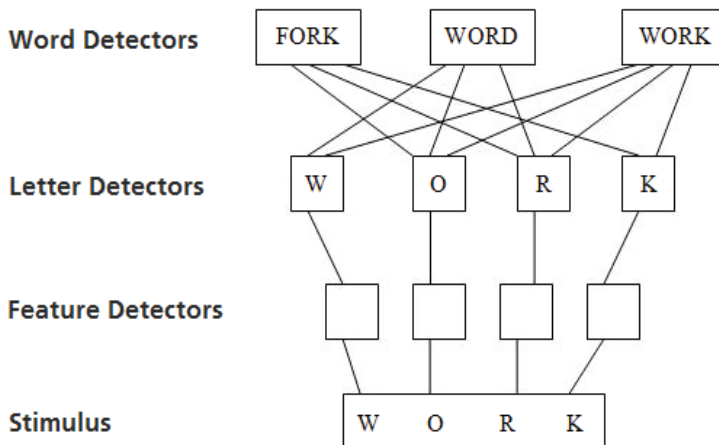


Figure 4: Parallel Letter Recognition

Figure 4 shows a generic activation based parallel letter recognition model. In this example, the reader is seeing the word work. Each of the stimulus letters are processed simultaneously. The first step of processing is recognising the features of the individual letters, such as horizontal lines, diagonal lines, and curves. The details of this level are not critical for our purposes. These features are then sent to the letter detector level, where each of the letters in the stimulus word are recognised simultaneously. The letter level then sends activation to the word detector level. The W in the first letter detector position sends activation to all the words that have a W in the first position (WORD and WORK). The O in the second letter detector position sends activation to all the words that have an O in the second position (FORK, WORD, and WORK). While FORK and WORD have activation from three of the four letters, WORK has the most activation because it has all four letters activated and is thus the recognized word.

The strongest evidence supporting the word shape model is perhaps the word superiority effect, which demonstrated that letters can be more accurately recognised in the context of a word than in isolation. For example, subjects are more accurate at recognising 'D' in the context of 'WORD' than in the context of 'ORWD' (Reicher, 1969). This supports word shape because subjects can quickly recognise the familiar word shape and deduce the presence of letter information after the stimulus presentation has finished, whereas the nonword can only be read letter by letter.

However, McClelland & Johnson (1977) demonstrated that the reason for the word superiority effect wasn't solely the recognition of word shapes, but rather the presence of regular letter combinations. Pseudowords, which are not real English words but possess phonetic regularity, are easily pronounceable, such as "mave" and "rint." Because pseudowords lack semantic content and are unfamiliar to subjects, they shouldn't have a familiar word shape. McClelland & Johnson found that letters are recognised faster in the context of pseudowords (e.g., "mave") than in the context of nonwords (e.g., "amve"). This indicates that the word superiority effect is caused by regular letter combinations rather than word shape.

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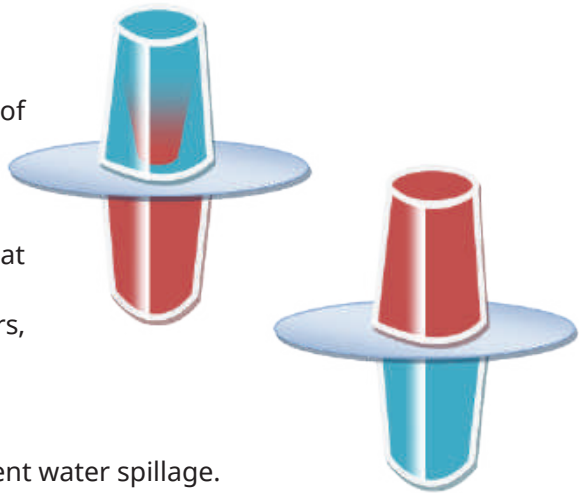
Hot vs Cold Water Density Experiment

Tools and Materials:

- Two small or medium glass jars of equal size
- Hot water
- Cold water
- A small sheet of card or a hard flat piece of plastic
- Food colouring (two different colours, for example blue and red)
- Tray (optional but suggested)

Steps:

1. Place both jars on the tray to prevent water spillage.
2. Fill the first jar with hot water and add a few of drops of red food colouring.
3. Fill another jar with cold water and add a couple of blue food colouring.
(Ensure that both jars have the same water volume and are fully filled)



Hot Water on Top of Cold

1. Cover the jar containing hot water with a small sheet of card, then gently position it on a top of the jar containing cold water.
2. Once the jars are in balance, carefully take off the card.
3. The two different colours of water should stay separate from each other.

Cold Water on Top of Hot

1. Refill the jars and give it another try.
2. This time, put the cold water on top of the hot water.
3. The two different colours of water should be mixed.

Why did this happen?

Hot and cold water are different forms of liquid H₂O. The difference lies in their densities, which are influenced by the effect of heat on water molecules. This causes cold water to be denser than hot water because its molecules move slower, resulting in less pressure, allowing them to fit into a smaller space. As a result of the molecules being packed together more tightly, the density of cold water becomes greater. On the other hand, hot water is less dense than cold water because of the heat itself, causing the molecules to become excited by the heat energy. They start moving faster, so when they collide with each other, they bounce off further. The increased space between the fast-moving molecules reduces the density. This difference allows warm water to "float" on top of cold water. Scientists call this phenomenon convection, and it occurs frequently in the world's oceans every day.

Ghost Ink Experiment: Send a Secret Message to Your Friend with Invisible Ink!



Tools and Materials:

- Lemon, lime, or vinegar for acidic substance
- Heat source (hair dryer, iron, candle) to reveal messages
- White paper
- Q-tip or paintbrush
- Small container

Steps:

1. Start by adding the acidic solution into the small container.
2. Use a Q-tip or paintbrush to write a message or draw a picture onto the white piece of paper using the solution.
3. Allow the paper to dry completely.
4. To reveal the message, hold the paper close to the heat source (be careful when using flammable heat sources, adult supervision is advised).
5. As the solution on the paper heats up, the message will slowly appear.

Why did this happen?

Heat sources help oxidize the carbon compounds in the acidic solution. This happens as the compounds are broken down and carbon is released. As a result, the carbon oxidizes and turns brown once it comes into contact with air. This is why we get to see our secret message!

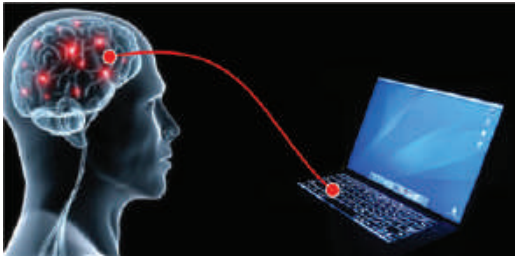
From Sci-Fi to Reality: Telekinesis Will Become Actuality

Have you ever been awestruck by those cool scenes in a sci-fi film where the character wields their telekinesis powers to manipulate objects using their minds effortlessly? Now, picture a world where we could do the same, control things with just the power of our minds, no physical touch needed. And guess what? That fantasy is not so far-fetched anymore, thanks to cutting-edge technology.



https://media.licdn.com/dms/image/D5612AQHIXkvyX4xdow/article-cover_image-shrink_720_1280/0/1706644932881?e=1716422400&v=beta&t=spR7FXml_KDAehHPNC1GLqHYWcRv4oyFMkIJ_FLuZgc

Researchers have been developing a technology called Brain-Computer Interface (BCI) for years. This technology allows people to control machines or external devices using signals from their brains. It goes like having a direct mind-to-machine connection. BCI works by recording the electrical activity generated by neurons in the human brain. They place small sensors or electrodes near those neurons to pick up their electrical signals. These signals, produced when neurons communicate, are sent through the electrodes and recorded by an internal device. The recorded data is then processed and decoded by software using specialised algorithms. Through machine learning techniques, the software learns to recognise patterns of brain activity associated with specific goals or actions the user desires. Once these patterns are identified, the software can command external devices. Then, users can effortlessly operate these devices by thinking about the actions they want to perform.



https://www.als.org/sites/default/files/styles/hero_image/public/blog_files/brain-computer-interface.webp?h=df9c535c&itok=D3GBF27Z

The main goal of BCI implementation is to help those with severe neuromuscular disorders causing paralysis to regain control over their limbs. For instance, BCI allows people with paralysis to spell out words on a computer screen to communicate, or even use robotic arms to feed themselves.

The use of BCI more and more gained fame through Elon Musk's company, Neuralink, established in 2016. After years of experimenting BCI on animals, last year, the company successfully obtained approval from the US Food and Drug Administration (FDA) to conduct clinical trials on humans. The company sought patients with ALS (Amyotrophic Lateral Sclerosis) to participate in the trial. On 30 January 2024, the first human received the Neuralink brain chip implant. This implant, named Telepathy, is their first product. Musk stated that the patient, who received the implant, is recovering well with promising initial results. However, there are no further details provided about the trial yet.



<https://cdn.punchng.com/wp-content/uploads/2023/05/26220648/Is-Elon-Musks-Neuralink-1536x864.jpg>



https://imagez.tnz.com/image/18/4by3/2024/01/30/189c0638d4b34cc997d217a06ec30886_md.png

The use of such technology also raises questions among the public regarding data privacy, security, safety, and equal access. Therefore, discussions on the broader ethical and legal implications of using this technology are important to ensure a balance between its benefits and risks.

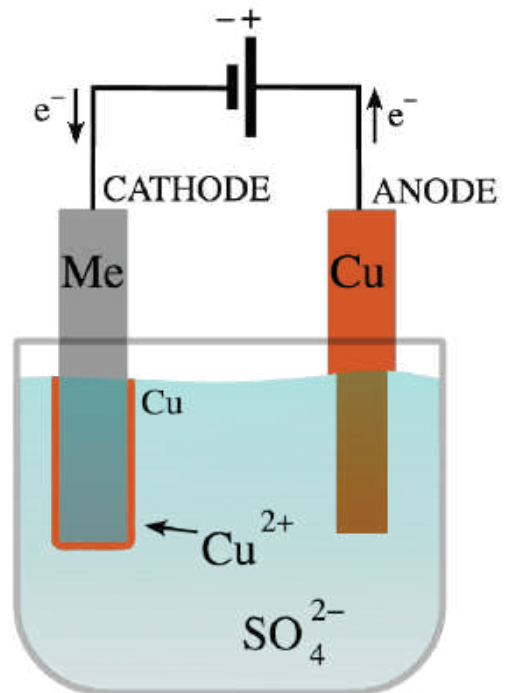
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Electroplating Unveiled: An Immersive Journey Through a Collaborative

The world of electroplating, with its intricate processes and diverse applications, has long been a cornerstone of modern manufacturing and innovation. However, grasping the nuances of electrochemistry often proves challenging within traditional educational settings. Fortunately, the advent of virtual laboratories is revolutionising the way students engage with complex chemical phenomena. In this article, we delve into a groundbreaking electroplating simulation crafted by a collaborative team of Indonesian and Taiwanese interns under the guidance of SEAQIS staff.

Electroplating, a cornerstone of various industries, involves depositing a metal coating onto a conductive surface via an electrolytic solution. Exploring this process in depth requires a firm grasp of electrochemical principles, including electrodeposition, electrolysis, and Faraday's laws.



Electroplating scheme
<https://www.cleanpng.com/png-electroplating-copper-plating-metal-movement-element-1353175/>

Traditional laboratory environments often pose challenges, such as resource constraints and safety concerns, limiting students' ability to fully immerse themselves in electroplating experiments. Visualising abstract concepts also proves daunting without advanced instrumentation and simulations.

The simulation's creation was a collaborative effort among SEAQIS, Michelle (MSIB Batch 5 intern in SEAQIS), and Jessica (Taiwanese intern in SEAQIS). They were guided by the expertise of SEAQIS staff, including Mr Prima Dermawan, Mr Septian Karyana, and Mr Gunawan Muhammad. This groundbreaking project took shape over a span of two months, culminating in an immersive virtual laboratory experience that transcends traditional boundaries. The simulation can be accessed at <https://simulation.qitepinscience.org/>.



SEAQIS Electroplating Simulation Window Display

The electroplating simulation offers a comprehensive suite of features designed to enhance student engagement and comprehension. Users can manipulate variables, observe real-time reactions, and explore electrochemical processes in a safe and interactive virtual environment. From selecting electrode materials to controlling current, students gain hands-on experience without the constraints of traditional laboratories.

The simulation's impact on chemistry education is profound, offering students a dynamic platform to explore electroplating principles with unprecedented clarity. By fostering active experimentation and inquiry-based learning, the simulation cultivates critical thinking skills essential for future scientific endeavours.

While the electroplating simulation marks a significant milestone in educational technology, challenges remain on the horizon. Addressing technological limitations, integrating the simulation into existing curricula, and ensuring accessibility for all learners is the main key in education world.

By leveraging technology to bridge gaps and inspire curiosity, we empower students to embark on a journey of discovery, unlocking the mysteries of electrochemistry and beyond. Together, let us embrace the possibilities of tomorrow, where learning knows no bounds.

Note: On the next pages, we provide the examples of Lesson Plan and Students Worksheet using SEAQIS Electroplating Simulation. You can freely modify this according to the needs of your classroom! 😊

Grade Level : High School (10th-12th Grade)
Subject : Chemistry
Topic : Electroplating
Duration : 1-2 class periods
 (approximately 90 minutes)

Objective:

1. Students will understand the principles of electroplating and its applications in various industries.
2. Students will engage in hands-on exploration of electroplating processes using a virtual laboratory simulation.
3. Students will analyse data, draw conclusions, and communicate their findings effectively.

Materials:

1. Computers or tablets with internet access
2. Projector and screen (optional)
3. Virtual laboratory simulation access (<https://simulation.qitepinscience.org/>)

Activity:

Lesson Outline

Introduction (15 minutes):

- Begin the lesson by discussing the concept of electroplating and its significance in everyday life. Students find examples of electroplated objects that might encountered by them, such as jewellery, silverware, or electronic devices.
- Engage students with a brief discussion on the challenges of conducting electroplating experiments in traditional laboratories.
- Introduce the virtual laboratory simulation, emphasizing its interactive features and the opportunity for hands-on exploration.

Virtual Laboratory

Exploration (60 minutes):

- Divide students into small groups and assign each group a computer or tablet.
- Instruct students to access the electroplating simulation website (<https://simulation.qitepinscience.org/>) and navigate to the virtual laboratory.
- Provide a brief overview of the simulation interface, including how to select electrode materials, adjust current, time and observe reactions.
- Task students with conducting a series of electroplating experiments within the virtual laboratory. Encourage them to vary parameters such as electrode materials, voltage, and time to observe their effects on the plating process (electrode materials change mass).
- Circulate among groups to facilitate discussions, answer questions, and ensure students are actively engaged with the simulation.
- Encourage students to collect data, make observations, and record their findings in their notebooks or on a shared digital platform.

Discussion and Analysis (15 minutes):

- Gather the class and facilitate a discussion on students' observations and findings from the virtual laboratory experiments.
- Encourage students to share their data, discuss trends, and draw conclusions about the factors influencing the electroplating process.
- Guide students in relating their findings to the principles of electrochemistry, including concepts such as electrodeposition, electrolysis, and Faraday's laws.
- Discuss the applications of electroplating in various industries and the importance of understanding these processes in a scientific context.

Conclusion and Reflection (10 minutes):

- Conclude the lesson by highlighting the significance of virtual laboratories in enhancing hands-on learning experiences and understanding complex scientific phenomena.
- Encourage students to reflect on their experience with the electroplating simulation and how it deepened their understanding of chemistry concepts.
- Invite students to consider real-world applications of electroplating and how they might apply their knowledge in future endeavours.

Homework (Optional):

- Assign students to research a specific application of electroplating in industry or technology. They should prepare a brief presentation summarizing their findings and discussing the electrochemical principles at play.

Assessment:

- Formative: Observation of students' participation in virtual laboratory exploration and group discussions.
- Formative: students worksheet evaluation, quality of data collection, analysis, and conclusions drawn from the experiments.
- Formative: Observation of students' engagement in class discussions and ability to articulate connections between electroplating concepts and real-world applications.
- Summative: written test about electroplating and its implementation in real-life.

Student Worksheet Exploring Electroplating with Virtual Laboratories

Introduction:

In this activity, you will explore the electroplating process using a virtual laboratory simulation. By conducting experiments and analysing data, you will deepen your understanding of electrochemistry and its applications in various industries.

Objective:

- To investigate the factors influencing the electroplating process.
- To analyse data and draw conclusions about the principles of electrochemistry.

Instructions:

Part 1: Introduction to Electroplating

1. Define electroplating and provide three examples of electroplated objects in everyday life.

Electroplating: _____

Examples of electroplated objects:

a. _____

b. _____

c. _____

2. Discuss the challenges of conducting electroplating experiments in traditional laboratories. Why might virtual laboratories offer advantages in this context?

Part 2: Virtual Laboratory Exploration

1. Access the electroplating simulation website (<https://simulation.qitepinscience.org/>) on your computer or tablet.

2. Navigate to the virtual laboratory and familiarize yourself with the simulation interface then fill in the blank and the table below.

- Control variable: ...

- Dependent variable: ...

- Independent variable: ...



Button	Function
Choice element A	...
Choice element B	...
Plus (+)	...
Minus (-)	...
+1 min	...
-1 min	...
+10 sec	...
-10 sec	...

3. Explore the different features, including selecting electrode materials, adjusting current and time, and observing mass change in electrode material.

4. Take note of how to collect data and record observations within the simulation.

5. In small groups, conduct a series of electroplating experiments within the virtual laboratory.

- Experiment 1: Vary the Positive and Negative Terminal Metal and observe its effect on the plating process.

- Experiment 2: Adjust the time of electroplating and determine its impact on metal mass.

- Experiment 3: Explore the influence of electric current (ampere) on metal mass during electroplating.

Part 3: Data Collection and Analysis

Record your observations and data for each experiment in the space provided below.

Experiment 1: Positive and Negative Terminal Metal

- constant time: 10 min

- constant current: 2 amperes

- initial mass of metal in positive and negative terminal: 10 grams

Observations:

Positive Metal	Negative Metal	Time	Current	Final mass (+)	Final mass (-)
		10 min	2A		
		10 min	2A		
		10 min	2A		
		10 min	2A		
		10 min	2A		

Experiment 2: Time

- constant positive and negative metal (choose by yourself)

- constant current: 2 amperes

- initial mass of metal in positive and negative terminal: 10 grams

Observations:

Positive Metal	Negative Metal	Time	Current	Final mass (+)	Final mass (-)
		10 min	2A		
		11 min	2A		
		12 min	2A		
		13 min	2A		
		14 min	2A		

Experiment 3: Electric Current (Ampere)

- constant positive and negative metal (choose by yourself)
- constant time: 10 min
- initial mass of metal in positive and negative terminal: 10 grams

Observations:

Positive Metal	Negative Metal	Time	Current	Final mass (+)	Final mass (-)
		10 min	0.5A		
		10 min	1A		
		10 min	1.5A		
		10 min	2A		
		10 min	2.5A		

Analyse your data and identify any trends or patterns observed during the experiments. What factors appear to have the greatest influence on the electroplating process?

.....

.....

.....

.....

Conclusion:

Reflect on your experience with the electroplating simulation and its implications for understanding electrochemistry.

- How did the virtual laboratory enhance your understanding of electroplating processes?
- What real-world applications of electroplating did you discover through the simulation?
- How might this knowledge be useful in future scientific endeavours or careers?

Homework (Optional):

Research a specific application of electroplating in industry or technology. Prepare a brief presentation summarizing your findings and discussing the electrochemical principles involved.

Wrapped in Four Days: From a Glimpse of 2023 Through the Evaluation Programme to Bonding Session in Capacity Building!

On 11 December 2023, the entire SEAQIS team attended the annual evaluation meeting. On this year's occasion, the evaluation meeting was held in the hall room of The Allure Villas, Pangandaran, West Java. All SEAQIS staff attended the meeting, including all members of the Programme and Training Division, Research and Development Division, ICT, Data, and Evaluation Division, Finance and Infrastructure Division, Partnership and Publication Division, Human Resources and General Affairs Division, and the Board of Directors, including SEAQIS Director, Dr Indrawati.

The evaluation meeting covered all the work done by the staff in 2023. Each division presented their work results for a year. Furthermore, the Board of Directors also gave feedback on what had been presented by each division. Thereafter, the evaluation meeting also provided information regarding the work plan that will be implemented in 2024. In an effort to improve work performance, especially in aspects of communication, the SEAQIS team also participated in capacity-building activities.





Pangandaran Beach, West Java, was also the place where all SEAQIS staff participated in capacity-building activities. Besides the staff, all interns were also involved in an outbound activity on 12 December 2023. During this opportunity, all of them established familiarity as they were grouped into several teams for each game. On the next day, 13 December 2023, all staff and interns went to Citumang River to do body rafting. Afterwards, they were also engaged in SEAQIS' annual event, the SEA EAA (SEAQIS Employee Achievement Awards), to appreciate all staff for their hard work over the past year. However, there was something different this year because all interns actively participated in organising the event as well as becoming nominees and winners; one of them was "Best Intern". Moreover, there was a special farewell for Dr Indrawati because it was her last period as the SEAQIS Director position.



Through this series of activities, it is expected that all participants can improve their understanding, skills, and effectiveness at work. In addition, it is hoped that there will be improvements in the work process as well as an increase in the quality of the results achieved. Evaluation and capacity building are also expected to encourage innovation, develop potential, and increase competitiveness, thereby contributing positively to the achievement of goals for the 2024 work plan. Moreover, there was a special farewell for Dr Indrawati because it was her last period as the SEAQIS Director position.



Farewell Statement from Dr. Indrawati

Over the past six years, SEAQIS has been an invaluable catalyst for my personal and professional growth. From being a widyaiswara to becoming the first female director at SEAQIS, I have experienced significant development alongside remarkable works with fully dedicated teams who consistently improved themselves while remaining strong as they faced various challenges.

Serving as the Director of SEAQIS from 2018 to 2023 has been a profound honour. This position has enabled me to make substantial contributions by launching several innovative programmes in the fields of education and science. I positioned myself as a mother for all SEAQIS members, while maintaining objectivity in evaluating the team members' skills to assist them in unlocking their full potential. Despite facing numerous challenges, our efforts over the past six years have been fruitful, with SEAQIS gaining recognition as a leading institution in STEM development and being able to publish a scientific magazine series and a science journal which is indexed nationally and internationally.

SEAQIS will forever hold a special place in my heart as a comforting home. Looking forward, I hope SEAQIS will continue to improve and contribute many groundbreaking innovations in education and science, particularly through strategic collaborations with digital technology.

As for my closing statement, I only have one message for SEAQIS: Stay humble, as pride can blind us from our shortcomings.

Thank you, SEAQIS!

Dr. Indrawati

Director of SEAQIS 2018-2023



INTERNING FOR LEARNING : SOARING HIGHER AND DIVE DEEPER

Introduction

Standing as a beacon for science learning development in Southeast Asia, SEAQIS opened an opportunity for university students through an internship programme by welcoming three Chinese interns from different universities in China, one independent intern, and 29 participants from different institutions in Indonesia underneath the Kampus Merdeka scheme for Magang dan Studi Independen Bersertifikat (MSIB).

During the programme, interns are assigned based on their specialty: they are categorised into three major departments and subdivided according to the seven internship positions offered. This distribution covers: (1) SEAQIS App and Learning Management System Development (Front-end developer, Back-end developer, UI/UX designer); (2) Knowledge Management Resources Development Project (Editorial Assistant, Graphic Designer, Video Editor); and (3) Science Learning Media Development for Research and Teachers Capacity Building (Science Learning Media Developer).

During their internship programme from 20 November 2023 to 20 February 2024, the three Chinese interns spent three months crafting a learning simulation about plate tectonics. Coming from different universities in China, these students worked together to accomplish the success of this project. Alina (Zhang Han) majoring in Applied Physics from Shanghai University, provides knowledge support as the grounding theory for the assigned project. Meanwhile, Carol (Mao Yirong) majoring in Animation from Shanghai Normal University, created 2D pictures to help visualise the plate tectonics. To execute and support the project plan, Haney (Zihan Tang) majoring in Software Engineering from Donghua University is assigned to programme the project simulation.

Success in Quests

“From our Chinese Interns and one Independent Intern”

Meet Alina, Carol, and Haney!

ALINA



Full name: Zhang Han
Major: Applied Physics
University: Shanghai University
Role Internship: provide knowledge support

HANEY



Full name: Zihan Tang
Major: Software engineering
University: Donghua University
Role Internship: programmer

CAROL



Full name: Mao Yirong
Major: Animation
University: Shanghai Normal University
Role Internship: Draw 2D pictures

HUMAN RESOURCE

As an independent intern from February to June 2024, Huri has her own experience during her time at SEAQIS. She voiced that the internship enriched her skills and experiences while expanding her knowledge, thanking her mentors for the guidance as she expressed her heartfelt gratitude for the opportunity she has received. "There's nothing else I'd say besides thank you, hoping for the best for everyone's success."



GRAPHIC DESIGN

Being interns at SEAQIS has been an immensely pleasurable journey, offering us an introduction to the realm of education development and beyond. As graphic designers, we have not only strengthened our skills in crafting visually appealing designs but also delved into the creation of interactive designs. Through this experience, we've gained insights into infusing empathy into our designs, adopting a holistic approach to design thinking, and fostering collaboration with our fellow graphic design interns and colleagues across various divisions.



VIDEO EDITOR

Our time at SEAQIS during our internship has been truly remarkable. It has afforded us the chance to forge new friendships and deepen our understanding of our shared passions such as filmmaking and video production. One thing that particularly exhilarating is the diverse array of backgrounds, majors, and universities represented among us

From across Indonesia, enabling rich discussions on producing high-quality content and videos. Additionally, the support and guidance provided by mentors and the amiable SEAQIS team have made us feel welcomed as though we have been members of the SEAQIS for some time.

TAMU

Maria

MUNIK

GLORY

BACK - END

Interning at SEAQIS? Absolutely top-notch. We gained experience and professional training to hone our skills as an IT team through a big project, namely developing the SEAQIS App which was very exciting and challenging because we had to work together between the front-end, back-end, and UI/UX Designer groups. All these provisions will definitely help our careers in the future. Much much love for SEAQIS!



FRONT - END

Interning at SEAQIS? Absolutely top-notch. We gained experience and professional training to hone our skills as an IT team through a big project, namely developing the SEAQIS App which was very exciting and challenging because we had to work together between the front-end, back-end, and UI/UX Designer groups. All these provisions will definitely help our careers in the future. Much much love for SEAQIS!



UI - UX

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EDITORIAL ASSISTANT

From the beginning, we have always loved the ambiance of SEAQIS. Within the first week, we have explored hidden gems like hanging out on the rooftop, sitting in the garden pavilion, and playing chess. People here never run out of topics to discuss. It is always something, from science, lifestyle, politics, to MBTI discussions. Hopefully, this experience will always be remembered by all SEAQIS Rangers. Don't forget us!"



SCIENCE LEARNING MEDIA DEVELOPER

Embarking on an internship journey at SEAQIS promises to be an indelible chapter in our lives. Our Science Learning Media Developer team comprises students from diverse backgrounds, fostering knowledge exchange. From crafting electronic learning media to adapting materials for elementary students, we gained valuable experience and formed lasting bonds in less than a month. Thank you, SEAQIS, for the invaluable experience!





MSIB BATCH 6

Human Resource

Huri Rifki Ardina

Graphic Design

Nabila Shirin Thowusi

Vinka Alza Safana

Citra Waldaniati

Video Editor

Nunik Nurriah

Tami Sedlakova

Dimas Juni Ardiansyah

Natasya Rosye Claudi Pandean

Back - End

Silvy Agnia Putri Arnisa

Raden Fadhil Anugerah Ardiwilaga

Ahmad Alfarel

UI - UX

Asifa Lestari

Eka Dian Wananda

Front - End

Muhammad Sofyan Daud Pujas

Kadek Ninda Nandita Putri

Muhammad Atsal Rizandri

Syifa Amelia

Editorial Assistant

Adhiva Raia Nahrisa

Priscilia Tsany Darajat

Putu Tatyana Prami Dewanty

Rasya Salsabila Nasution

Novianti

Science Learning Media Developer

Anita Putri Ningrum

Rahma Isnaini Fadila

Fahmi Muhammad Fauzi

Alma Salum Salsabilla

Hilda Oktapiani

Nida Sayyidah Munawar

Alifia Bintang Syifa

Ghia Syifa Maharani



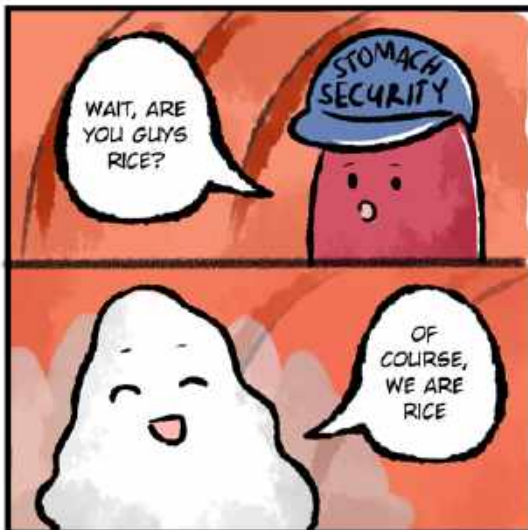
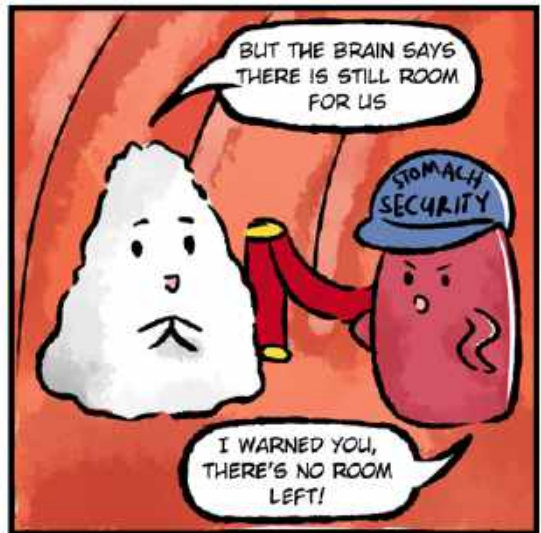


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#DareToInnovate

RICE COLONY



EVEN THOUGH THERE ARE LOTS OF CARBOHYDRATES IN IT, IT'S NOT CONSIDERED EATING IF YOU HAVEN'T EATEN RICE. RICE EVERYWHERE

ARTWORK BY MAYMIYURIAE
STORY BY MAYMIYURIAE

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